

# The 2012 Ageing Report:

Underlying Assumptions and Projection Methodologies

EUROPEAN ECONOMY 4 | 2011



The European Economy series contains important reports and communications from the Commission to the Council and the Parliament on the economic situation and developments, such as the *Economic forecasts*, the annual *EU economy review* and the *Public finances in EMU* report.

Subscription terms are shown on the back cover and details on how to obtain the list of sales agents are shown on the inside back cover.

Unless otherwise indicated, the texts are published under the responsibility of the Directorate-General for Economic and Financial Affairs of the European Commission, BU1, B-1049 Brussels, to which enquiries other than those related to sales and subscriptions should be addressed.

#### LEGAL NOTICE

Neither the European Commission nor any person acting on its behalf may be held responsible for the use which may be made of the information contained in this publication, or for any errors which, despite careful preparation and checking, may appear.

More information on the European Union is available on the Internet (<http://europa.eu>).

Cataloguing data can be found at the end of this publication.

Luxembourg: Office for Official Publications of the European Union, 2011

ISBN 978-92-79-19298-2

doi: 10.2765/15373

© European Union, 2011

Reproduction is authorised provided the source is acknowledged.

*Printed in Luxembourg*

EUROPEAN COMMISSION

DIRECTORATE-GENERAL FOR ECONOMIC AND FINANCIAL AFFAIRS

ECONOMIC POLICY COMMITTEE

# The 2012 Ageing Report: Underlying Assumptions and Projection Methodologies

Joint Report prepared by the European  
Commission's Directorate-General for  
Economic and Financial Affairs and the  
Economic Policy Committee





## ACKNOWLEDGEMENTS

This report has been prepared as part of the mandate the Economic and Financial Affairs (ECOFIN) Council gave to the Economic Policy Committee (EPC) in 2009 to update and further deepen its common exercise of age-related expenditure projections by 2012, on the basis of a new population projection by Eurostat.

The forthcoming projections, now reaching the fourth edition, of the budgetary impact of the ageing population in the 27 EU Member States over the period 2010–60 will be calculated on the basis of the macroeconomic assumptions and the methodology described in this report and will be presented to the ECOFIN Council in May 2012.

In accordance with its normal practice, the EPC mandated a working group, the Ageing Working Group (AWG) under the chairmanship of Jens Granlund, to take forward the work needed to discharge this remit.

This report is presented by the EPC and the European Commission's Directorate-General for Economic and Financial Affairs after full discussion on the basis of the AWG's comprehensive work. The Directorate-General for Economic and Financial Affairs provided the necessary analysis and calculations used in the report. The demographic projections (EUROPOP2010) were carried out by Eurostat. Valuable contributions were also made by staff of the OECD, the IMF and the European Central Bank.

The report was prepared under the supervision of Lucio Pench (Director for Fiscal Policy, Directorate-General for Economic and Financial Affairs), Lorenzo Codogno (Chair, EPC), Jens Granlund (Chairman, AWG), Giuseppe Carone (Head of Unit, Directorate-General for Economic and Financial Affairs). The main contributors were Per Eckefeldt, Joao Medeiros, Etienne Sail, Veli Laine, Luigi Giamboni, Ana Xavier, Barbara Lipszyc, Katia Berti and the members of the AWG (a list of Members is on p. 4). The EPC and the Directorate-General for Economic and Financial Affairs would like to thank all those concerned.

Comments on the report would be gratefully received at the following addresses.

### **DG ECFIN — Unit C2**

Directorate-General for Economic and Financial Affairs  
European Commission  
Giuseppe Carone  
Rue de la Loi 200  
1049 Brussels  
BELGIUM  
E-mail: [Giuseppe.carone@ec.europa.eu](mailto:Giuseppe.carone@ec.europa.eu)

### **Secretariat of the Economic Policy Committee**

European Commission  
Alvaro Lopez Barcelo  
Rue de la Loi 200  
1049 Brussels  
BELGIUM  
E-mail: [EPC-Secretariat@ec.europa.eu](mailto:EPC-Secretariat@ec.europa.eu)

## MEMBERS OF THE AGEING WORKING GROUP

### **CHAIRMAN**

Mr Jens **GRANLUND**

Director, International Department,  
Ministry of Finance of Sweden

### **BELGIUM**

Mr Michel **ENGLERT**

Bureau fédéral du Plan — Federaal Planbureau

Ms Micheline **LAMBRECHT**

Bureau fédéral du Plan — Federaal Planbureau

### **BULGARIA**

Ms Anna-Marie **VILAMOVSKA**

Ministry of Finance

Ms Penka **TANEVA**

National Social Security Institute

Ms Tsvetelina **DIMITROVA**

Ministry of Finance

### **CZECH REPUBLIC**

Mr Zbynek **STORK**

Ministry of Finance

Mr Jindrich **MARVAL**

Ministry of Finance

### **DENMARK**

Mr Jakob Egholt **SØGAARD**

Ministry of Finance

Ms Kirstine **FLARUP TOFTHØJ**

Ministry of Finance

### **GERMANY**

Ms Britta **VELLEUER**

Bundesministerium der Finanzen

Mr Konrad **HAKER**

Bundesministerium für Arbeit und Soziales

### **ESTONIA**

Mr Tanel **STEINBERG**

Ministry of Finance

### **IRELAND**

Mr Niall **FEERICK**

Department of Finance

### **GREECE**

Mr Athanasios C. **THANOPOULOS**

Ministry of Finance

Ms Marianna **PAPAMICHAIL**

National Actuarial Authority

Mr Georgios **SYMEONIDIS**

National Actuarial Authority

### **SPAIN**

Ms Virginia **ALONSO**

Ministerio de Economía y Hacienda

Mr Juan **VARELA**

Ministerio de Economía y Hacienda

### **FRANCE**

Ms Marie **MAGNIEN**

Ministère de l'économie, des finances et de l'industrie

Mr Thomas **LELLOUCH**

Ministère de l'économie, des finances et de l'industrie

### **ITALY**

Mr Rocco **APRILE**

Ministero dell'Economia e delle Finanze

Mr Marco **CACCIOTTI**

Ministero dell'Economia e delle Finanze

### **CYPRUS**

Mr Costas **STAVRAKIS**

Ministry of Labour and Social Insurance

Ms Maria **MATSI**

Ministry of Finance

### **LATVIA**

Ms Kristīne **JAKOVLEVA**

Ministry of Finance

Ms Sandra **STABINA**

Ministry of Welfare

**LITHUANIA**

Ms Rasa **SLIOGERIENE**  
Ms Vidija **PASTUKIENE**

Ministry of Finance  
Ministry of Social Security and Labour

**LUXEMBOURG**

Mr François **PELTIER**  
Mr Tom **DOMINIQUE**

STATEC  
Inspection Générale de la Sécurité Sociale

**HUNGARY**

Ms Edit **LENDVAI**  
Mr Marton **SZILI**

Ministry for National Economy  
Ministry for National Economy

**MALTA**

Mr Godwin **MIFSUD**  
Ms Pauline **MERCIECA**

Ministry of Finance, the Economy and Investment  
Ministry of Finance, the Economy and Investment

**NETHERLANDS**

Mr Harry **TER RELE**  
Mr Emiel **AFMAN**

Centraal Planbureau  
Ministry of Finance

**AUSTRIA**

Mr Peter **PART**  
Mr Stefan **SCHIMAN**

Bundesministerium für Finanzen  
Bundesministerium für Finanzen

**POLAND**

Ms Joanna **STACHURA**  
Mr Pawel **STRZELECKI**

Ministry of Finance  
National Bank of Poland

**PORTUGAL**

Ms Vanda **GERALDES DA CUNHA**  
Ms Ariana **PAULO**

Ministry of Finance  
Ministry of Finance

**ROMANIA**

Mrs Iuliana **DASCALU**  
Ms Lucian **NOVAK**

Ministry of Public Finance  
National Commission for Prognosis

**SLOVENIA**

Mr Slaven **MIČKOVIĆ**  
Mrs Saša **JAZBEC**  
Ms Eva **ZVER**

Ministry of Finance  
Ministry of Finance  
Institute of Macroeconomic Analysis and  
Development

**SLOVAKIA**

Ms Patricia **BOJKOVA**  
Mr Marek **PORUBSKY**

Ministry of Labour, Social Affairs and Family  
Ministry of Finance

**FINLAND**

Mr Jussi **HUOPANIEMI**  
Ms Marja **TUOVINEN**

Ministry of Finance  
Ministry of Finance

**SWEDEN**

Mr Lars **ELFVIN**  
Mr Olle **SUNDBERG**

Ministry of Finance  
Ministry of Finance

**UNITED KINGDOM**

Ms Joseph **ROBINS**  
Mr Martin **BECK**

Office for Budget Responsibility  
HM Treasury

***OBSERVERS***

Mr Yngvar <b>DYVI</b>	Ministry of Finance, Norway
Mr Per-Mathis <b>KONGSRUD</b>	Ministry of Finance, Norway
Mr Eythor <b>BENEDIKTSSON</b>	Icelandic Mission to the European Union

***OECD***

Ms Isabelle <b>JOUMARD</b>	Economics Department
----------------------------	----------------------

***EUROPEAN CENTRAL BANK***

Mr Michal **SLAVIK**

***EUROSTAT***

Ms Bettina **KNAUTH**  
Mr Giampaolo **LANZIERI**

***WORLD BANK***

Mr Hermann von **GERSDORFF**

***INTERNATIONAL MONETARY FUND***

Mr Emmanuel <b>VAN DER MENSBRUGGHE</b>	Paris
Mr Scott <b>ROGER</b>	Paris

***EPC SECRETARIAT***

Mr Alvaro **LOPEZ BARCELO**  
Mr Fuat **VARDAR**  
Mr Balazs **HORVATH**

***EUROPEAN COMMISSION***

Mr Giuseppe **CARONE**  
Mr Per **ECKEFELDT**  
Mr Lucio **PENCH**

# CONTENTS

EXECUTIVE SUMMARY	15
PART I — UNDERLYING ASSUMPTIONS AND PROJECTION METHODOLOGIES	33
1. POPULATION	34
1.1. BACKGROUND AND GENERAL APPROACH	34
1.2. PROJECTION OF FERTILITY RATES	34
1.2.1. Past trends	34
1.2.2. The EUROPOP2010 projection	35
1.3. PROJECTION OF LIFE EXPECTANCY	37
1.3.1. Past trends	37
1.3.2. The EUROPOP2010 projection	39
1.4. PROJECTION OF NET MIGRATION FLOWS	39
1.4.1. Past trends and driving forces	39
1.4.2. The EUROPOP 2010 projection	44
1.5. OVERALL RESULTS OF THE EUROPOP2010 POPULATION PROJECTION	45
1.6. POPULATION AGEING IN THE EU IN A GLOBAL CONTEXT	54
1.7. COMPARISON WITH THE EUROPOP2008 DEMOGRAPHIC PROJECTION USED IN THE 2009 AGEING REPORT	57
2. LABOUR FORCE PROJECTIONS	67
2.1. INTRODUCTION	67
2.2. PAST TRENDS AND MAIN DRIVERS OF LABOUR MARKET DEVELOPMENTS	67
2.3. MAIN FEATURES OF THE COHORT SIMULATION MODEL (CSM) AND MAIN ASSUMPTIONS OF THE 2012 EXERCISE	73
2.3.1. The two main steps to project the labour force/supply	73
2.3.2. Data sources and an additional assumption on labour input	74
2.4. LEGISLATED PENSION REFORMS IN EU MEMBER STATES	74
2.5. THE IMPACT OF PENSION REFORMS ON THE PARTICIPATION RATE OF OLDER WORKERS	84
2.5.1. Estimates of the impact of pension reforms	84
2.6. MAIN RESULTS OF THE PROJECTION OF LABOUR MARKET PARTICIPATION RATES	88
2.6.1. Projection of participation rates	88
2.6.2. Projection of labour supply	94
2.6.3. Breaking down changes in participation rates and labour force	98
2.7. ASSUMPTIONS ON STRUCTURAL UNEMPLOYMENT	101
2.8. EMPLOYMENT PROJECTIONS	102
2.9. RESULTING ECONOMIC DEPENDENCY RATIOS	109
2.10. PROJECTION OF TOTAL HOURS WORKED	111
2.11. COMPARING THE 2012 AND 2009 LABOUR MARKET PROJECTIONS	113
ANNEX 2.1. PROJECTING LABOUR FORCE DEVELOPMENTS USING THE COHORT SIMULATION MODEL (CSM)	120
ANNEX 2.2. ESTIMATION OF THE AVERAGE EXIT AGE FROM THE LABOUR MARKET	122

3. LABOUR PRODUCTIVITY AND POTENTIAL GDP	123
3.1. BACKGROUND AND GENERAL APPROACH	123
3.1.1. A production function approach for the long-term projection exercise	123
3.2. METHODOLOGY USED TO PROJECT POTENTIAL OUTPUT	124
3.2.1. Description of the production function framework	124
3.3. SPECIFIC ASSUMPTIONS ON THE COMPONENTS OF THE PRODUCTION FUNCTION IN THE SHORT TERM (2011–15)	125
3.4. SPECIFIC ASSUMPTIONS ON THE COMPONENTS OF THE PRODUCTION FUNCTION IN THE LONGER TERM (2016–60)	125
3.5. THE KEY ASSUMPTION ON TOTAL FACTOR PRODUCTIVITY DEVELOPMENTS	126
3.6. CAPITAL FORMATION	127
3.7. TAKING ACCOUNT OF THE CYCLICAL POSITION OF THE ECONOMY IN LONG-TERM PROJECTIONS	128
3.8. MAIN RESULTS OF BASELINE GDP PROJECTIONS	128
3.9. CROSS-COUNTRY DIFFERENCES	134
3.10. SOURCES OF GROWTH	134
3.11. COMPARISON WITH THE PREVIOUS 2009 LONG-TERM BUDGETARY PROJECTION EXERCISE	135
4. INTEREST RATES	137
4.1. BACKGROUND	137
4.2. ASSUMPTIONS ON INTEREST RATES TO BE USED IN THE 2012 PROJECTION OF AGE-RELATED EXPENDITURE	137
5. SENSITIVITY TESTS	138
5.1. BACKGROUND	138
5.2. MACROECONOMIC ASSUMPTIONS UNDER THE DIFFERENT SENSITIVITY SCENARIOS	138
PART II — AGE-RELATED EXPENDITURE ITEMS: COVERAGE, PROJECTION METHODOLOGIES AND DATA SOURCES	145
6. PENSIONS	146
6.1. MAIN FEATURES OF PENSION PROJECTIONS	146
6.2. COVERAGE OF PENSION PROJECTIONS	146
6.3. DEFINITIONS OF THE VARIABLES	148
6.3.1. Reporting norms and input data	148
6.3.2. Variables definitions and clarifications	148
6.3.3. Benefit ratio and replacement rate at retirement	152
6.3.4. Disaggregation into stock and flows of pension expenditure	152
6.3.5. Additional information on the number of pensioners, contributors and contributions to pension schemes and assets of pension funds	155
ANNEX 6.1. PENSION PROJECTION REPORTING SHEET	212
7. HEALTHCARE	217
7.1. INTRODUCTION	217
7.2. GENERAL METHODOLOGY FOR PROJECTING PUBLIC EXPENDITURE ON HEALTHCARE	217
7.3. MAIN DRIVERS OF HEALTHCARE EXPENDITURE AND PROJECTION SCENARIOS	218
7.3.1. Pure demographic scenario	220
7.3.2. High life expectancy	221
7.3.3. Estimating the impact of non-demographic drivers on healthcare expenditure	221

7.3.4. Constant health scenario: considering improvements in the health status of elderly citizens	223
7.3.5. Death-related costs scenario	225
7.3.6. Income elasticity scenario	228
7.3.7. EU-27 average cost convergence scenario	229
7.3.8. Labour intensity scenario	230
7.3.9. Sector-specific composite indexation scenario	231
7.4. DATA SOURCES	233
7.4.1. Data collection	233
7.4.2. Computing public expenditure on healthcare	233
8. LONG-TERM CARE	234
8.1. SHORT OVERVIEW OF THE PROJECTION METHODOLOGY	234
8.2. SCENARIOS CARRIED OUT IN THE PROJECTION EXERCISE	236
8.2.1. Pure demographic scenario	237
8.2.2. Base case scenario	238
8.2.3. High life expectancy scenario	238
8.2.4. Constant disability scenario	238
8.2.5. Scenario assessing the effect of a shift from informal to formal care	238
8.2.6. Coverage convergence scenario	239
8.2.7. Cost convergence to EU-27 average scenario	239
8.3. DATA SOURCES	239
8.3.1. Public expenditure on long-term care	240
8.3.2. Public spending on cash benefits	241
8.3.3. Home care and institutional care spending	242
8.3.4. Disability rates	243
ANNEX 8.1. LONG-TERM CARE MODEL STRUCTURE	244
ANNEX 8.2. SOURCES OF DATA TO COMPUTE HEALTHCARE AND LONG-TERM CARE ACCORDING TO DATA AVAILABILITY	245
ANNEX 8.3. MATHEMATICAL ILLUSTRATION OF THE LONG-TERM CARE SCENARIOS	246
9. EDUCATION	252
9.1. INTRODUCTION	252
9.2. METHODOLOGY USED TO PROJECT EXPENDITURE ON EDUCATION	252
9.2.1. Number of students	254
9.2.2. Direct expenditure per student	254
9.2.3. Transfers to households	256
9.3. DATA	256
9.4. SENSITIVITY ANALYSIS	257
ANNEX 9.1. ORGANISATIONAL STRUCTURE OF SECONDARY EDUCATION	259
10. UNEMPLOYMENT BENEFITS	260
10.1. APPLYING THE METHODOLOGY USED IN PREVIOUS ROUNDS	260
10.2. METHODOLOGY USED TO PROJECT EXPENDITURE ON UNEMPLOYMENT BENEFITS	260

STATISTICAL ANNEX	263
BELGIUM	264
BULGARIA	266
CZECH REPUBLIC	268
DENMARK	270
GERMANY	272
ESTONIA	274
IRELAND	276
GREECE	278
SPAIN	280
FRANCE	282
ITALY	284
CYPRUS	286
LATVIA	288
LITHUANIA	290
LUXEMBOURG	292
HUNGARY	294
MALTA	296
NETHERLANDS	298
AUSTRIA	300
POLAND	302
PORTUGAL	304
ROMANIA	306
SLOVENIA	308
SLOVAKIA	310
FINLAND	312
SWEDEN	314
UNITED KINGDOM	316
REFERENCES	318

## BOXES

BOX 1.1: DRIVERS OF MIGRATION TRENDS	43
BOX 2.1: PENSION REFORMS LEGISLATED IN THE MEMBER STATES AND REFLECTED IN THE LABOUR FORCE PROJECTIONS	75

## TABLES

TABLE 0.1:	2012 AND 2009 PROJECTIONS COMPARED, DEMOGRAPHIC ASSUMPTIONS	27
TABLE 0.2:	2012 AND 2009 PROJECTIONS COMPARED, POPULATION PROJECTIONS	28
TABLE 0.3:	2012 AND 2009 PROJECTIONS COMPARED, LABOUR FORCE PROJECTIONS	29
TABLE 0.4:	2012 AND 2009 PROJECTIONS COMPARED, ECONOMIC GROWTH PROJECTIONS	31
TABLE 1.1:	PAST TRENDS IN TOTAL FERTILITY RATES (TFR), 1950–2009	35
TABLE 1.2:	PROJECTION OF FERTILITY RATES IN EUROPOP2010	36



TABLE 1.3:	PAST TRENDS IN LIFE EXPECTANCY AT BIRTH, 1950–2009	38
TABLE 1.4:	PROJECTION OF LIFE EXPECTANCY AT BIRTH IN EUROPOP2010	40
TABLE 1.5:	PROJECTION OF LIFE EXPECTANCY AT 65 IN EUROPOP2010	41
TABLE 1.6:	PAST TRENDS IN NET MIGRATION FLOWS	44
TABLE 1.7:	PROJECTION OF NET MIGRATION FLOWS IN EUROPOP2010	45
TABLE 1.8:	PROJECTION OF THE TOTAL POPULATION (MILLION)	46
TABLE 1.9:	PROJECTION OF YOUNG POPULATION AGED 0–14 (MILLION)	48
TABLE 1.10:	PROJECTION OF THE WORKING-AGE POPULATION AGED 15–64 (MILLION)	49
TABLE 1.11:	PROJECTION OF PERSONS AGED 65 AND OVER (MILLION)	50
TABLE 1.12:	PROJECTION OF PERSONS AGED 80 AND OVER (MILLION)	51
TABLE 1.13:	DISAGGREGATION OF THE POPULATION BY AGE GROUPS	52
TABLE 1.14:	OLD-AGE DEPENDENCY RATIO (65+/(15–64))	53
TABLE 1.15:	DEMOGRAPHIC TOTAL AGE-DEPENDENCY RATIO (0–14 PLUS 65+/(15–64))	54
TABLE 1.16:	GEOGRAPHIC DISTRIBUTION OF WORLD POPULATION BASED ON THE UN 2008 REVISION	55
TABLE 1.17:	OLD-AGE DEPENDENCY RATIO BASED ON THE UN 2008 REVISION (65+/(15–64))	56
TABLE 1.18:	OLD-AGE DEPENDENCY RATIO BASED ON THE UN 2008 REVISION (80+/(15–64))	56
TABLE 1.19:	TOTAL POPULATION COMPARED (EUROPOP2010/EUROPOP2008) ('000)	59
TABLE 1.20:	WORKING-AGE (15–64) POPULATION COMPARED (EUROPOP2010/EUROPOP2008) ('000)	60
TABLE 1.21:	POPULATION AGED 0–14 COMPARED (EUROPOP2010/EUROPOP2008) ('000)	61
TABLE 1.22:	POPULATION AGED 65 AND OVER COMPARED (EUROPOP2010/EUROPOP2008) ('000)	62
TABLE 1.23:	OLD-AGE DEPENDENCY RATIO (65+/(15–64)) COMPARED (EUROPOP2010/EUROPOP2008)	63
TABLE 1.24:	FERTILITY RATES COMPARED (EUROPOP2010/EUROPOP2008)	64
TABLE 1.25:	LIFE EXPECTANCY AT BIRTH COMPARED (EUROPOP2010/EUROPOP2008)	65
TABLE 1.26:	NET MIGRATION FLOWS COMPARED (EUROPOP2010/EUROPOP2008) ('000)	66
TABLE 2.1:	HISTORICAL PARTICIPATION RATES: WORKERS AGED 15–64	68
TABLE 2.2:	HISTORICAL PARTICIPATION RATES: WORKERS AGED 20–64	69
TABLE 2.3:	HISTORICAL PARTICIPATION RATES: WORKERS AGED 20–24	70
TABLE 2.4:	HISTORICAL PARTICIPATION RATES: WORKERS AGED 25–54	71
TABLE 2.5:	HISTORICAL PARTICIPATION RATES: WORKERS AGED 55–64	72
TABLE 2.6:	HISTORICAL AVERAGE EXIT AGE FROM THE LABOUR FORCE	85
TABLE 2.7:	ESTIMATED IMPACT OF PENSION REFORMS ON PARTICIPATION RATES (2020, 2040, 2060), IN PERCENTAGE POINTS (COMPARISON OF PROJECTIONS WITH AND WITHOUT INCORPORATING PENSION REFORMS)	86
TABLE 2.8:	PROJECTED CHANGES IN PARTICIPATION RATES	90
TABLE 2.9:	PARTICIPATION RATES BY AGE GROUPS — TOTAL, 2010–60	92
TABLE 2.10:	PARTICIPATION RATES BY AGE GROUPS — MEN, 2010–60	93
TABLE 2.11:	PARTICIPATION RATES BY AGE GROUPS — WOMEN, 2010–60	94
TABLE 2.12:	LABOUR SUPPLY — AGE GROUP 20–64 ('000)	96
TABLE 2.13:	LABOUR SUPPLY PROJECTION IN THE 'LARGEST' EIGHT EU MEMBER STATES	97
TABLE 2.14:	CONTRIBUTION TO THE OVERALL CHANGE IN PARTICIPATION RATES, 2010–60 (% CHANGE)	99
TABLE 2.15:	CONTRIBUTION TO THE OVERALL CHANGE IN THE LABOUR FORCE, 2010–60 (% CHANGE)	100
TABLE 2.16:	UNEMPLOYMENT RATE ASSUMPTIONS (15–64, %)	102

TABLE 2.17:	EMPLOYMENT RATE PROJECTIONS	103
TABLE 2.18:	EMPLOYMENT PROJECTIONS (20–64)	104
TABLE 2.19:	EMPLOYMENT RATE PROJECTIONS BY AGE GROUP, TOTAL	105
TABLE 2.20:	EMPLOYMENT RATE PROJECTIONS BY AGE GROUP, MEN	106
TABLE 2.21:	EMPLOYMENT RATE PROJECTIONS BY AGE GROUP, WOMEN	107
TABLE 2.22:	SHARE OF OLDER WORKERS (55–64) AS A PERCENTAGE OF THE LABOUR FORCE (20–64)	108
TABLE 2.23:	EFFECTIVE ECONOMIC OLD-AGE DEPENDENCY RATIO	109
TABLE 2.24:	TOTAL ECONOMIC DEPENDENCY RATIO	110
TABLE 2.25:	PROJECTIONS FOR TOTAL WEEKLY HOURS WORKED ('000), AND BREAK DOWN BY FULL AND PART-TIME, 2010–60 (15–74)	112
TABLE 2.26:	LABOUR FORCE PROJECTIONS: 2012 ROUND V 2009 ROUND, 2010–60 ('000)	113
TABLE 2.27:	LABOUR FORCE PROJECTIONS: 2012 ROUND (2010–60)	114
TABLE 2.28:	LABOUR FORCE PROJECTIONS: 2012 ROUND V 2009 ROUND (2010–60)	115
TABLE 2.29:	BREAKDOWN OF REVISIONS IN EMPLOYMENT PROJECTIONS (2012 ROUND V 2009 ROUND), 2060	116
TABLE 2.30:	REVISION OF PARTICIPATION RATE PROJECTIONS, 2012 ROUND V 2009 ROUND, 2060	118
TABLE 3.1:	POTENTIAL GDP PER CAPITA (2010)	126
TABLE 3.2:	ASSUMPTIONS ON SPEED OF CONVERGENCE AND CRITERIA FOR SELECTION	127
TABLE 3.3:	PROJECTED POTENTIAL GROWTH RATES (ANNUAL AVERAGE GROWTH RATES)	129
TABLE 3.4:	DETERMINANTS OF POTENTIAL GROWTH: LABOUR PRODUCTIVITY PER HOUR (ANNUAL AVERAGE GROWTH RATES)	130
TABLE 3.5:	DETERMINANTS OF POTENTIAL GROWTH: TOTAL HOURS WORKED (ANNUAL AVERAGE GROWTH RATES)	131
TABLE 3.6:	DETERMINANTS OF LABOUR PRODUCTIVITY: TOTAL FACTOR PRODUCTIVITY (ANNUAL AVERAGE GROWTH RATES)	132
TABLE 3.7:	DETERMINANTS OF LABOUR PRODUCTIVITY: CAPITAL DEEPENING	132
TABLE 3.8:	PROJECTED GDP PER CAPITA GROWTH RATES (PERIOD AVERAGES)	133
TABLE 3.9:	DISAGGREGATION OF POTENTIAL GDP GROWTH, 2010–60	134
TABLE 3.10:	2012 AND 2009 PROJECTIONS COMPARED, 2010–60 (PERCENTAGE POINTS)	136
TABLE 4.1:	AVERAGE REAL LONG-TERM INTEREST RATES (1969–2009)	137
TABLE 5.1:	OVERVIEW OF SENSITIVITY TESTS: DIFFERENCE IN ASSUMPTIONS COMPARED TO THE BASELINE SCENARIO	138
TABLE 5.2:	SENSITIVITY TESTS: HIGHER EMPLOYMENT RATE OF OLDER WORKERS	139
TABLE 5.3:	SENSITIVITY TESTS: HIGHER EMPLOYMENT RATE	140
TABLE 5.4:	SENSITIVITY TESTS: HIGHER/LOWER PRODUCTIVITY GROWTH	141
TABLE 5.5:	SENSITIVITY TESTS: HIGHER LIFE EXPECTANCY	143
TABLE 5.6:	SENSITIVITY TESTS: LOWER MIGRATION	144
TABLE 6.1:	PENSIONS SCHEMES ACROSS MEMBER STATES	153
TABLE 6.2:	OVERVIEW OF THE PENSION SYSTEMS IN MEMBER STATES	157
TABLE 6.3:	COVERAGE AND SPECIFICATION OF PENSION SCHEMES	164
TABLE 6.4:	SUMMARY OF PENSION SCHEMES	172
TABLE 7.1:	OVERVIEW OF DIFFERENT SCENARIOS TO PROJECT PUBLIC EXPENDITURE ON HEALTHCARE	219
TABLE 8.1:	OVERVIEW OF THE DIFFERENT SCENARIOS TO PROJECT LONG-TERM CARE EXPENDITURE	237
TABLE 9.1:	EDUCATION EXPENDITURE-TO-GDP RATIOS (%)	253
TABLE 9.2:	ANNUAL EXPENDITURE ON PUBLIC EDUCATIONAL INSTITUTIONS PER PUPIL (EUR PPS) (A) IN 2007	255

## FIGURES

GRAPH 0.1: OVERVIEW OF THE 2012 PROJECTION OF AGE-RELATED EXPENDITURE	16
GRAPH 0.2: AGE STRUCTURE OF THE POPULATION IN 2010 AND 2060, EU-27 AND EA (PERSONS)	19
GRAPH 0.3: OLD-AGE DEPENDENCY RATIOS (65+/15–64), EU-27 AND EA	20
GRAPH 0.4: POTENTIAL AND FORECAST GROWTH, EU-27	24
GRAPH 0.5: POTENTIAL GDP GROWTH, 2012 AND 2009 REPORTS COMPARED	25
GRAPH 1.1: NET MIGRATION FLOWS, 1965–2009	42
GRAPH 1.2: AGE STRUCTURE OF THE POPULATION IN 2010 AND 2060, EU-27 AND EA (PERSONS)	47
GRAPH 1.3: POPULATION PROJECTIONS COMPARED	57
GRAPH 1.4: PROJECTED CUMULATIVE NET MIGRATION PER CAPITA 2010–60 ACCORDING TO EUROPOP2008 AND EUROPOP2010 SORTED BY VALUE OF EUROPOP2010	59
GRAPH 2.1: IMPACT OF PENSION REFORMS ON THE AVERAGE EFFECTIVE RETIREMENT AGE ( ) FROM THE LABOUR FORCE	85
GRAPH 2.2: AGE PROFILES OF PARTICIPATION AND EMPLOYMENT RATES BY GENDER IN 2010 AND 2060 (EU-27)	88
GRAPH 2.3: AGE PROFILES OF PARTICIPATION AND EMPLOYMENT RATES BY GENDER IN 2010 AND 2060 (EA-17)	89
GRAPH 2.4: KNOCK-ON EFFECTS OF THE 2008–09 ECONOMIC RECESSION ON MEN'S PRIME-AGE PARTICIPATION RATE	91
GRAPH 2.5: PERCENTAGE CHANGE IN TOTAL LABOUR SUPPLY OF THE POPULATION AGED 20–64 (2010–60)	95
GRAPH 2.6: PERCENTAGE CHANGE IN LABOUR SUPPLY BY GENDER OF THE POPULATION AGED 20–64 (2020–60)	95
GRAPH 2.7: POPULATION AND LABOUR SUPPLY 2020–60 (% CHANGE IN THE AGE GROUP 20–64)	98
GRAPH 2.8: REVISIONS OF POPULATION AND EMPLOYMENT PROJECTIONS, 2012 ROUND V 2009 ROUND, 2060 (% CHANGE)	117
GRAPH 2.9: REVISION OF PARTICIPATION RATES OF AGE GROUP 25–54 IN 2060 AGAINST THE REVISION OF PARTICIPATION RATES OF AGE GROUP 15–24 IN 2010 (2012 ROUND V 2009 ROUND)	119
GRAPH 2.10: REVISION OF PARTICIPATION RATES AGE PROFILES BY GENDER, 2012 ROUND V 2009 ROUND, 2060 (PERCENTAGE POINT CHANGE)	119
GRAPH 3.1: OVERVIEW OF THE PRODUCTION FUNCTION APPROACH	123
GRAPH 3.2: ACTUAL AND POTENTIAL GDP GROWTH (2010–20)	130
GRAPH 3.3: POTENTIAL GDP GROWTH COMPARED	135
GRAPH 7.1: SCHEMATIC PRESENTATION OF THE PROJECTION METHODOLOGY	218
GRAPH 7.2: PUBLIC EXPENDITURE ON HEALTHCARE AS % OF GDP IN THE EU-27 (BASELINE SCENARIO OF THE 2009 AR) AND TRENDS, 1990–2060	222
GRAPH 8.1: SCHEMATIC PRESENTATION OF THE PROJECTION METHODOLOGY/LTC BENEFITS IN KIND	235
GRAPH 9.1: IMPLICIT DISAGGREGATION OF EXPENDITURE PER STUDENT	256



## EXECUTIVE SUMMARY

### OVERVIEW OF THE 2012 PROJECTION OF AGE-RELATED EXPENDITURE

#### THE MANDATE AND BROAD PRINCIPLES

Safeguarding the sustainability of public finances is a key policy objective in the EU. In order to achieve this objective, reliable and comparable information on possible challenges to fiscal sustainability is required, including the expected strains caused by the demographic changes ahead. In 2009, the ECOFIN Council gave a mandate to the Economic Policy Committee (EPC) to update and further deepen its common exercise of age-related expenditure projections by 2012, now reaching the fourth edition, on the basis of a new population projection by Eurostat (EUROPOP2010), which was released in April 2011. In preparing the EUROPOP2010 population projection, Eurostat actively involved national statistical institutes via the 'Population Projection' Interest Group. However, Eurostat acted with full independence when preparing the population projections.

In light of this mandate, the EPC and Commission services (Directorate-General for Economic and Financial Affairs) agreed a work programme with broad arrangements to organise the budgetary projections and reach agreement on its assumptions and methodologies.

This report provides a description of the underlying macroeconomic assumptions and projection methodologies of the age-related expenditure projections for all Member States. On the basis of these underlying assumptions and methodologies, age-related expenditures covering pensions, healthcare, long-term care, education and unemployment benefits will be calculated and presented to the ECOFIN Council in spring 2012.

The work was carried out by the EPC Working Group on Ageing Populations (AWG), which gathers experts from the 27 Member States and Norway and the European Commission, represented by the Directorate-General for Economic and Financial Affairs. The European Central Bank, the OECD and the IMF have also participated in the meetings of the AWG. The

Directorate-General for Economic and Financial Affairs has played a central role by providing analysis and calculations. Eurostat has prepared demographic projections (EUROPOP2010). The EPC and its AWG coordinated the work with their counterparts in other Council formations, in particular the Social Protection Committee. In the preparation of the population projection, Eurostat actively consulted national statistical institutes in the Member States.

The EPC has reached agreement on underlying assumptions, projection methodologies and coverage by consensus on the basis of proposals prepared by the Directorate-General for Economic and Financial Affairs. The macroeconomic projections have been made by applying common assumptions and methodologies uniformly to all Member States.

Given the uncertainty surrounding the assumptions underpinning long-term budgetary projections, a number of sensitivity tests will be carried out in addition to the baseline scenario, so as to quantify the responsiveness of projection results to changes in key underlying assumptions.

Before being finalised, the pension projections will be peer-reviewed by the AWG. This will be done on the basis of country fiches provided by Member States describing the national pension model(s) used to make the projections, an analysis of the projection results and other relevant information on data sources and institutional factors which could be driving the pension projections.

#### COVERAGE AND GENERAL OVERVIEW

Graph 0.1 presents an overview of the entire age-related projection exercise. The starting point is the EUROPOP2010 population projection for the period 2010–60. The EPC agreed a common set of assumptions and methodologies in order to make projections on a set of exogenous macroeconomic variables, covering the labour force (participation, employment and unemployment rates), labour productivity and the real interest rate. These combined sets of projections enabled the calculation of GDP for all Member States up to 2060.

On the basis of these assumptions, separate budgetary projections are being run for five age-related expenditure items. The projections for pensions are run by the Member States using their own national model(s). In this way, the projections benefit from capturing the country-specific circumstances prevailing in the different Member States as a result of different pension legislation, while, at the same time, consistency is ensured by basing the projections on commonly agreed underlying assumptions. The projections for healthcare, long-term care, education and unemployment are run by the European Commission (Directorate-General for Economic and Financial Affairs), on the basis of a common projection model for each expenditure item. The results of this set of projections will be aggregated to provide an overall projection of age-related public expenditures.

This report is structured in two parts. Part I describes the underlying assumptions: the population projection, the labour force projection and the other macroeconomic assumptions as well as the sensitivity tests, and Part II presents the methodologies for projecting future expenditure on pensions, healthcare, long-term care, education and unemployment benefits. The Statistical Annex gives an overview of the main assumptions by country.

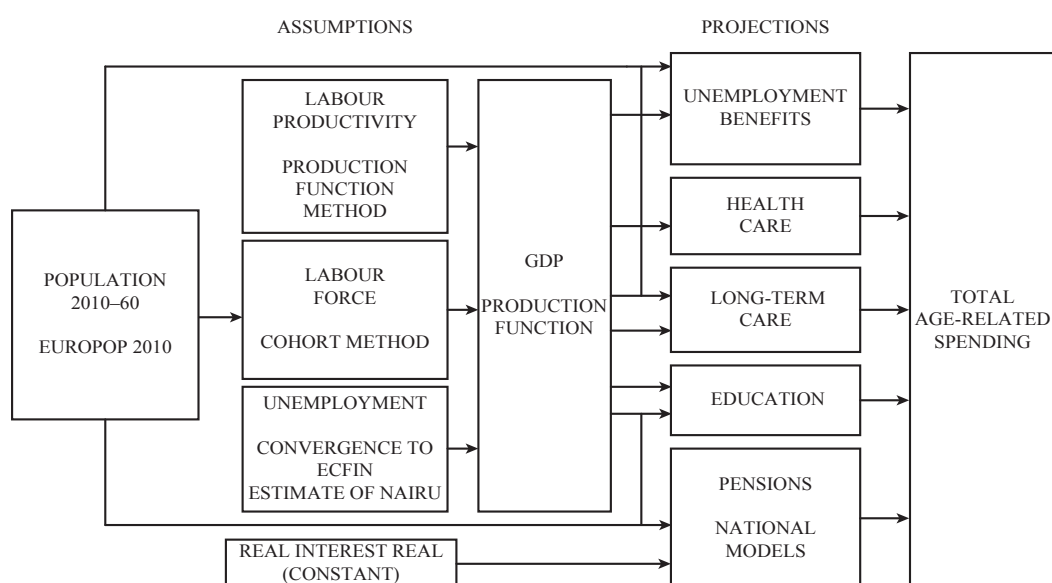
## MAIN RESULTS

Long-term demographic and economic projections are helpful in highlighting the immediate and future policy challenges for governments posed by demographic trends. They show where (in which countries), when, and to what extent ageing pressures will accelerate as the baby boom generation retires and average lifespan in the EU continues to increase. It should be recalled that the long-term projections are not forecasts, they are subject to increasing uncertainty over time, and the results are strongly influenced by the underlying assumptions. Moreover, in the current juncture, facing the largest financial crisis in many decades, there is also considerable additional uncertainty concerning medium-term economic developments, on top of the inherent uncertainty of longer-term developments.

## DEMOGRAPHIC PROJECTIONS

Assumptions regarding fertility rates, life expectancy and migration are the key drivers of changes in the size and age profile of the population.

**Graph 0.1:** Overview of the 2012 projection of age-related expenditure



Source: Commission services, EPC

### FERTILITY RATES RISE SLIGHTLY ...

The convergence scenario approach employed in the EUROPOP2010 projection entails a process of convergence in fertility rates across Member States to that of the countries currently exhibiting the highest rates, the forerunners (Belgium, Denmark, Ireland, France, Finland, Sweden and the United Kingdom), over the very long-term <sup>(1)</sup>. For the EU as a whole, the total fertility rate (TFR) is projected to rise from 1.59 in 2010 to 1.64 by 2030 and further to 1.71 by 2060. In the euro area, a slightly lower increase is projected, from 1.54 in 2010 to 1.65 in 2060.

The fertility rate is projected to increase over the projection period in nearly all Member States, with the exception of Ireland, France, Sweden and the United Kingdom where it decreases (though remaining above 1.9), and in Belgium, Denmark and Finland, it is projected to remain stable. Hence, in all countries, fertility rates are expected to remain below the natural replacement rate of 2.1 in the period up to 2060. As a result of the convergence assumption, the largest increases in fertility rates are projected to take place in Latvia, Hungary and Portugal, which have the lowest fertility rates in the EU in 2010. The increase is projected to occur gradually, with fertility rates in these countries approaching, but not reaching, the current EU average fertility rate in 2060.

### ... AND FURTHER LIFE EXPECTANCY GAINS ARE PROJECTED ...

In the EU, life expectancy at birth for males is projected to increase by 7.9 years over the projection period, from 76.7 in 2010 to 84.6 in 2060. Life expectancy at birth is projected to increase by 6.5 years for females, from 82.5 in 2008 to 89.1 in 2060, implying a slight convergence of life expectancy between males and females. The largest increases in life expectancy at birth, for both males and females, are projected to take place in the Member States with the lowest life expectancy in 2010. Life expectancy for males in 2010 is lowest in

Bulgaria, Estonia, Latvia, Lithuania, Hungary and Romania, ranging between 67 and 71 years. Some catching up takes place over the projection period, with increases in life expectancy of more than 11 years up to 2060 for these countries. For females, gains in life expectancy at birth of eight years or more are projected in Bulgaria, Latvia, Lithuania, Hungary, Romania and Slovakia: female life expectancy in 2010 in all of these countries is less than 80 years.

Given the assumed 'convergence hypothesis' <sup>(2)</sup>, the projection compresses the spread of life expectancy at birth for males across the Member States, from 11.7 years in 2008 (79.4 in Sweden and 67.7 in Lithuania) to 4.8 years in 2060 (85.5 in Sweden and Italy compared with 80.7 in Lithuania). For females, the reduction of the differential in life expectancy at birth is lower, from 7.2 years in 2008 (84.7 in Spain and 77.5 in Bulgaria and Romania) to 3.4 years in 2060 (90 in France and 86.6 in Bulgaria).

In the EU as a whole, life expectancy at age 65 is projected to increase by 5.2 years for males and by 4.9 years for females over the projection period. In 2060, life expectancy at age 65 will reach 22.4 years for males and 25.6 for females and the projected difference (3.2 years) is smaller than the 4.5 year difference in life expectancy at birth. In 2060, the highest life expectancy at age 65 is expected in France for both males (23 years) and females (26.6 years), while the lowest is expected in Bulgaria for both males (20.6 years) and females (23.6 years).

### ... TOGETHER WITH CONTINUED, BUT DECELERATING INWARD NET MIGRATION TO THE EU.

For the EU as a whole, annual net inflows are projected to increase from about 1 018 000 people in 2010 (equivalent to 0.2 % of the natural EU population) to 1 217 000 by 2020 and thereafter declining to 878 000 people by 2060.

<sup>(1)</sup> Member States are assumed to converge to a total fertility rate of 1.85 live births per woman. However, this is only a theoretical convergence level, which for most of the countries is not reached within the time horizon of the projections.

<sup>(2)</sup> Life expectancy increases are assumed to be greater for countries at lower levels of life expectancy and smaller for those at higher levels, thus following convergent trajectories. The countries converge towards a long-term theoretical age pattern of mortality following an exponential interpolation, thus mortality improvements take place at a decreasing pace. Those theoretical levels are not reached within the time horizon of the projections.



The cumulative net migration to the EU over the entire projection period is 55 million, of which the bulk is in the euro area (42 million). Net migration flows are projected to be concentrated to a few destination countries: Italy (15.4 million cumulative to 2060), Spain (10.9 million) and the United Kingdom (8.6 million). According to the assumptions, the change of Spain and Italy from countries of origin of migration in the past to destination countries will be confirmed in the coming decades. For countries that are currently experiencing a net outflow (BG, EE, LV, LT, MT and RO), this is projected to taper off or reverse in the coming decades <sup>(3)</sup>.

#### THE EU POPULATION IS PROJECTED TO INCREASE UP TO 2040 AND DECLINE THEREAFTER ...

Due to the expected dynamics of fertility, life expectancy and migration rates, the age structure of the EU population is projected to dramatically change in coming decades. The overall size of the population is projected to be slightly greater in 50 years' time, but much older than it is now. The EU population is projected to increase (from 501 million in 2010) up to 2040 by almost 5 %, when it will peak (at 526 million). Thereafter, a steady decline occurs and the population shrinks by nearly 2 % by 2060. Nonetheless, according to the projections, the population in 2060 will be slightly higher than in 2010, at 517 million.

While the EU population is projected to be greater in 2060 compared to 2010, there are wide differences in population trends until 2060 across Member States. Decreases

in the total population are projected for about half of the EU Member States (BG, CZ, DE, EE, EL, LV, LT, HU, MT, PL, PT, RO and SK). For the other Member States (BE, DK, IE, ES, FR, IT, CY, LU, NL, AT, SI, FI, SE and UK) an increase is projected. The strongest population growth is projected in Ireland (+ 46 %), Luxembourg (+ 45 %), Cyprus (+ 41 %), the United Kingdom (+ 27 %), Belgium (+ 24 %) and Sweden (+ 23 %), and the sharpest declines in Bulgaria (– 27 %), Latvia (– 26 %), Lithuania (– 20 %), Romania and Germany (both – 19 %).

In 2010, the Member States with the largest populations were: Germany (82 million), France (65 million), the United Kingdom (62 million), Italy (60 million) and Spain (46 million). In 2060, the United Kingdom would become the most populous EU country (79 million), followed by France (74 million), Germany (66 million), Italy (65 million) and Spain (52 million).

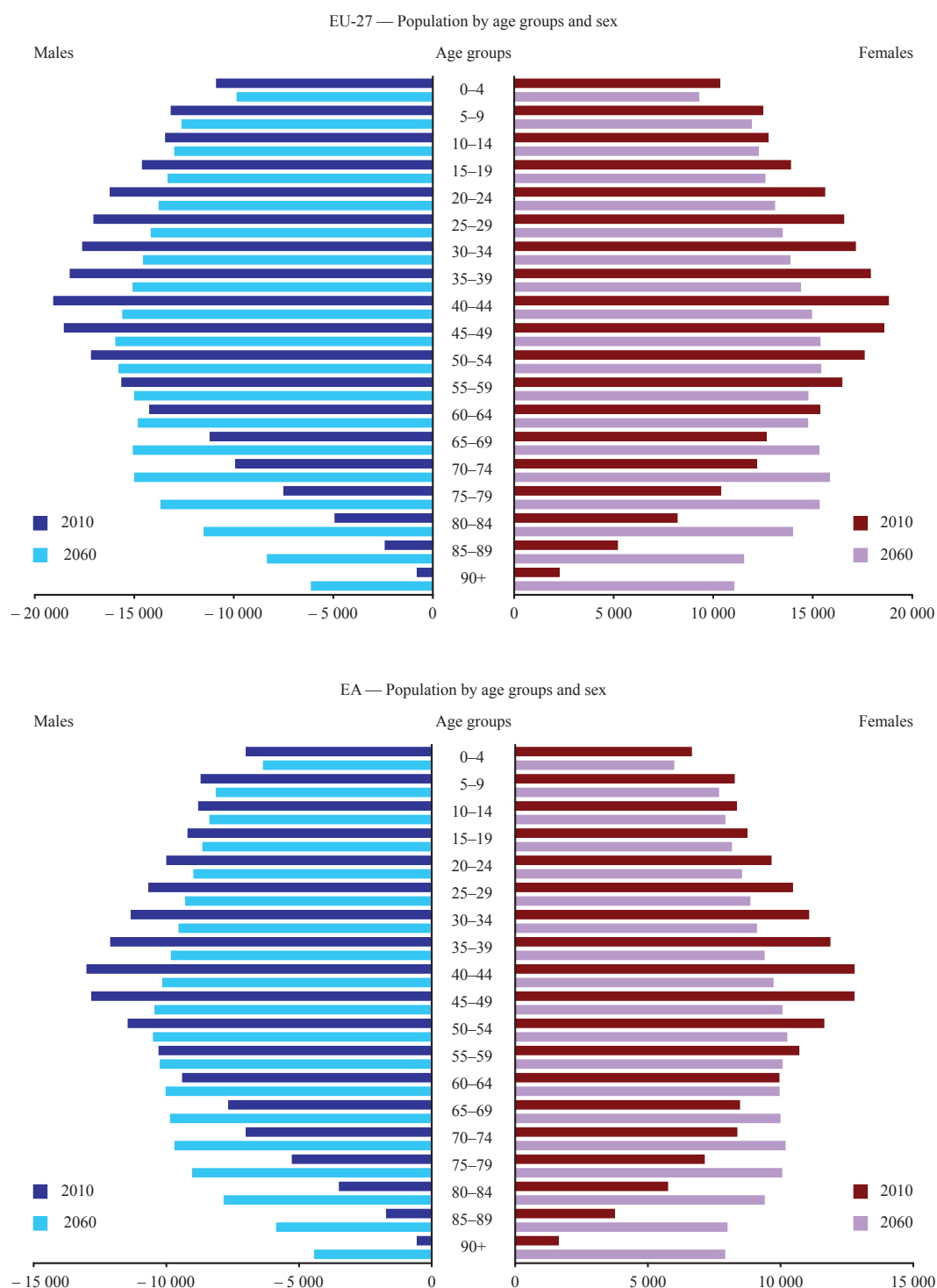
#### ... AND UNDERGO SIGNIFICANT CHANGES IN ITS AGE STRUCTURE

The age structure of the EU population is projected to change dramatically, as shown in the population pyramids presented in Graph 0.2. The most numerous cohorts in 2010 are aged around 40 for men and women. Elderly people are projected to account for an increasing share of the population. At the same time, the middle of the age pyramid becomes smaller during the projection period due to below natural replacement fertility rates. As a consequence, the shape of the population pyramids gradually change from pyramids to pillars. A similar development is projected for the euro area.

---

<sup>(3)</sup> Migration flows are assumed to subside in the very long term. The basic assumption on migration is that immigration and emigration flows tend to converge towards a common level, which is different country by country, and dependent on the latest observed values. Additional immigration flows are assumed to take place when the projected age structure of the countries' population reveals a shrinking in the number of persons of working age. The theoretical common point for the two flows is not assumed to be reached within the time horizon of the projections.



**Graph 0.2:** Age structure of the population in 2010 and 2060, EU-27 and EA (persons)

Source: Eurostat

The proportion of young people (aged 0–14) is projected to remain fairly constant until 2060 in the EU-27 and the euro area (around 15 %), while those aged 15–64 will become a substantially smaller share, declining from 67 % to 56 %.

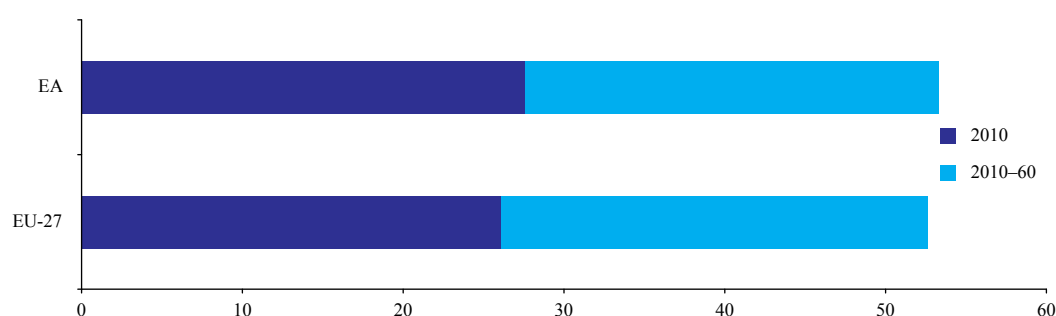
Those aged 65 and over will become a much larger share (rising from 18 % to 30 % of the population), and those aged 80 and over (rising from 5 % to 12 %) will almost become as numerous as the young population in 2060.

### THE PROJECTIONS POINT TO A SIGNIFICANT REDUCTION IN THE POPULATION AGED 15–64 ...

The population aged 15–64 will start to decline as of 2010 in the EU and, over the whole projection period, it will drop by 14 %. This is, however, not a uniform phenomenon across the EU; it is projected to increase in seven Member States (Belgium, Ireland, France, Cyprus, Luxembourg, Sweden and the United Kingdom).

and aged 65 and over divided by the total population aged 15–64) is projected to be even greater, rising from 49.3 in 2010 to 77.9 in 2060. The difference is noticeable among individual EU Member States. A relatively small increase in the total age-dependency ratio (less than 20 percentage points) is projected in Belgium, Denmark, Ireland and the United Kingdom, while in Latvia, Poland, Romania and Slovakia, an increase of 40 percentage points or more is projected by 2060.

Graph 0.3: Old-age dependency ratios (65+/15–64), EU-27 and EA



Source: Eurostat

### ... AND AN INCREASE IN PERSONS AGED 65 AND OVER ...

The population aged 65 and over will increase very markedly throughout the projection period. This group will almost double, rising from 87.5 million in 2010 to 152.6 million in 2060 in the EU. The number of older people (aged 80 and over) is projected to increase by even more, almost tripling from 23.7 million in 2010 to 62.4 million in 2060.

### ... LEADING TO A DOUBLING OF THE OLD-AGE DEPENDENCY RATIO IN THE EU.

As a result of these different trends among age groups, the demographic old-age dependency ratio (persons aged 65 and over relative to persons aged 15–64) is projected to increase from 26 % to 52.5 % in the EU as a whole over the projection period (Graph 0.3). This means that the EU would move from having four working-age people for every person aged over 65 years to just two working-age persons. The increase in the total age-dependency ratio (people aged 14 and under

## LABOUR FORCE PROJECTIONS

### OVERALL PARTICIPATION RATES ARE PROJECTED TO INCREASE ...

Using recent trends in labour market behaviour, the total participation rate <sup>(4)</sup> (for the age group 20–64) in the EU-27 is projected to increase by 3.1 percentage points (from 75.6 % in 2010 to 78.7 % in 2060).

<sup>(4)</sup> The Cohort Simulation Method (CSM) is used to project participation rates (Carone, 2005). The CSM makes the following four main assumptions: (i) the starting year for the projections is 2010; (ii) labour market participation rates are calculated by gender and single age, using average entry/exit rates in the labour market observed over the last 10 years (2001–10); (iii) a correction mechanism is applied for young generations (15–24), in order to avoid that any increase in enrolment rates (and the corresponding decline in participation rates) feeds into future declines of participation rates for prime-age workers; and (iv) the impact of pension reforms is modelled through their estimated impact on the labour market exit rates of older workers (aged 50–74). Specifically, exit rates of older workers (50–74) are adjusted relatively to average historical values (2001–10) in order to incorporate the expected future effects of legislated pension reforms.

For the euro area, a similar increase is projected (from 75.9 % in 2007 to 79.2 % in 2060). For the age group 15–64, the projected increases in participation rates are smaller, with 80 % of the total improvement occurring in the period up to 2020.

In the EU-27, the biggest increase in participation rates is projected for workers aged 55–64 (around 20 percentage points for women and 10 percentage points for men), leading to a substantial narrowing of the gender gap in terms of participation rates up to 2060.

#### ... BUT LABOUR SUPPLY WILL DECLINE BECAUSE OF THE PROJECTED POPULATION TRENDS.

Total labour supply in the EU-27 is projected to increase by 1.4 % from 2010 to 2020 (age group 20–64). In terms of persons, this represents an increase in labour force of roughly 3.3 million. In the euro area, the labour force is projected to increase by 2.0 % in the same period. The increase in labour supply over the period 2010 to 2020 is mainly due to the increase in women's labour supply, as men's labour force is projected to remain substantially unchanged.

The positive trend in labour supply up to 2020 is expected to be reversed during the period 2020 to 2060 when the total labour force is projected to contract by 11.8 %, equivalent to 27.7 million people (24.5 million compared with the 2010 level). In the euro area, the projected fall in labour supply between 2020 and 2060 is 11.5 %, which represents 17.9 million people (14.9 million compared with the 2010 level).

There is, however, a wide diversity across Member States, ranging from an increase in the labour force of 24.9 % in Ireland to a decrease of 38.5 % in Romania. The initially positive trend across most countries over the period 2010–20 is projected to be reversed after 2020, when a large majority of countries is expected to record a decline (21 Member States in total).

In the eight largest (in terms of labour force) EU Member States, representing about 78 % of the total EU labour force in 2020, their prospective evolution over the period 2020–60 is strikingly dissimilar, mostly due to differences in the projected dynamics in

the working-age population given by the demographic projection. As a result, projected differences in the annual growth rate of the total labour force are very significant, because they are 'compounded' over 40 years. Germany, Poland and Romania are projected to register average annual declines of close to 1 % or in excess during a period of 40 years, while Spain, Italy and the Netherlands are projected to register declines of 0.2–0.3 %, which are equivalent to the EU average. Conversely, France and the United Kingdom are expected to register small expansions in the total labour force. Consequently, country rankings (in terms of labour force sizes) are expected to change significantly during the period 2020–60.

#### ASSUMPTIONS ON UNEMPLOYMENT

As a general rule, actual unemployment rates are assumed to converge to structural unemployment rates (the NAWRU rates) by 2015 <sup>(5)</sup>, and thereafter gradually decline towards country-specific historical minima. For countries where the best historical rates are high, the structural unemployment rates are capped at 7.3 %, which corresponds to the EU-27 NAWRU average (based on the Directorate-General for Economic and Financial Affairs's spring 2011 Economic Forecasts) <sup>(6)</sup>. In the EU-27, the unemployment rate is assumed to decline by 3.2 percentage points (from 9.7 % in 2010 to 6.5 % in 2060). In the euro area, the unemployment rate is expected to fall from 10.1 % in 2010 to 6.7 % in 2060.

#### EMPLOYMENT PROJECTIONS

As a result of the population projection, the unemployment rate assumptions and the labour force projection, the total employment rate (for individuals aged 20–64) in the EU-27 is projected to increase from 68.6 % in 2010 to 71.3 % in 2020 and to 73.8 % in 2060. In the euro area, a similar development

<sup>(5)</sup> Convergence by 2015 corresponds to a general rule for closing the output gap. Convergence by 2017 represents a two-year extension for those countries with initial (2012) large output gaps (more than double the EU average, applied to Greece).

<sup>(6)</sup> For some Member States currently with high estimated structural unemployment rates, the assumed decline of the unemployment rate has a large positive effect on GDP growth over the projection period.

is projected, with the employment rate attaining 74.0 % in 2060.

The crisis has made the construction of cross-country comparable employment rate projections more difficult. The projected decrease in the unemployment rates is dramatic — and much stronger than in previous projection exercises — for Member States where unemployment has been severely affected by the crisis, whereas the projected decrease is limited — and in some cases even weaker than in the 2009 exercise <sup>(7)</sup> — for Member States where the unemployment rate was only marginally or even not negatively affected by the crisis (Table 0.3, last column).

As a result, the projected increase in employment rates tend to be very strong (weak) — and stronger (weaker) than in the 2009 exercise — for Member States where unemployment was the most (the less) affected by the crisis. In a few cases where labour markets performed well during the crisis, the projected increase in the employment rate is even weaker than in the 2009 exercise.

The employment rate of women is projected to rise from 62.1 % in 2010 to 65.9 % in 2020 and to 69.4 % in 2060. The employment rate for workers aged 55–64 is expected to increase by even more, from 46.3 % in 2010 to 56.1 % in 2020 and to 62.7 % in 2060, reflecting the expected impact of recent pension reforms in many Member States, aimed at increasing the retirement age. For the euro area, the increase in the employment rate of older workers (55–64) is higher than in the EU-27, rising by 18.1 percentage points compared with 16.4 percentage points in the EU-27.

In the EU-27, the number of persons employed (using the Labour Force Survey (LFS) definition) is projected to record an annual growth rate of only 0.3 % over the period 2010–20 (compared to 0.9 % over the period 2000–09), which is expected to reverse to a negative annual growth rate of a similar magnitude over the period 2020–60. The outcome of these opposite trends is that employment will peak at 228.3 million in 2026 and decrease to 208.7 million in 2060. This implies a decline of about 10.5 million

workers over the period 2010–60. The negative prospects for population developments, including the rapid ageing of the population, will only be partly offset by the increase in (older workers') participation rates and migration inflows, leading to a reduction in the number of people employed during the period 2020–60 (about 18.2 million).

#### PROJECTION OF LABOUR INPUT (TOTAL HOURS WORKED)

These trends in employment trends and compositional effects, namely the rising share of part-time work, will bring about a medium to long-term decline in average hours worked. Nevertheless, total hours worked are projected to increase by 3.3 % over the period 2010–20 in the EU-27. However, from 2020 onwards, the rising trend is projected to be reversed and total hours worked are expected to fall by 8.4 % between 2020 and 2060. Over the entire projection period (i.e. 2010–60), total hours worked are projected to fall by 5.3 % in the EU-27. For the euro area, the projected fall is less marked (– 3.8 % between 2010 and 2060). In terms of annual average growth rates, hours worked are projected to decline slightly over the period 2010–60 in the EU-27 and in the euro area.

There are major differences across Member States, reflecting different demographic outlooks. A reduction in total hours worked of 20 % or more between 2010 and 2060 is projected for some Member States (BG, DE, LV, LT, PL, RO and SK). In contrast, for some other Member States, an increase of 10 % or more is projected over the same period (namely BE, IE, ES, FR, CY, LU, SE and UK).

#### MACROECONOMIC ASSUMPTIONS: LABOUR PRODUCTIVITY AND POTENTIAL GROWTH RATES

##### TOTAL FACTOR PRODUCTIVITY DRIVES LABOUR PRODUCTIVITY GROWTH IN THE LONG TERM

In the long term, the growth in labour productivity (output per hour worked) broadly coincides with total factor productivity (TFP) growth divided by the labour share (set at 0.65). The EPC has decided on the following

<sup>(7)</sup> This is notably the case for Belgium.

assumption for TFP: country-specific TFP growth rates will converge to a long-term historical average TFP growth rate recorded in the EU <sup>(8)</sup> of 1 % (which represents a downward revision of 0.1 percentage point relative to the assumption made in the previous round) <sup>(9)</sup>. As a result of this assumption, the growth rate in labour productivity is projected to be 1.5 % in the long term.

The speed of convergence to this long-term TFP growth rate has been determined by the relative country-specific income position in the different Member States. Specifically, it is assumed that the lower the GDP per capita of a country compared to the EU average at present, the higher its catch-up potential.

#### TAKING ACCOUNT OF THE CYCLICAL POSITION OF THE ECONOMY IN THE LONG-TERM PROJECTIONS

Over a short to medium-term horizon, there is a need to take account of the cyclical position of the economy, so as to bridge the current situation and the longer-term prospects. This is of particular importance at the current juncture, where nearly all Member States have large output gaps.

In order to produce actual, as opposed to potential, growth rate projections, the following operational rules are applied for closing the output gap. Firstly, the default rule is that the output gap will be closed at the end of the medium term (i.e. 2015 based on the spring 2011 Commission forecast). Secondly, in circumstances where the output gap is small at the end of the short-term forecasts, the gap could be closed by 0.5 percentage point per year until the gap is closed. Finally, when an output gap is particularly large (i.e. more than double the EU average), a longer period of closure would be allowed, up to a maximum of two additional years. Specifically, on the basis

of the Commission's spring 2011 forecast, all Member States are assumed to close the output gap in 2015 except Greece, where it is assumed to be closed in 2017.

#### MARKEDLY LOWER POTENTIAL GROWTH RATES PROJECTED FOR THE EU

In the EU as a whole, the annual average potential GDP growth rate is projected to remain quite stable over the long term. After an average potential growth of 1.5 % up to 2020, a slight rebound to 1.6 % is projected over the period 2021–30 on account of the assumption of the catch-up potential in terms of labour productivity in those EU Member States where it currently is relatively low, while over the remainder of the projection period (2031–60) a slowdown to 1.3 % emerges. Over the whole period 2010–60, output growth rates in the euro area are very close to those in the EU-27, as the former represents more than two thirds of the EU-27 total output. Notwithstanding this, the potential growth rate in the euro area is projected to be consistently slightly lower (by about 0.1 percentage point) than for the EU-27 throughout the entire projection period.

Taking account of the negative output gaps prevailing in the EU Member States, GDP growth is assumed to be higher than the potential growth rates until the output gap is closed (generally in 2015). For the EU as a whole and the euro area, annual GDP growth is assumed to be 0.7 percentage point higher than the potential growth rates over the period 2010–15.

#### THE SOURCES OF POTENTIAL GROWTH ARE ALSO PROJECTED TO CHANGE

For the EU and for the euro area, labour input acts as a drag on growth over the projection period (2010–60) as the working-age population is projected to decline. As a result, labour input contributes negatively to annual output growth on average over the projection period (by 0.15 percentage point and 0.1 percentage point respectively in the EU and in the euro area). Hence, labour productivity growth becomes the sole source for potential output growth in both the EU and the euro area starting from 2028. There are, however,

<sup>(8)</sup> Annual average TFP growth in the EU, proxied by EU-15, 1971–2010.

<sup>(9)</sup> For some Member States, a 1 % TFP growth rate entails an acceleration in growth compared with recent trends, while for others it would imply a deceleration. It should be stressed that TFP growth in many countries, notably in the euro area, has been on a falling trend, with a declining TFP growth rate to around 0.6–0.7 % already well before the financial crisis in 2008–09. The baseline, therefore, assumes a significant increase in TFP growth over the forecast horizon.



**Graph 0.4:** Potential and forecast growth, EU-27



Source: Commission services, EPC

significant differences across Member States. Since projected migration flows, for example, are heavily influenced by the latest observed values (be it on the low side or on the high side) and will only subside over the very long term, these continue to exert a sizable influence not just on population figures and labour input, but on the evolution of potential output and GDP growth as well.

#### COMPARISON WITH THE PREVIOUS LONG-TERM PROJECTION EXERCISE

In the EU as a whole, the population in 2010 was 2.4 million more compared to the EUROPOP2008 projection. By 2030, the population is projected to be about 2.6 million greater and, by 2060, about 10.7 million more (+ 2.1 %). The higher population in 2060 is mostly concentrated in the working-age population (15–64), and both more young and old persons are projected as well (Table 0.2).

As a result of the differences between the two rounds of population projections, the increase in the old-age dependency ratio (persons aged 65 and over relative to persons aged 15–64) is slightly lower in the EUROPOP2010 projection (rising by 26.5 percentage points between 2010 and 2060, compared with 27.6 percentage points in the previous projection). Due to diverging changes of assumptions, the projected increase in the

old-age dependency ratio is significantly lower in the Czech Republic, Ireland, Lithuania and Slovakia, and significantly higher in Cyprus, Latvia, Luxembourg and Portugal.

In terms of drivers of population changes, total EU fertility rates are higher in the EUROPOP2010 projection compared with the previous projection, and in particular in the beginning of the projection period (up by 0.05 in 2010). This pattern is especially the case in Bulgaria, Czech Republic, Ireland, Greece, Poland, Slovenia, Slovakia, and the United Kingdom (higher by 0.1 or more in 2010). By contrast, the total fertility rate is lower in 2010 compared with EUROPOP2008 in Denmark, Latvia, Lithuania, Luxembourg, Hungary, Austria and Portugal. Over the projection period to 2060, the increase is now expected to be slightly lower in the EU (Table 0.1).

Life expectancy at birth in 2010 is assumed to be higher in EUROPOP2010 compared with EUROPOP2008 in the EU as a whole for both males (+ 0.2 year) and females (+ 0.1 year). The largest increases in 2010 (of 0.5 year or more) for males occurs in Estonia, Spain, Latvia, Lithuania, Luxembourg, Malta, Slovenia and the United Kingdom, and for females in Estonia, Spain, Cyprus, Latvia, Lithuania, Luxembourg, Malta and the United Kingdom. Over the projection period by 2060, the increase is now expected to be slightly lower in the EU,

with a rise of 0.1 year less for both males and females.

In light of the recent observed decreases in net migration inflows to the EU, especially in some Member States (DE, IE, ES), net migration flows in the EU in 2010 are lower in the EUROPOP2010 projection compared with EUROPOP2008 by about 545 000. Overall, by 2060, EU net inward migration is projected to be 4.4 million lower in EUROPOP2010 compared with EUROPOP2008.

The impact of the 2008–09 economic recession is clearly present in the downward revision of the 2010 employment rate. Compared with the 2009 projections, the structural unemployment rate in the EU-27 is projected to be 0.7 percentage point higher by 2060, the employment rate in 2060 is also lower by 1.2 percentage points. In contrast, the participation rate of older workers (55–64) is increased by 2.9 percentage points by 2060, reflecting the positive effect of (further) legislated pension reforms in a number of Member States (Table 0.3).

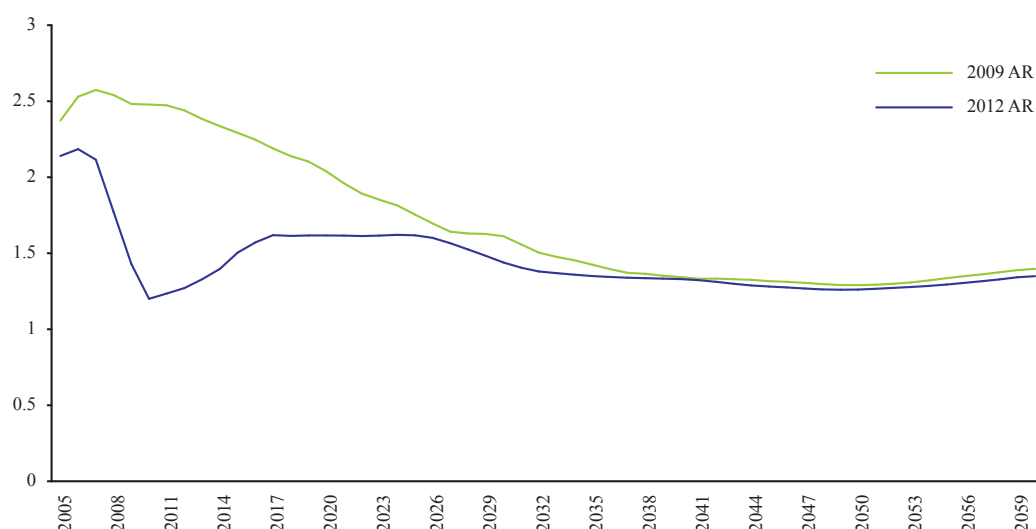
Following the largest economic crisis in many decades, potential GDP growth has been revised downwards in 2010 and the surrounding years, compared with the baseline projection in the 2009 Ageing Report (Graph 0.5). The current projections indicate that potential

growth in the EU as a whole should only very gradually approach the growth rates projected in the 2009 Ageing Report, just before the economic and financial crisis.

Annual average potential GDP growth over the period 2010–60 in the EU-27 is projected to be 1.4 %, compared with 1.6 % in the 2009 projection. A similar picture emerges for the euro area (with slightly lower potential growth of 1.3 % currently being projected, i.e. 0.3 percentage point lower compared with the projection in the 2009 Ageing Report). The lower average potential growth rate in the EU can mainly be attributed to the new, more prudent assumption of convergence to a labour productivity growth rate of 1.5 %, compared with an assumption of 1.7 % in the 2009 Ageing Report. As regards labour input, although there are differences between Member States, the different trends cancel out at the EU aggregate level. This means that, on average, the projected labour input trends over the entire projection period do not change significantly compared with the 2009 Ageing Report. The less favourable projections for structural unemployment and employment are counterbalanced by more favourable projections of participation rates of older workers due to pension reforms implemented in several Member States since 2008.

There are, however, significant differences in average potential GDP growth across Member

**Graph 0.5:** Potential GDP growth in the EU-27, 2012 and 2009 reports compared (% change)



Source: Commission services, EPC

States (Table 0.4) but it should be borne in mind that in GDP per capita terms, differences in average growth rates across countries are smaller. Large revisions in potential growth prospects (of 0.4 percentage point or more per year) over the period 2010–60 are noted in Germany, Greece, Cyprus, Luxembourg, Hungary, Portugal and Romania. The lower projected productivity growth is the main reason for the lower potential GDP growth rates for all these countries, influenced by both lower initial values points and the lower long-term convergence assumption for TFP

growth. This is compounded by lower labour input growth (due to downward revision of demographic projections for the working-age population) in all cases, with the exception of Greece and Hungary. By contrast, a very limited downward revision of potential growth (of no more than 0.1 percentage point) is projected in the Czech Republic, Poland, Slovenia, Slovakia, Finland and Sweden. For all of these countries, labour input growth is projected to be higher (with the exception of Poland and Finland where it is zero) than in the 2009 projections.



**Table 0.1:**  
2012 and 2009 projections compared, demographic assumptions

	Projection exercise 2012 (EUROPOP2010)										Projection exercise 2011 v Projection exercise 2009																			
	Fertility rate					Life expectancy at birth					Net migration ('000)					Fertility rate					Life expectancy at birth					Net migration ('000)				
	Males					Females					Cumulative 2010-60 of total population in 2010 (%)					Males					Females									
	2010	2060	Change	2010	2060	Change	2010	2060	Change	2010	2060	Change	2010	2060	Change	2010	2060	Change	2010	2060	Change	2010	2060	Change	2010	2060	Change	2010	2060	Change
BE	1.84	1.84	0.00	77.3	84.6	7.3	82.6	89.0	6.4	61	32	18.5	0.08	0.05	-0.03	0.3	0.2	-0.10	0.09	14	9									
BG	1.56	1.67	0.10	70.3	81.7	11.4	77.5	86.6	9.1	-10	1	-1.6	0.17	0.12	-0.06	0.0	0.1	0.08	0.3	0.1	-0.21	-10	2							
CZ	1.49	1.62	0.13	74.3	83.2	8.8	80.4	87.8	7.4	30	18	12.5	0.15	0.10	-0.05	0.1	0.0	-0.06	-0.1	-0.0	0.03	5	2							
DK	1.84	1.84	0.00	77.0	84.4	7.4	81.1	88.4	7.3	12	9	9.2	-0.01	-0.01	0.00	0.2	0.2	-0.06	-0.2	-0.0	0.20	2	3							
DE	1.36	1.54	0.17	77.6	84.8	7.2	82.7	88.9	6.2	41	72	6.2	0.01	0.01	-0.01	-0.0	-0.1	-0.07	-0.2	-0.2	-0.00	-106	-44							
EE	1.62	1.70	0.08	69.8	81.6	11.8	80.1	88.0	7.9	-1	0	0.2	0.07	0.04	-0.03	1.2	0.8	-0.44	1.0	0.4	-0.50	-0	0							
IE	2.07	1.99	-0.08	77.0	84.5	7.5	82.0	88.9	6.9	-22	16	15.7	0.17	0.11	-0.06	-0.9	-0.7	0.21	-0.2	-0.3	-0.08	-75	7							
EL	1.52	1.64	0.12	77.8	84.9	7.1	82.8	88.3	5.5	26	25	14.5	0.11	0.07	-0.04	-0.0	0.1	0.11	-0.1	-0.4	-0.32	-13	-1							
ES	1.40	1.56	0.16	78.6	85.4	6.8	84.7	89.9	5.3	79	185	23.4	0.01	0.00	-0.01	0.9	0.5	-0.42	0.5	0.3	-0.24	-461	55							
FR	2.00	1.95	-0.05	77.9	85.1	7.2	84.6	90.0	5.5	72	63	6.0	0.02	0.02	-0.00	0.1	-0.0	-0.09	-0.0	-0.0	-0.03	-26	-0							
IT	1.42	1.57	0.15	78.9	85.5	6.6	84.2	89.7	5.6	361	244	25.3	0.03	0.02	-0.01	0.1	0.0	-0.04	-0.3	-0.3	0.09	105	70							
CY	1.50	1.62	0.13	78.3	85.1	6.8	82.8	89.0	6.2	2	4	27.8	0.04	0.02	-0.01	-0.2	-0.0	0.17	0.8	0.3	-0.46	-7	-2							
LV	1.31	1.51	0.19	68.3	81.1	12.8	78.0	87.2	9.2	-3	1	1.2	-0.05	-0.03	0.01	1.7	0.6	-1.06	0.8	0.4	-0.44	-3	1							
LT	1.55	1.66	0.11	67.7	80.7	12.9	78.7	87.1	8.4	-13	1	-2.7	0.20	0.12	-0.08	1.2	0.2	-0.97	0.8	0.2	-0.61	-11	1							
LU	1.59	1.68	0.09	77.8	84.9	7.1	82.9	89.5	6.6	6	3	31.2	-0.06	-0.04	0.02	1.1	0.4	-0.70	1.3	1.0	-0.36	2	-0							
HU	1.32	1.51	0.19	70.4	81.9	11.5	78.4	87.4	9.0	23	19	12.1	-0.03	-0.02	0.01	0.2	0.1	-0.14	-0.1	0.1	0.13	3	4							
MT	1.44	1.59	0.15	77.6	84.9	7.3	82.3	88.9	6.6	-1	0	3.4	0.05	0.04	-0.01	1.2	0.6	-0.68	0.9	0.3	-0.58	-2	-0							
NL	1.79	1.81	0.02	78.7	85.2	6.5	82.8	89.1	6.3	36	6	3.3	0.07	0.04	-0.03	0.4	0.2	-0.17	0.3	0.2	-0.12	28	-2							
AT	1.39	1.56	0.16	77.6	84.8	7.2	83.0	89.1	6.1	19	26	17.9	-0.03	-0.01	0.01	-0.2	-0.1	0.10	-0.2	-0.1	0.11	-14	3							
PL	1.40	1.56	0.16	71.7	82.4	10.7	80.1	87.9	7.8	12	14	2.5	0.12	0.07	-0.05	-0.2	-0.1	0.03	-0.2	-0.1	0.08	27	6							
PT	1.32	1.51	0.19	76.5	84.2	7.7	82.5	88.6	6.1	19	28	15.6	-0.05	-0.03	0.02	0.4	0.2	-0.21	-0.2	-0.2	-0.01	-33	-7							
RO	1.38	1.55	0.17	70.0	81.8	11.8	77.5	86.7	9.3	-0	8	2.7	0.05	0.03	-0.02	-0.3	-0.1	0.21	0.4	0.2	-0.22	5	4							
SI	1.54	1.65	0.11	75.8	84.0	8.1	82.3	88.8	6.5	11	4	14.2	0.21	0.13	-0.08	0.7	0.2	-0.48	0.1	-0.0	-0.11	6	2							
SK	1.41	1.57	0.16	71.6	82.2	10.6	79.1	87.4	8.3	11	7	8.6	0.15	0.10	-0.05	0.2	0.2	-0.05	0.0	0.1	0.02	7	3							
FI	1.86	1.86	-0.00	76.6	84.4	7.7	83.2	89.2	6.0	15	7	9.1	0.02	0.02	-0.00	0.1	0.0	-0.09	-0.1	-0.0	0.06	5	3							
SE	1.94	1.90	-0.03	79.4	85.5	6.1	83.4	89.3	5.9	60	19	14.2	0.09	0.05	-0.03	0.2	0.1	-0.12	0.0	0.0	-0.01	18	4							
UK	1.94	1.91	-0.03	78.3	85.2	7.0	82.4	89.1	6.7	198	134	13.0	0.10	0.07	-0.03	0.6	0.2	-0.36	0.5	0.2	-0.35	14	20							
NO	2.00	1.94	-0.06	78.7	85.2	6.5	83.1	89.2	6.1	37	12	16.4	0.10	0.06	-0.04	0.0	-0.0	-0.02	-0.0	0.0	0.03	16	2							
EU-27	1.59	1.71	0.11	76.7	84.6	7.9	82.5	89.1	6.5	1 043	945	11.8	0.05	0.03	-0.02	0.2	0.1	-0.12	0.1	-0.0	-0.07	-520	142							
EA	1.57	1.68	0.12	77.9	85.0	7.1	83.5	89.4	5.9	735	722	13.5																		

Source: Eurostat (EUROPOP2010), Commission services ((Directorate-General for Economic and Financial Affairs), EPC (AWG))

**Table 0.2:**  
2012 and 2009 projections compared, population projections

	Projection exercise 2012 (EUROPOP2010)										Projection exercise 2012 v Projection exercise 2009				
	Total population			Demographic dependency ratio			Total dependency ratio				Total population		Demographic dependency ratio		
	2010	2060	Change (%)	2010	2060	Change (percentage points)	2010	2060	Change (percentage points)	2010	2060	Difference in 2060 as % of total population in EUROPOP2008	2010	2060	Change (percentage points)
BE	10.9	13.5	23.7	26.1	43.8	17.7	51.8	71.9	20.1	0.1	1.2	9.5	0.0	-2.0	-2.0
BG	7.5	5.5	-26.9	25.7	60.0	34.3	45.6	84.1	38.5	0.1	0.8	0.5	0.4	-3.5	-3.9
CZ	10.5	10.5	-0.7	21.8	54.9	33.0	42.2	79.1	36.9	0.2	1.0	9.9	0.0	-6.6	-6.6
DK	5.5	6.1	9.7	25.3	43.7	18.4	52.8	71.3	18.5	0.0	0.5	2.7	0.3	1.1	0.7
DE	81.7	66.2	-19.0	31.2	59.8	28.6	51.6	82.6	31.1	-0.6	-0.2	-6.5	0.0	0.8	0.7
EE	1.3	1.2	-12.6	25.2	55.3	30.1	47.7	81.5	33.9	0.0	0.1	3.4	0.2	-0.2	-0.4
IE	4.5	6.6	46.5	17.1	36.5	19.4	49.3	66.5	17.2	0.2	1.1	-2.8	0.5	-7.0	-7.5
EL	11.3	11.3	-0.4	28.6	56.5	27.9	50.3	81.0	30.7	0.0	0.8	1.4	0.4	-0.6	-1.0
ES	46.1	52.2	13.4	24.9	56.2	31.3	47.0	79.0	32.0	1.1	10.4	0.6	0.5	-2.8	-3.3
FR	64.9	73.7	13.7	25.8	46.6	20.8	54.3	75.3	21.0	0.9	5.3	2.7	-0.0	1.4	1.4
IT	60.5	64.9	7.3	30.8	56.6	25.8	52.2	78.9	26.7	1.0	8.5	9.3	-0.2	-2.7	-2.6
CY	0.8	1.1	40.9	18.9	47.8	29.0	42.9	73.6	30.7	0.0	0.3	-13.9	0.9	3.4	2.5
LV	2.2	1.7	-25.8	25.2	67.9	42.7	45.2	90.5	45.3	0.0	-0.1	-1.0	0.0	3.4	3.4
LT	3.3	2.7	-19.6	23.4	56.7	33.3	45.1	81.7	36.5	-0.0	-0.1	4.8	0.2	-9.0	-9.2
LU	0.5	0.7	44.0	20.4	45.2	24.8	46.2	71.0	24.8	0.0	0.1	-0.4	-0.7	6.1	6.7
HU	10.0	8.8	-11.7	24.3	58.1	33.8	45.7	80.3	34.6	0.0	0.1	1.4	0.1	0.4	0.4
MT	0.4	0.4	-6.3	21.8	55.9	34.1	44.2	79.3	35.1	-0.0	-0.1	-4.4	0.6	-3.2	-3.8
NL	16.6	17.1	2.7	23.0	47.5	24.5	49.2	74.6	25.4	-0.1	-0.5	2.8	0.2	0.3	0.1
AT	8.4	8.9	5.7	26.1	50.8	24.8	47.9	74.4	26.5	0.1	0.9	-1.9	0.1	0.2	0.1
PL	38.2	32.6	-14.6	19.0	64.8	45.8	40.2	87.3	47.2	0.2	-0.4	4.7	-0.0	-4.2	-4.2
PT	10.6	10.2	-3.7	26.9	57.2	30.3	49.6	78.7	29.1	-0.0	1.4	-9.0	0.4	2.5	2.1
RO	21.4	17.2	-19.6	21.3	64.8	43.5	43.0	86.3	43.4	-0.1	1.0	1.9	-0.0	-0.5	-0.5
SI	2.1	2.1	0.0	23.7	57.5	33.7	44.0	82.4	38.3	0.0	-0.0	15.5	-0.2	-4.7	-4.6
SK	5.4	5.1	-6.1	17.0	61.9	44.9	38.2	84.7	46.6	0.0	0.1	12.2	0.1	-6.6	-6.7
FI	5.4	5.7	7.1	26.1	47.6	21.5	51.1	75.7	24.6	0.0	0.2	6.4	0.4	-1.8	-2.1
SE	9.4	11.5	23.0	28.1	46.2	18.2	53.6	75.7	22.1	0.1	0.5	6.1	0.3	-0.5	-0.7
UK	62.2	79.0	27.0	25.0	42.1	17.1	51.5	71.5	20.0	0.8	10.2	3.1	0.3	-0.0	-0.3
NO	4.9	6.6	35.0	22.7	43.1	20.4	51.1	72.6	21.5	:	:	9.3	-0.1	-0.8	-0.8
EU-27	501.8	516.5	2.9	26.0	52.5	26.5	49.3	77.9	28.5	4.1	43.3	2.1	0.1	-0.9	-1.1
EA	331.4	340.8	2.9	27.6	53.3	25.7	50.9	78.0	27.2						

Source: Eurostat (EUROPOP2010), Commission services (Directorate-General for Economic and Financial Affairs), EPC (AWG)

**Table 0.3:**  
2012 and 2009 projections compared, labour force projections

Projection exercise 2012												
	Employment rate (15-64)			Employment rate (55-64)			Participation rate (15-64)			Participation rate (55-64)		
	2010	2060	Change (percentage points)	2010	2060	Change (percentage points)	2010	2060	Change (percentage points)	2010	2060	Change (percentage points)
BE	62.0	63.5	1.5	37.3	46.8	9.5	67.7	68.5	0.8	39.1	48.7	9.6
BG	60.0	64.4	4.4	44.7	56.0	11.3	67.1	69.4	2.4	49.3	59.8	10.5
CZ	65.1	68.6	3.5	46.8	69.1	22.3	70.3	73.1	2.8	50.1	72.6	22.5
DK	73.5	76.8	3.3	57.6	70.7	13.1	79.5	80.6	1.1	61.1	73.2	12.1
DE	71.2	74.0	2.9	57.7	70.0	12.3	76.7	78.9	2.2	62.5	74.8	12.3
EE	61.3	70.1	8.7	54.0	68.7	14.7	74.1	75.6	1.5	64.4	73.6	9.2
IE	60.0	63.2	3.2	49.9	61.7	11.7	69.6	67.3	-2.3	54.7	63.9	9.3
EL	59.6	67.3	7.7	42.6	67.1	24.5	68.4	72.6	4.2	45.5	69.6	24.1
ES	58.6	71.8	13.2	43.6	72.5	28.9	73.4	77.5	4.0	50.8	76.4	25.6
FR	63.8	69.2	5.4	39.7	60.2	20.4	70.4	74.7	4.2	42.5	63.3	20.8
IT	56.9	61.7	4.9	36.4	66.2	29.7	62.2	66.6	4.4	37.8	68.3	30.5
CY	68.3	74.5	6.2	56.8	66.5	9.7	73.2	78.0	4.8	59.6	68.8	9.2
LV	59.7	71.3	11.6	48.2	60.7	12.5	73.7	76.9	3.2	57.1	64.7	7.5
LT	58.2	67.7	9.5	48.3	62.7	14.4	71.0	73.0	2.0	56.5	66.1	9.7
LU	64.9	64.6	-0.2	39.2	40.7	1.5	67.9	67.5	-0.4	40.1	41.6	1.5
HU	55.4	62.2	6.8	34.2	56.6	22.4	62.4	67.1	4.7	37.1	59.1	22.0
MT	56.5	65.6	9.2	31.1	56.4	25.2	60.7	70.3	9.6	32.6	58.5	26.0
NL	74.7	77.1	2.4	53.7	60.6	6.8	78.2	79.9	1.7	56.0	62.4	6.5
AT	71.7	74.4	2.7	42.2	55.1	12.9	75.0	77.6	2.5	43.1	56.1	12.9
PL	59.3	62.3	3.0	34.2	44.8	10.6	65.8	67.2	1.4	36.8	47.4	10.5
PT	65.6	71.1	5.5	49.4	65.5	16.1	74.1	76.7	2.6	54.2	69.4	15.2
RO	58.9	56.8	-2.1	40.9	45.0	4.1	63.8	60.9	-2.9	42.3	46.3	4.0
SI	66.4	70.5	4.1	34.9	59.9	25.0	71.7	74.7	3.0	36.3	61.6	25.3
SK	59.0	62.8	3.8	40.6	48.3	7.8	68.9	67.8	-1.1	45.1	50.7	5.5
FI	68.2	71.2	3.0	56.6	62.6	6.0	74.6	76.2	1.7	60.5	65.8	5.3
SE	72.4	76.5	4.2	70.0	74.7	4.6	79.1	81.9	2.8	73.9	77.9	3.9
UK	69.4	72.4	3.0	57.1	67.8	10.7	75.4	76.7	1.3	59.9	70.1	10.2
NO	75.4	75.4	0.0	68.9	67.3	-1.6	78.2	78.0	-0.2	69.8	68.2	-1.7
EU27	64.1	69.0	4.9	46.3	63.5	17.2	71.1	73.8	2.8	49.7	66.5	16.8
EA17	64.2	69.2	5.1	45.7	64.9	19.2	71.4	74.2	2.8	49.3	68.1	18.8
										10.1	6.7	-3.4

Projection exercise 2012 v Projection exercise 2009														
Employment rate (15-64)				Employment rate (55-64)				Participation rate (15-64)				Unemployment rate (15-64)		
2010	2060	Change (percentage points)		2010	2060	Change (percentage points)		2010	2060	Change (percentage points)		2010	2060	Change (percentage points)
Change (percentage points)				Change (percentage points)				Change (percentage points)				Change (percentage points)		
BE	-0.8	-1.9	-1.1	-0.2	-0.6	-0.4		-0.2	-1.3	-1.0		0.0	-0.4	-0.4
BG	-4.7	-1.6	3.2	0.6	8.0	7.4		-0.9	0.2	1.1		3.1	9.5	6.4
CZ	-2.8	-1.6	1.2	-3.9	3.8	7.6		-0.8	-0.5	0.4		-2.6	4.9	7.4
DK	-3.7	-1.5	2.3	-1.1	3.2	4.3		-0.3	-0.2	0.1		0.7	3.8	3.1
DE	0.1	-0.8	-0.9	3.4	1.4	-2.1		-0.6	-0.9	-0.3		2.6	1.0	-1.6
EE	-10.6	-1.8	8.8	-7.3	6.3	13.5		-0.4	1.1	1.5		1.4	9.4	8.0
IE	-10.2	-9.2	1.0	-5.6	-5.6	0.0		-4.3	-9.0	-4.7		-2.4	-5.2	-2.7
EL	-3.1	2.7	5.8	-0.8	16.6	17.4		0.2	3.8	3.6		0.6	17.8	17.2
ES	-8.3	-0.7	7.6	-4.4	2.0	6.4		0.1	0.1	0.0		-0.5	2.4	2.9
FR	-0.5	2.1	2.6	2.8	12.8	10.0		0.6	3.1	2.4		3.7	14.1	10.4
IT	-3.1	-2.0	1.1	-1.7	4.6	6.4		-1.4	-1.1	0.4		-1.3	5.2	6.5
CY	-3.8	-0.8	3.0	-0.6	3.0	3.6		-1.4	0.0	1.5		0.8	3.7	2.9
LV	-11.1	0.7	11.7	-8.7	4.3	13.0		-0.7	2.7	3.3		-1.8	6.1	7.9
LT	-8.6	1.9	10.5	-8.5	10.1	18.6		1.8	4.8	3.0		-2.1	12.0	14.0
LU	1.1	0.9	-0.2	3.6	0.2	-3.4		1.0	0.7	-0.3		3.7	0.3	-3.5
HU	-3.2	1.2	4.4	-6.0	8.6	14.6		-1.0	2.1	3.1		-4.9	9.6	14.5
MT	0.8	5.2	4.4	4.4	8.3	3.9		1.3	5.9	4.6		4.9	8.2	3.3
NL	-1.6	-0.6	1.0	2.3	5.0	2.7		-0.5	-0.3	0.2		2.8	5.0	2.2
AT	-0.3	0.0	0.3	2.7	1.1	-1.6		-0.1	-0.1	0.1		2.6	0.6	-1.9
PL	-0.9	-0.1	0.8	2.8	0.1	-2.7		1.8	0.9	-0.9		4.1	0.8	-3.3
PT	-3.8	-0.5	3.3	-4.1	1.0	5.1		-1.1	0.4	1.5		-2.7	1.6	4.3
RO	-1.2	-0.8	0.5	-2.7	0.4	3.1		-0.2	-0.4	-0.2		-2.2	0.8	3.0
SI	-1.8	2.0	3.8	-0.3	12.1	12.4		0.1	2.8	2.7		0.0	12.4	12.4
SK	-3.6	-4.0	-0.4	-2.5	-2.2	0.3		-1.5	-3.4	-2.0		-1.6	-2.3	-0.7
FI	-2.7	-3.4	-0.6	1.9	-1.9	-3.7		-0.7	-2.9	-2.3		2.9	-2.0	-4.8
SE	-2.9	-1.1	1.8	-0.3	0.8	1.2		-0.9	-0.7	0.2		0.8	1.1	0.3
UK	-2.2	-2.0	0.2	0.4	-1.1	-1.5		-0.3	-2.0	-1.7		1.4	-1.1	-2.5
NO	0.3	0.6	0.3	2.6	2.7	0.1		-0.1	0.0	0.1		2.5	2.5	0.0
EU27	-2.4	-0.9	1.5	0.1	3.5	3.4		-0.3	-0.3	0.0		1.1	3.9	2.8
EA17	-2.5	-0.7	1.8	0.4	4.7	4.3		-0.5	-0.1	0.4		1.2	5.1	3.9

Source: Commission services (Directorate-General for Economic and Financial Affairs). EPC (AWG)

Source: Commission services (Directorate-General for Economic and Financial Affairs), EPC (AWG)

**Table 0.4:**  
2012 and 2009 projections compared, economic growth projections

	2012 projection									
	Due to growth in:									
	GDP growth 2010–60	Productivity (GDP per hour worked)	TPP	Capital deepening	Labour input	Total population	Employment rate	Share of working-age population	Change in average hours worked	GDP per capita growth 2010–60
	1=2+5	2=3+4	3	4	5=6+7+8+9	6	7	8	9	10=1–6
BE	1.6	1.4	0.9	0.5	0.2	0.4	-0.1	-0.1	0.0	1.2
BG	1.3	2.3	1.4	0.9	-1.0	-0.6	-0.0	-0.3	-0.0	1.9
CZ	1.5	1.9	1.2	0.7	-0.3	-0.0	-0.0	-0.3	0.0	1.6
DK	1.4	1.4	0.9	0.5	0.0	0.2	-0.0	-0.1	0.0	1.3
DE	0.8	1.5	0.9	0.5	-0.6	-0.4	0.1	-0.3	-0.0	1.2
EE	1.5	2.1	1.2	0.8	-0.6	-0.3	-0.1	-0.2	0.0	1.8
IE	2.1	1.6	1.0	0.6	0.5	0.8	-0.1	-0.2	-0.0	1.3
EL	1.0	1.1	0.8	0.3	-0.1	0.1	0.0	-0.3	0.0	0.9
ES	1.6	1.4	0.8	0.6	0.2	0.3	0.2	-0.3	0.0	1.3
FR	1.7	1.5	0.9	0.5	0.2	0.3	0.0	-0.1	-0.0	1.4
IT	1.2	1.3	0.8	0.5	-0.1	0.2	0.0	-0.2	0.0	1.1
CY	1.8	1.4	0.8	0.5	0.5	0.8	-0.2	-0.2	0.0	1.1
LV	1.1	2.1	1.2	0.9	-1.0	-0.6	-0.0	-0.3	-0.1	1.7
LT	1.3	1.9	1.1	0.8	-0.7	-0.4	-0.1	-0.2	0.1	1.7
LU	1.9	1.5	0.9	0.6	0.4	0.8	-0.1	-0.2	-0.1	1.2
HU	1.2	1.7	1.0	0.7	-0.5	-0.2	-0.0	-0.2	-0.0	1.4
MT	1.4	1.7	1.1	0.6	-0.2	-0.1	0.2	-0.2	-0.1	1.6
NL	1.3	1.5	1.0	0.5	-0.2	0.1	-0.1	-0.2	-0.0	1.2
AT	1.4	1.5	1.0	0.5	-0.1	0.1	-0.0	-0.2	-0.0	1.3
PL	1.5	2.2	1.3	0.8	-0.6	-0.3	-0.1	-0.3	-0.0	1.8
PT	1.2	1.4	0.9	0.5	-0.2	-0.1	0.0	-0.2	0.0	1.3
RO	1.1	2.1	1.3	0.8	-1.0	-0.4	-0.3	-0.3	0.0	1.5
SI	1.3	1.6	1.0	0.7	-0.3	0.0	-0.0	-0.3	0.0	1.3
SK	1.6	2.3	1.4	0.8	-0.6	-0.1	-0.2	-0.3	-0.0	1.8
FI	1.5	1.7	1.1	0.6	-0.1	0.2	-0.1	-0.2	-0.0	1.4
SE	1.8	1.5	1.0	0.5	0.2	0.4	-0.0	-0.2	0.0	1.3
UK	1.9	1.6	1.0	0.6	0.3	0.5	-0.0	-0.2	-0.0	1.4
NO	2.0	1.6	1.1	0.5	0.4	0.6	-0.1	-0.1	0.0	1.3
EA	1.3	1.4	0.9	0.5	-0.1	0.1	0.0	-0.2	0.0	1.2
EU-27	1.4	1.5	1.0	0.6	-0.2	0.1	0.1	-0.2	-0.1	1.3

Source: Commission services (Directorate-General for Economic and Financial Affairs), EPC (AWG)

## PART I — UNDERLYING ASSUMPTIONS AND PROJECTION METHODOLOGIES

# 1. POPULATION

## 1.1. BACKGROUND AND GENERAL APPROACH

Eurostat's population projection EUROPOP2010, released in April 2011 (Eurostat (2011)) <sup>(10)</sup>, is the basis for the 2012 age-related expenditure projection for the 27 EU Member States. A description of the methodologies used to project fertility rates, life expectancy and net migration in EUROPOP2010 can be found in Eurostat (2011) <sup>(11)</sup>.

In preparing the EUROPOP2010 population projection, Eurostat actively involved national statistical institutes via the 'Population Projection' Interest Group. Moreover, a joint meeting of the Working Group on Population Projections and the EPC Ageing Working Group (AWG) was held on 13 December 2010 in Luxembourg so that the views of the EPC-AWG could be communicated before finalisation of the projection. However, responsibility for the population projections rests with Eurostat. In setting the assumptions and generating the population figures, Eurostat acted in full independence <sup>(12)</sup>.

As was the case with the EUROPOP2008 demographic projection, EUROPOP2010 used a 'convergence' approach. This means that the key demographic determinants are assumed to converge over the very long term. These demographic determinants are: (i) the fertility rate; (ii) the mortality rate; and (iii) the level of net migration. As far as fertility and mortality are

concerned, it is assumed that they converge to that of the 'forerunners'.

Specifically, *fertility rates* are assumed to converge to levels achieved by Member States that are considered to be 'forerunners' in the demographic transition.

Life expectancy increases are assumed to be greater for countries at lower levels of life expectancy and smaller for those at higher levels, thus following convergent trajectories.

In each Member State, immigration and emigration flows assumed to converge, taking also into account the changes in the national age structures.

## 1.2. PROJECTION OF FERTILITY RATES

### 1.2.1. PAST TRENDS

*Fertility rates have been on a downward trend for several decades but, more recently, seem to be reversing*

Total fertility rates (TFR <sup>(13)</sup>) have declined sharply in the EU Member States since the post-war 'baby boom' peak above 2.5 in the second half of the 1960s, to below the natural replacement level of 2.1 (Table 1.1). This decline was relatively fast and completely unexpected.

The trend of falling fertility rates varied across countries in size and timing. Fertility rates fell below replacement levels in the late 1960s in the Czech Republic, Denmark, Germany, Latvia, Luxembourg, Hungary, Finland and Sweden. The fall occurred somewhat later in Belgium, France, the Netherlands, Austria, and the United Kingdom (1972–73) and Italy (1975) <sup>(14)</sup>. Declines in fertility rates occurred much later in Greece,

---

<sup>(10)</sup> Eurostat (2011), News release 80/2011, 8 June 2011.

<sup>(11)</sup> Lanzieri (2011), 'The greying of the baby boomers — A century-long view of ageing in European populations', Eurostat, *Statistics in Focus*, 23/2011 and 'Eurostat Population Projections 2010-based "EUROPOP2010": Methodology and results of a long-term scenario of demographic convergence' (forthcoming). The EuroPOP2010 (Eurostat Population Projections 2010-based) convergence scenario provides population projections (and assumptions on total fertility rates (TFR), life expectancy at birth by gender and net international migration) at national level projected for each year on 1 January. Data comprise the EU-27 Member States and the EFTA countries.

<sup>(12)</sup> The assumptions do not necessarily fully reflect the views of the AWG either as a group or individual Member States or national statistical offices. The Maltese authorities have expressed reservations on EUROPOP2010: Eurostat has adopted the same methodology for Malta as used for the other countries.

---

<sup>(13)</sup> Fertility rates are reflected by the average number of children a woman would have, should she at each bearing age have the fertility rates of the year under review (this number is obtained by summing the fertility rates by age and is called the Total Fertility Rate, or TFR).

<sup>(14)</sup> The time series for Germany (DE) excluded the former German Democratic Republic before 1991 and refers to the Federal Republic starting in 1991.



**Table 1.1:**  
Past trends in total fertility rates (TFR), 1950–2009

	1950	1960	1970	1980	1990	2000	2005	2009	1960–2009	2000–09
BE	2.34	2.54	2.25	1.68	1.62	1.67	1.76	1.84	–0.7	0.2
BG	:	2.31	2.17	2.05	1.82	1.26	1.32	1.57	–0.7	0.3
CZ	:	2.09	1.92	2.08	1.90	1.14	1.28	1.49	–0.6	0.4
DK	2.57	2.57	1.95	1.55	1.67	1.77	1.80	1.84	–0.7	0.1
DE	:	2.37	2.03	1.56	1.45	1.38	1.34	1.36	–1.0	–0.0
EE	:	:	2.16	:	2.05	1.38	1.50	1.62	:	0.2
IE	:	3.78	3.85	3.21	2.11	1.89	1.86	2.07	–1.7	0.2
EL	:	2.23	2.40	2.23	1.40	1.26	1.33	1.52	–0.7	0.3
ES	:	2.86	2.90	2.20	1.36	1.23	1.35	1.40	–1.5	0.2
FR	2.93	2.73	2.47	1.95	1.78	1.89	1.94	2.00	–0.7	0.1
IT	2.50	2.37	2.38	1.64	1.33	1.26	1.32	:	:	:
CY	:	3.51	2.54	:	2.41	1.64	1.42	1.51	–2.0	–0.1
LV	:	:	2.00	1.88	2.01	1.24	1.31	1.31	:	0.1
LT	:	2.60	2.40	1.99	2.03	1.39	1.27	1.55	–1.1	0.2
LU	:	2.29	1.97	1.50	1.60	1.76	1.63	1.59	–0.7	–0.2
HU	:	2.02	1.98	1.91	1.87	1.32	1.31	1.32	–0.7	0.0
MT	:	3.62	2.02	1.99	2.04	1.70	1.38	1.44	–2.2	–0.3
NL	3.10	3.12	2.57	1.60	1.62	1.72	1.71	1.79	–1.3	0.1
AT	:	2.69	2.29	1.65	1.46	1.36	1.41	1.39	–1.3	0.0
PL	3.71	2.98	2.20	2.28	1.99	1.37	1.24	1.40	–1.6	0.0
PT	:	3.16	3.01	2.25	1.56	1.55	1.40	1.32	–1.8	–0.2
RO	:	:	:	2.43	1.83	1.31	1.32	1.38	:	0.1
SI	:	2.18	2.10	2.11	1.46	1.26	1.26	1.53	–0.7	0.3
SK	:	3.04	2.41	2.32	2.09	1.30	1.25	1.41	–1.6	0.1
FI	3.15	2.72	1.83	1.63	1.78	1.73	1.80	1.86	–0.9	0.1
SE	2.28	2.20	1.92	1.68	2.13	1.54	1.77	1.94	–0.3	0.4
UK	:	2.72	2.43	1.90	1.83	1.64	1.78	1.94	–0.8	0.3
NO	2.51	2.90	2.50	1.72	1.93	1.85	1.84	1.98	–0.9	0.1
EU-27	:	2.70	2.31	1.97	1.79	1.48	1.48	1.59	–1.1	0.1
EA	:	2.83	2.42	1.97	1.71	1.53	1.51	1.60	–1.2	0.1
EA-12	:	2.76	2.34	1.99	1.82	1.40	1.42	1.51	–1.3	0.1
EU-15	:	2.69	2.42	1.88	1.65	1.58	1.61	1.70	–1.0	0.1
EU-10	:	2.65	2.13	2.07	1.95	1.34	1.31	1.45	–1.2	0.1
EU-25	:	2.71	2.32	1.95	1.78	1.49	1.50	1.60	–1.1	0.1

Source: Commission services based on Eurostat data, 2009 Ageing Report

Note: EU averages are simple averages.

Spain, Portugal (1981–82) and Ireland (2000), Malta (1980), Poland (1983) and Slovakia (1989). Several Member States had very low fertility rates (below 1.4) in 2000, namely Bulgaria, the Czech Republic, Germany, Estonia, Greece, Spain, Italy, Latvia, Lithuania, Hungary, Austria, Poland, Romania, Slovenia, and Slovakia.

However, more recent trends over the last decade indicate a trend shift. On average in the EU, fertility rates have increased since 2000. In particular, increases are noted in almost all Member States, with total fertility rates above 1.8 in Belgium, Denmark, Ireland, France, Finland, Sweden and the United Kingdom. By contrast, fertility rates have

continued to fall in Luxembourg and Portugal, while in Cyprus and Malta it has increased since 2005.

## 1.2.2. THE EUROPOP2010 PROJECTION

### *The projected fertility rates in EUROPOP2010*

The convergence scenario approach employed in the EUROPOP2010 projection entails a process of convergence in the fertility rates across Member States to that of the forerunners over the projection period over the very long term. For the EU as a whole, the total fertility rate (TFR) is projected to rise from 1.59 in 2010

to 1.64 by 2030 and further to 1.71 by 2060. In the euro area, a similar increase is projected, from 1.54 in 2010 to 1.65 in 2060 <sup>(15)</sup>.

The fertility rate is projected to increase over the projection period in nearly all Member States, with the exception of Ireland, France, Sweden and the United Kingdom (though remaining above 1.9), and in Belgium, Denmark and Finland it is projected to remain stable. Hence, in all

countries, fertility rates are expected to remain below the natural replacement rate of 2.1 in the period up to 2060. As a result of the convergence assumption, the largest increases in fertility rates are projected to take place in Latvia, Hungary and Portugal, which have the lowest fertility rates in the EU in 2010. The increase is projected to occur gradually, with fertility rates in these countries approaching but not reaching the current EU average fertility rate in 2060.

**Table 1.2:**  
Projection of fertility rates in EUROPOP2010

	Fertility rate						Change 2010–60
	2010	2020	2030	2040	2050	2060	
<b>BE</b>	1.84	1.84	1.84	1.84	1.84	1.84	0.00
<b>BG</b>	1.56	1.58	1.60	1.63	1.65	1.67	0.10
<b>CZ</b>	1.49	1.52	1.55	1.57	1.60	1.62	0.13
<b>DK</b>	1.84	1.84	1.84	1.84	1.84	1.84	0.00
<b>DE</b>	1.36	1.40	1.43	1.47	1.50	1.54	0.17
<b>EE</b>	1.62	1.64	1.66	1.67	1.69	1.70	0.08
<b>IE</b>	2.07	2.05	2.04	2.02	2.00	1.99	– 0.08
<b>EL</b>	1.52	1.55	1.57	1.59	1.62	1.64	0.12
<b>ES</b>	1.40	1.43	1.46	1.50	1.53	1.56	0.16
<b>FR</b>	2.00	1.99	1.98	1.97	1.96	1.95	– 0.05
<b>IT</b>	1.42	1.45	1.48	1.51	1.54	1.57	0.15
<b>CY</b>	1.50	1.52	1.55	1.57	1.60	1.62	0.13
<b>LV</b>	1.31	1.35	1.39	1.43	1.47	1.51	0.19
<b>LT</b>	1.55	1.57	1.59	1.61	1.63	1.66	0.11
<b>LU</b>	1.59	1.61	1.63	1.65	1.66	1.68	0.09
<b>HU</b>	1.32	1.36	1.40	1.44	1.47	1.51	0.19
<b>MT</b>	1.44	1.47	1.50	1.53	1.56	1.59	0.15
<b>NL</b>	1.79	1.79	1.80	1.80	1.81	1.81	0.02
<b>AT</b>	1.39	1.43	1.46	1.49	1.52	1.56	0.16
<b>PL</b>	1.40	1.43	1.46	1.50	1.53	1.56	0.16
<b>PT</b>	1.32	1.36	1.40	1.44	1.47	1.51	0.19
<b>RO</b>	1.38	1.41	1.45	1.48	1.51	1.55	0.17
<b>SI</b>	1.54	1.56	1.58	1.60	1.63	1.65	0.11
<b>SK</b>	1.41	1.44	1.48	1.51	1.54	1.57	0.16
<b>FI</b>	1.86	1.86	1.86	1.86	1.86	1.86	– 0.00
<b>SE</b>	1.94	1.93	1.92	1.92	1.91	1.90	– 0.03
<b>UK</b>	1.94	1.93	1.93	1.92	1.91	1.91	– 0.03
<b>NO</b>	2.00	1.99	1.98	1.97	1.96	1.94	– 0.06
<b>EU-27</b>	1.59	1.62	1.64	1.66	1.68	1.71	0.11
<b>EA</b>	1.57	1.59	1.61	1.64	1.66	1.68	0.12
<b>EA-12</b>	1.60	1.62	1.65	1.67	1.69	1.71	0.11
<b>EU-15</b>	1.64	1.66	1.68	1.70	1.72	1.73	0.09
<b>EU-10</b>	1.42	1.45	1.48	1.51	1.54	1.57	0.16
<b>EU-25</b>	1.60	1.63	1.65	1.67	1.69	1.71	0.11

Source: Commission services based on Eurostat EUROPOP2010 data

Note: EU averages are weighted averages.

<sup>(15)</sup> Table 1.1 reports total fertility rates according to the age last birthday during the year, while Table 1.2 reports total fertility rates according to the age reached during a calendar year.

### 1.3. PROJECTION OF LIFE EXPECTANCY

#### 1.3.1. PAST TRENDS

*Large and continuous increases in life expectancy have been observed*

Life expectancy has been increasing in most developed countries worldwide over very long time periods <sup>(16)</sup>. Since 1960, there have been significant increases in life expectancy at birth in all Member States (Table 1.3). Between 1960 and 2009, life expectancy at birth has increased significantly, especially for women. In euro area Member States, the increase is even more pronounced where the life expectancy at birth can increase by up to three months each year.

In the EU, the gap between female and male life expectancy has diminished since 1990, due to the faster improvement in life expectancy for males relative to females. In the euro area, this process started in 1980, and the difference between males and females is also smaller than in the EU as a whole. Since 2000, the increase in life expectancy has been 2.2 for females and 2.6 for males.

The gains in life expectancy at birth have varied across countries between 1960 and 2009. Women have gained 11 years or more in Germany, Spain, France, Italy, Luxembourg, Malta, Portugal and Finland. Smaller increases of eight years or less were observed in Bulgaria, the Czech Republic, Denmark, Latvia and Slovakia.

Gains in the life expectancy over the same period for men have been 11 years or more in Germany, Spain, France, Italy, Luxembourg,

Malta, Austria, Portugal and Finland, while increases of seven years or less have occurred in Bulgaria, the Czech Republic, Denmark, Estonia, Latvia, Lithuania, Hungary, Poland and Slovakia.

There is no consensus among demographers on trends over the very long term: for example whether there is a natural biological limit to longevity, the impact of future medical breakthroughs, the long-term impact of public health programmes and societal behaviour such as the reduction in smoking or the increased prevalence of obesity. Past population projections from official sources have, however, generally underestimated the gains in life expectancy at birth as it was difficult to imagine that the reduction of mortality would continue at the same pace in the long term. Some commentators have argued, in consequence, that governments may have underestimated the potential budgetary impact of ageing populations.

Official projections generally assume that gains in life expectancy at birth will slow down compared with historical trends. This is because mortality rates at younger ages are already very low and future gains in life expectancy would require improvements in mortality rates at older ages (which, statistically, have a smaller impact on life expectancy at birth). On the other hand, the wide range of life expectancies across EU Member States, and also compared with other countries, points to considerable scope for future gains. In 2009, life expectancy at birth for females ranged from 77.4 in Romania and Bulgaria to 85 years in France, and for males ranging from 67.5 in Lithuania to over 79.4 in Sweden.

---

<sup>(16)</sup> Since the 19th century, improvements in living conditions and medical advances have led to increases in life expectancy at birth. Several stages have been identified in the decline in mortality, starting in northwest Europe, around 1700 to 1800, with a reduction in mortality rates as famine-related mortality was reduced (UN, 2004). Mortality levels began to decline in a second stage starting in the early 19th century in England and northern European countries, due to vaccination and public health measures as well as improved personal hygiene. The decline in mortality rates accelerated during a third stage in the early years of the 20th century, with significant improvements made in the reduction of infant and child mortality and in survival rates of young adults.

**Table 1.3:**  
Past trends in life expectancy at birth, 1950–2009

<b>Males</b>	<b>1950</b>	<b>1960</b>	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2005</b>	<b>2009</b>	<b>1960–2009</b>	<b>2000–2009</b>
BE	62.0	66.8	67.9	69.9	72.7	74.6	76.2	77.3	10.5	2.7
BG	:	67.5	69.1	68.5	68.0	68.4	69.0	70.1	2.6	1.7
CZ	:	67.8	66.1	66.9	67.6	71.7	72.9	74.2	6.4	2.5
DK	:	70.4	70.7	71.2	72.0	74.5	76.0	76.9	6.5	2.4
DE	64.6	66.5	67.5	69.6	72.0	75.1	76.7	77.8	11.3	2.7
EE	:	64.3	65.5	64.1	64.7	65.2	67.3	69.8	5.5	4.6
IE	64.5	68.1	68.8	70.1	72.1	74.0	77.2	77.4	9.3	3.4
EL	63.4	67.3	71.6	73.0	74.7	75.5	76.8	77.8	10.5	2.3
ES	59.8	67.4	69.2	72.3	73.4	75.8	77.0	78.6	11.2	2.8
FR	62.9	66.9	68.4	70.2	72.8	75.3	76.7	78.0	11.1	2.7
IT *	63.7	67.2	69.0	70.6	73.8	76.9	78.0	79.1	11.9	2.2
CY	:	:	:	72.3	74.1	75.4	76.8	78.6	:	3.2
LV	:	65.2	66.0	63.6	64.3	65.0	65.4	68.1	2.9	3.1
LT	:	64.9	66.8	65.4	66.4	66.8	65.3	67.5	2.6	0.7
LU	:	66.5	67.1	70.0	72.4	74.6	76.7	78.1	11.6	3.5
HU	:	65.9	66.3	65.5	65.2	67.5	68.7	70.3	4.4	2.8
MT	:	66.5	68.4	68.0	73.7	76.2	77.2	77.8	11.3	1.6
NL	:	71.5	70.7	72.7	73.8	75.6	77.2	78.7	7.2	3.1
AT	:	66.2	66.5	69.0	72.3	75.2	76.6	77.6	11.4	2.4
PL	:	64.9	66.6	66.9	66.3	69.6	70.8	71.5	6.6	1.9
PT	56.4	61.1	63.7	67.9	70.6	73.2	74.9	76.5	15.4	3.3
RO	:	:	65.9	66.6	66.7	67.7	68.7	69.8	:	2.1
SI	:	66.1	65.0	67.4	69.8	72.2	73.9	75.9	9.8	3.7
SK	:	67.9	66.8	66.8	66.7	69.2	70.2	71.4	3.5	2.2
FI	:	65.5	66.5	69.3	71.0	74.2	75.6	76.6	11.1	2.4
SE	:	71.2	72.3	72.8	74.8	77.4	78.5	79.4	8.2	2.0
UK	66.2	67.9	68.7	70.2	72.9	75.5	77.1	78.3	10.4	2.8
NO	:	71.6	71.2	72.4	73.5	76.0	77.8	78.7	7.1	2.7
EU-27		66.9	67.7	68.9	70.5	72.7	74.0	75.3	8.4	2.6
EA		66.6	67.7	69.6	71.8	74.0	75.6	76.9	10.3	2.9
EA-12		66.7	67.9	70.2	72.8	75.0	76.5	77.8	11.2	2.8
EU-15		67.4	68.6	70.6	72.8	75.2	76.7	77.9	10.5	2.7
EU-10		65.9	66.4	66.7	67.9	69.9	70.9	72.5	6.6	2.6
EU-25		66.8	67.8	69.0	70.8	73.0	74.4	75.7	8.9	2.7
<b>Females</b>	<b>1950</b>	<b>1960</b>	<b>1970</b>	<b>1980</b>	<b>1990</b>	<b>2000</b>	<b>2005</b>	<b>2009</b>	<b>1960–2009</b>	<b>2000–09</b>
BE	67.3	72.8	74.3	76.7	79.5	81.0	81.9	82.8	10.0	1.8
BG	:	71.1	73.5	73.9	74.7	75.0	76.2	77.4	6.3	2.4
CZ	:	73.5	73.1	74.0	75.5	78.5	79.2	80.5	7.0	2.0
DK	:	74.4	75.9	77.3	77.8	79.2	80.5	81.1	6.7	1.9
DE	68.5	71.7	73.6	76.2	78.5	81.2	82.0	82.8	11.1	1.6
EE	:	71.6	74.1	74.1	74.9	76.2	78.1	80.2	8.6	4.0
IE	67.1	71.9	73.5	75.6	77.7	79.2	81.6	82.5	10.6	3.3
EL	68.5	72.4	76.1	77.5	79.5	80.6	81.6	82.7	10.3	2.1
ES	64.3	72.2	74.8	78.5	80.6	82.9	83.7	84.9	12.7	2.0
FR	68.5	73.6	75.9	78.4	81.2	83.0	83.8	85.0	11.4	2.0
IT *	67.2	72.3	74.9	77.4	80.3	82.8	83.6	84.5	12.2	1.7
CY	:	:	:	77.0	78.6	80.1	80.9	83.6	:	3.5
LV	:	72.4	74.4	74.2	74.6	76.1	76.5	78.0	5.6	1.9
LT	:	71.4	75.0	75.4	76.3	77.5	77.3	78.7	7.3	1.2
LU	:	72.2	73.0	75.6	78.7	81.3	82.3	83.3	11.1	2.0
HU	:	70.2	72.2	72.8	73.8	76.2	77.2	78.4	8.2	2.2
MT	:	70.5	72.6	72.8	78.1	80.3	81.4	82.7	12.2	2.4
NL	:	75.5	76.3	79.3	80.3	80.7	81.7	82.9	7.4	2.2
AT	:	72.7	73.5	76.1	79.0	81.2	82.2	83.2	10.5	2.0
PL	:	70.6	73.3	75.4	75.3	78.0	79.3	80.1	9.5	2.1
PT	61.6	66.7	69.7	74.9	77.5	80.2	81.3	82.6	15.9	2.4
RO	:	:	70.4	71.9	73.1	74.8	75.7	77.4	:	2.6
SI	:	72.0	72.4	75.2	77.8	79.9	80.9	82.7	10.7	2.8
SK	:	72.7	73.1	74.4	75.7	77.5	78.1	79.1	6.4	1.6
FI	:	72.5	75.0	78.0	79.0	81.2	82.5	83.5	11.0	2.3
SE	:	74.9	77.3	79.0	80.6	82.0	82.9	83.5	8.6	1.5
UK	71.2	73.7	75.0	76.2	78.5	80.3	81.3	82.5	8.8	2.2
NO	:	76.0	77.5	79.3	79.9	81.5	82.7	83.2	7.2	1.7
EU-27	:	72.2	73.9	75.8	77.7	79.5	80.5	81.7	9.5	2.2
EA	:	72.1	73.9	76.3	78.6	80.5	81.6	82.9	10.8	2.3
EA-12	:	72.0	73.9	76.6	79.2	81.2	82.1	83.4	11.3	2.2
EU-15	:	72.6	74.6	77.1	79.2	81.1	82.2	83.2	10.6	2.1
EU-10	:	71.6	73.3	74.5	76.1	78.0	78.9	80.4	8.8	2.4
EU-25	:	72.3	74.1	76.1	78.0	79.9	80.9	82.1	9.8	2.2

Source: Commission services based on Eurostat data, 2009 Ageing Report

Note: EU averages are simple averages. \* 2008.

### 1.3.2. THE EUROPOP2010 PROJECTION

A detailed overview of the projection methodology is provided by Eurostat <sup>(17)</sup> <sup>(18)</sup>.

Table 1.4 and Table 1.5 present the projected changes in life expectancy at birth and at age 65 for males and females in the baseline scenario of EUROPOP2010. It projects large increases in life expectancy at birth being sustained during the projection period, albeit with a considerable degree of diversity across Member States.

In the EU, life expectancy at birth for males is projected to increase by 7.9 years over the projection period, from 76.7 in 2008 to 84.6 in 2060. For females, life expectancy at birth is projected to increase by 6.5 years, from 82.5 in 2008 to 89.1 in 2060, implying a convergence of life expectancy between males and females. The largest increases in life expectancy at birth, for both males and females, are projected to take place in the Member States with the lowest life expectancy in 2010. Life expectancy for males in 2010 is the lowest in Bulgaria, Estonia, Latvia, Lithuania, Hungary and Romania, ranging between 67 and 71 years. Some catching up takes place over the projection period, with increases in life expectancy of more than 11 years up to 2060 for these countries. For females, the largest gains in life expectancy at birth of eight years or more is projected in Bulgaria, Latvia, Lithuania, Hungary, Romania and Slovakia: female life expectancy in 2010 in all of these countries is less than 80 years.

Given the assumed ‘convergence hypothesis’, the projection compresses the spread of life expectancy at birth for males across the Member States, from 11.7 years in 2008 (79.4 in Sweden and 67.7 in Lithuania) to 4.8 years in 2060 (85.5 in Sweden and Italy compared with 80.7 in Lithuania). For females, the reduction of the differential in life expectancy at birth is lower, from 7.2 years in 2008 (84.7 in

Spain and 77.5 in Bulgaria and Romania) to 3.4 years in 2060 (90 in France and 86.6 in Bulgaria).

In the EU as a whole, life expectancy at age 65 is projected to increase by 5.2 years for males and by 4.9 years for females over the projection period. In 2060, life expectancy at age 65 will reach 22.4 years for males and 25.6 for females and the projected difference (3.2 years) is smaller than the 4.5 year difference in life expectancy at birth. In 2060, the highest life expectancy at age 65 is expected in France for both males (23 years) and females (26.6 years), while the lowest is expected in Bulgaria for both males (20.6 years) and females (23.6 years).

## 1.4. PROJECTION OF NET MIGRATION FLOWS

### 1.4.1. PAST TRENDS AND DRIVING FORCES

European countries have gradually become a destination for migrants, starting in the 1950s in countries with post-war labour recruitment needs and with a colonial past. Southern European countries became net receiving countries during the 1990s and several countries in Central and Eastern Europe are currently both source and destination countries of migrants. Three distinct phases of immigration can be identified in the last half century.

- The *guest worker* phase, with programmes to recruit foreign workers to cope with increasing labour demand during the economic boom in the 1950s and 1960s in Belgium, Denmark, Germany, France, Luxembourg, the Netherlands, Austria and the United Kingdom. They turned to other European countries, such as Spain, Italy and Portugal and/or to former colonies or neighbouring countries: North Africa in the case of Belgium and France; the Caribbean and the Indian subcontinent for the United Kingdom; and Turkey and Yugoslavia for Germany. Foreign labour recruitment stopped in 1974, after the

<sup>(17)</sup> ‘Eurostat Population Projections 2010-based “EUROPOP2010”: Methodology and results of a long-term scenario of demographic convergence’ (forthcoming).

<sup>(18)</sup> Table 1.3 reports life expectancy according to the age last birthday during the year, while Table 1.4 reports life expectancy according to the age reached during a calendar year.

**Table 1.4:**  
Projection of life expectancy at birth in EUROPOP2010

	Males							Females						
	2010	2020	2030	2040	2050	2060	Change 2010-60	2010	2020	2030	2040	2050	2060	Change 2010-60
BE	77.3	79.0	80.5	82.0	83.3	84.6	7.3	82.6	84.0	85.4	86.7	87.9	89.0	6.4
BG	70.3	72.9	75.4	77.6	79.7	81.7	11.4	77.5	79.6	81.5	83.3	85.0	86.6	9.1
CZ	74.3	76.3	78.2	79.9	81.6	83.2	8.8	80.4	82.1	83.6	85.1	86.5	87.8	7.4
DK	77.0	78.6	80.2	81.7	83.1	84.4	7.4	81.1	82.8	84.3	85.8	87.2	88.4	7.3
DE	77.6	79.3	80.8	82.2	83.6	84.8	7.2	82.7	84.1	85.4	86.6	87.8	88.9	6.2
EE	69.8	72.5	75.0	77.4	79.6	81.6	11.8	80.1	81.9	83.6	85.1	86.6	88.0	7.9
IE	77.0	78.7	80.3	81.8	83.2	84.5	7.5	82.0	83.5	85.0	86.4	87.7	88.9	6.9
EL	77.8	79.4	80.9	82.3	83.7	84.9	7.1	82.8	84.0	85.1	86.2	87.3	88.3	5.5
ES	78.6	80.2	81.6	83.0	84.2	85.4	6.8	84.7	85.8	86.9	88.0	89.0	89.9	5.3
FR	77.9	79.6	81.1	82.5	83.9	85.1	7.2	84.6	85.8	87.0	88.1	89.1	90.0	5.5
IT	78.9	80.4	81.8	83.1	84.3	85.5	6.6	84.2	85.4	86.6	87.7	88.8	89.7	5.6
CY	78.3	79.9	81.3	82.7	83.9	85.1	6.8	82.8	84.2	85.4	86.7	87.9	89.0	6.2
LV	68.3	71.2	74.0	76.6	78.9	81.1	12.8	78.0	80.1	82.1	83.9	85.6	87.2	9.2
LT	67.7	70.7	73.5	76.1	78.5	80.7	12.9	78.7	80.6	82.4	84.0	85.6	87.1	8.4
LU	77.8	79.4	80.9	82.3	83.6	84.9	7.1	82.9	84.4	85.8	87.1	88.3	89.5	6.6
HU	70.4	73.0	75.5	77.8	80.0	81.9	11.5	78.4	80.5	82.4	84.2	85.9	87.4	9.0
MT	77.6	79.3	80.8	82.3	83.6	84.9	7.3	82.3	83.8	85.3	86.6	87.8	88.9	6.6
NL	78.7	80.1	81.5	82.8	84.0	85.2	6.5	82.8	84.2	85.5	86.8	88.0	89.1	6.3
AT	77.6	79.2	80.7	82.2	83.5	84.8	7.2	83.0	84.4	85.6	86.9	88.0	89.1	6.1
PL	71.7	74.2	76.4	78.6	80.6	82.4	10.7	80.1	81.9	83.5	85.1	86.6	87.9	7.8
PT	76.5	78.3	79.9	81.5	82.9	84.2	7.7	82.5	83.9	85.1	86.3	87.5	88.6	6.1
RO	70.0	72.8	75.3	77.6	79.8	81.8	11.8	77.5	79.6	81.6	83.4	85.1	86.7	9.3
SI	75.8	77.7	79.4	81.0	82.5	84.0	8.1	82.3	83.7	85.1	86.4	87.6	88.8	6.5
SK	71.6	74.0	76.2	78.4	80.3	82.2	10.6	79.1	81.0	82.7	84.4	86.0	87.4	8.3
FI	76.6	78.4	80.0	81.6	83.0	84.4	7.7	83.2	84.6	85.9	87.0	88.2	89.2	6.0
SE	79.4	80.8	82.1	83.3	84.4	85.5	6.1	83.4	84.8	86.0	87.2	88.3	89.3	5.9
UK	78.3	79.9	81.4	82.7	84.0	85.2	7.0	82.4	83.9	85.4	86.7	87.9	89.1	6.7
NO	78.7	80.2	81.5	82.8	84.1	85.2	6.5	83.1	84.5	85.8	87.0	88.1	89.2	6.1
EU27	76.7	78.6	80.3	81.8	83.3	84.6	7.9	82.5	84.0	85.4	86.7	87.9	89.1	6.5
EA	77.9	79.5	81.0	82.5	83.8	85.0	7.1	83.5	84.9	86.1	87.3	88.4	89.4	5.9
EA-12	79.5	81.2	82.7	84.1	85.4	86.6	7.1	85.3	86.7	87.9	89.1	90.1	91.2	5.8
EU-15	78.1	79.7	81.2	82.6	83.9	85.1	7.0	83.4	84.8	86.0	87.2	88.3	89.4	6.0
EU-10	71.8	74.3	76.5	78.7	80.6	82.4	10.6	79.8	81.6	83.3	84.9	86.4	87.8	8.0
EU-25	77.1	78.9	80.5	82.0	83.5	84.8	7.6	82.8	84.3	85.6	86.9	88.1	89.2	6.3

Source: Commission services based on Eurostat EUROPOP2010 data

Note: EU averages are weighted averages.

**Table 1.5:**  
Projection of life expectancy at 65 in EUROPOP2010

	Males							Females						
	2010	2020	2030	2040	2050	2060	Change 2010–60	2010	2020	2030	2040	2050	2060	Change 2010–60
BE	17.4	18.4	19.4	20.4	21.4	22.3	4.9	20.9	21.9	22.9	23.9	24.8	25.7	4.8
BG	13.8	15.3	16.6	18.0	19.3	20.6	6.7	17.0	18.4	19.7	21.1	22.4	23.6	6.6
CZ	15.3	16.5	17.7	18.9	20.1	21.2	5.9	18.7	19.9	21.1	22.3	23.4	24.5	5.8
DK	16.8	17.9	19.0	20.0	21.1	22.0	5.2	19.5	20.8	21.9	23.1	24.1	25.1	5.6
DE	17.4	18.5	19.5	20.5	21.5	22.4	5.0	20.6	21.6	22.6	23.6	24.5	25.4	4.8
EE	14.1	15.5	16.9	18.3	19.6	20.9	6.8	19.1	20.4	21.6	22.7	23.8	24.9	5.8
IE	16.8	18.0	19.1	20.1	21.2	22.2	5.3	20.0	21.2	22.4	23.5	24.5	25.5	5.5
EL	17.9	18.9	19.9	20.8	21.7	22.6	4.7	20.2	21.1	22.0	22.9	23.8	24.6	4.4
ES	18.2	19.2	20.2	21.1	22.0	22.9	4.7	22.1	23.0	23.9	24.7	25.5	26.3	4.1
FR	18.5	19.5	20.4	21.3	22.1	23.0	4.5	22.7	23.6	24.4	25.2	25.9	26.6	3.9
IT	18.1	19.1	20.1	21.0	22.0	22.8	4.7	21.7	22.7	23.6	24.5	25.3	26.1	4.4
CY	17.8	18.8	19.8	20.7	21.6	22.5	4.8	20.0	21.1	22.2	23.3	24.3	25.3	5.3
LV	13.5	15.0	16.5	17.9	19.3	20.6	7.2	18.1	19.5	20.8	22.1	23.3	24.4	6.3
LT	13.5	15.0	16.4	17.8	19.1	20.4	6.9	18.4	19.6	20.8	22.0	23.1	24.2	5.8
LU	17.3	18.4	19.5	20.5	21.4	22.4	5.0	21.1	22.2	23.3	24.3	25.2	26.1	4.9
HU	14.0	15.5	16.9	18.3	19.7	20.9	6.9	18.1	19.5	20.9	22.2	23.4	24.6	6.4
MT	17.0	18.1	19.2	20.3	21.3	22.2	5.2	20.2	21.3	22.4	23.4	24.4	25.4	5.2
NL	17.5	18.5	19.5	20.5	21.4	22.3	4.9	20.9	21.9	22.9	23.8	24.8	25.6	4.8
AT	17.6	18.6	19.6	20.6	21.5	22.4	4.8	20.9	21.9	22.9	23.8	24.7	25.6	4.7
PL	14.8	16.2	17.5	18.8	20.0	21.2	6.4	19.1	20.3	21.5	22.7	23.8	24.8	5.7
PT	17.1	18.1	19.2	20.2	21.1	22.1	5.0	20.4	21.4	22.4	23.3	24.2	25.1	4.7
RO	14.1	15.5	16.9	18.3	19.6	20.8	6.7	17.2	18.6	20.0	21.3	22.6	23.8	6.6
SI	16.4	17.6	18.7	19.8	20.8	21.9	5.5	20.2	21.3	22.4	23.4	24.4	25.3	5.1
SK	14.1	15.5	16.9	18.2	19.5	20.8	6.6	18.0	19.3	20.6	21.9	23.1	24.3	6.3
FI	17.3	18.3	19.4	20.4	21.4	22.3	5.0	21.3	22.2	23.2	24.1	25.0	25.8	4.5
SE	18.2	19.2	20.1	21.0	21.8	22.7	4.4	21.1	22.1	23.1	24.0	24.9	25.7	4.7
UK	18.0	19.0	20.0	21.0	21.9	22.8	4.8	20.7	21.8	22.8	23.8	24.8	25.7	5.0
NO	17.9	18.9	19.9	20.8	21.7	22.5	4.6	21.0	22.0	23.0	23.9	24.8	25.7	4.7
EU-27	17.2	18.3	19.4	20.5	21.4	22.4	5.2	20.7	21.8	22.8	23.8	24.7	25.6	4.9
EA	17.8	18.8	19.8	20.8	21.7	22.6	4.8	21.4	22.4	23.3	24.2	25.1	25.9	4.5
EA-12	18.2	19.2	20.2	21.2	22.2	23.0	4.9	21.9	22.9	23.8	24.7	25.6	26.4	4.6
EU-15	17.9	18.9	19.9	20.9	21.8	22.7	4.8	21.3	22.3	23.3	24.2	25.1	25.9	4.6
EU-10	14.7	16.1	17.4	18.7	20.0	21.1	6.4	18.8	20.1	21.3	22.5	23.6	24.7	5.9
EU-25	17.4	18.5	19.5	20.6	21.5	22.5	5.1	20.9	21.9	23.0	23.9	24.8	25.7	4.8

Source: Commission services based on Eurostat EUROPOP2010 data

Note: EU averages are weighted averages.

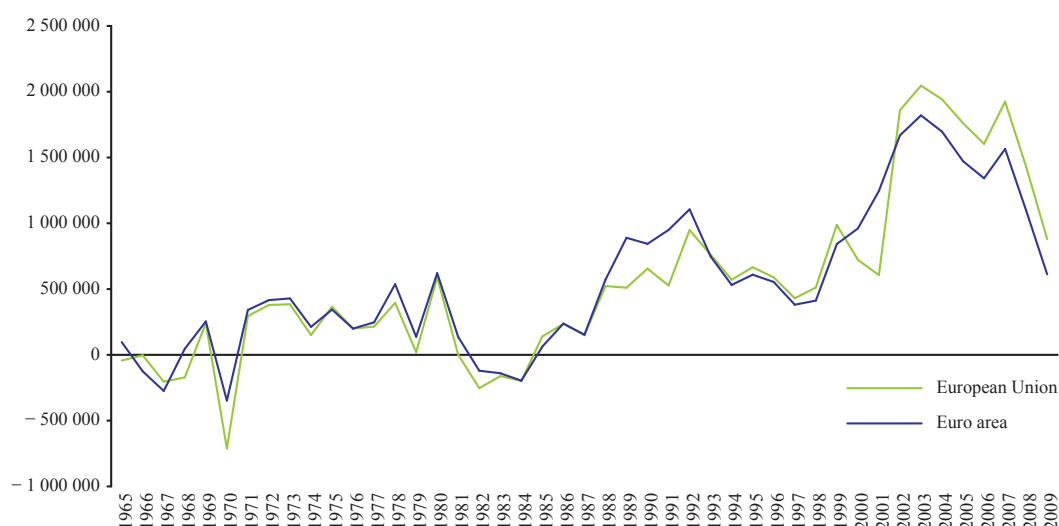


first oil price shock and subsequent rise in unemployment <sup>(19)</sup>.

Yugoslavia, increased the number of people seeking asylum.

- Then immigration continued mostly due to *family reunification*: net migration flows during the 1970s were on average 240 000 people per year as immigrants who were present in these countries decided to stay and were joined by their families from their home countries.
  - The *asylum seekers* phase: after a brief period of net outflows during the early 1980s recession, net migration flows rose again, peaking in 1991–92, as the fall of the Iron Curtain and a number of wars and ethnic conflicts, such as in the former
- Net inflows dropped significantly between 1992 and 1997, partly due to tighter controls over migratory flows in the main receiving countries, but they resumed their growth at the end of the 1990s. Overall, the average annual net entries for the EU-25 more than tripled from around 198 000 people per year during the 1980s to around 750 000 people per year during the 1990s. High clandestine migration also marked the decade of the 1990s. At the beginning of the 2000s, the net migration flows to the EU-27 countries encountered a vigorous increase, totalling more than 2 000 000 in 2003.

**Graph 1.1:** Net migration flows, 1965–2009 (persons)



Source: Commission services based on Eurostat data

<sup>(19)</sup> Measures of macroeconomic conditions, such as unemployment rates, are typically not helpful in explaining *long-term* immigration policy changes; however, the *timing* of their introduction is strongly influenced by short-term macroeconomic conditions (Hatton and Williamson, 2003). See also Box 1.1, Drivers of migration trends, that identifies four main economic and demographic drivers as identified by Hatton and Williamson (2003). However, Eurostat migration projections were not based on the explicit consideration of these factors but on trend projections.



**Box 1.1: Drivers of migration trends**

The economic theory of migration is based on the assumption that migrants try to maximise the net gains from migration, calculated as the difference in present value of alternative earnings streams, minus migration costs. An individual is more likely to migrate the higher the wage is in the destination country and the lower the source country wage and the migration cost. Policies that restrict immigration can be seen as raising the migration cost. The likelihood of migration tends to decline with age because the remaining working life is shorter. Thus, for a given incentive to migrate, migration will be higher the younger the working-age population is in the source country.

New economic theories have expanded this framework to incorporate the idea that migration decisions are taken in a household context rather than by an individual. The family member in a foreign labour market sends a stream of remittances to improve the economic situation of the family which can either stay in the country or follow via family reunification.

Hatton and Williamson (2003) identified four main economic and demographic factors generating migration.

- The gap in income per capita between rich, high-wage countries and poor, low-wage countries.
- Emigration from poor countries may increase as economic development takes place, which

does not seem consistent with the fact that migration is driven by the gap between income in the source and destination regions. This is due to the relaxation of the poverty constraints to migrate. Indeed, for the very poor, it may be difficult to finance migration so income gains have a positive effect on migration, which may dominate the negative effect associated with a reduction of the income gap between countries of origin and receiving countries. A hump-shaped relationship between economic development in countries of origin and emigration has been observed: emigration rates out of very poor countries are very low, whilst they are much higher out of moderately poor countries (Hatton and Williamson, 1998); this could be explained by catching-up, which relaxes the poverty constraint.

- The share of the young adult population in a receiving country has a negative effect on immigration, whilst a greater young adult share in countries of origin increases emigration.
- Networks (friends and relatives) drive dynamic effects of migration through the stock of previous migrants from countries of origin residing in the receiving country.

On the demand-side, the policies of receiving countries are factors of migration, notably the promotion of immigration to fill labour shortages.

Net migration flows <sup>(20)</sup> per country are characterised by high variability (Table 1.6). Traditionally, Germany, France and the United Kingdom record the largest number of arrivals in the EU but, in the last decade, there has been a rise of migration flows to Spain, Italy and Ireland that have switched from countries of origin to destination countries. After high

migration inflows to the EU in the first half of the 2000s, flows were drastically reduced and even turned into outflows in some countries that had previously experienced sharp increases. For the EU as a whole, annual inward migration more than halved between 2005 and 2009 (from + 1 760 933 in 2005 to + 879 644 in 2009). In terms of persons, the largest declines in annual inflows were recorded in Germany, Ireland, Spain, France and the United Kingdom (between 590 000 and 48 000 less). By contrast, higher inflows were noted in Belgium, Italy, the Netherlands and Sweden (between 61 000 and 14 000 more). However, net migration flows do not show the size of inward and outward movements — due to temporary and return migration. Therefore, net migration flows are much smaller than gross flows, as can be seen in a country such as Germany.

<sup>(20)</sup> Due to difficulties in obtaining good statistics from each Member State on migration flows, net migration is measured as the difference between the total population on 31 December and 1 January for a given calendar year, minus the difference between births and deaths (or natural increase). The approach is different from that of subtracting recorded emigration flows from immigration flows. Notably, when operating as above, the 'net migration' not only records errors due to the difficulty of registering the migration moves, it also includes all possible errors and adjustments in other demographic variables.

**Table 1.6:**  
Past trends in net migration flows

Net migration flows							
	1961	1970	1980	1990	2000	2005	2009
BE	- 39 859	- 32 718	- 2 436	19 547	12 836	49 186	64 037
BG	- 67	- 11 031	- 5	- 94 611	0	0	- 15 729
CZ	4 911	- 121 345	- 41 216	- 58 893	6 539	36 229	28 344
DK	2 745	21 113	570	8 553	10 094	6 734	15 341
DE	118 435	- 271 686	304 410	656 166	167 863	81 578	- 10 681
EE	8 506	6 066	6 052	- 5 623	224	140	30
IE	- 19 662	- 2 796	- 592	- 7 667	31 820	62 553	- 27 556
EL	- 16 761	- 46 393	55 777	63 920	29 401	39 974	35 099
ES	- 82 664	72 947	112 659	- 20 007	389 774	641 199	50 780
FR	:	:	:	:	166 761	187 185	70 288
IT	- 136 302	- 107 276	4 914	22 260	49 526	303 640	318 066
CY	- 6 519	- 903	836	8 708	3 960	14 421	1 846
LV	15 467	6 734	2 445	- 13 085	- 5 504	- 564	- 4 700
LT	3 690	14 025	2 122	- 8 848	- 20 306	- 8 782	- 15 483
LU	2 415	1 084	1 344	3 937	3 431	6 106	6 583
HU	909	0	0	18 313	16 658	17 268	17 321
MT	- 6 037	- 1 944	380	857	873	1 612	- 1 561
NL	5 924	32 516	50 557	48 730	57 033	- 22 824	38 522
AT	- 2 679	10 406	9 357	58 562	17 272	49 938	21 067
PL	- 61 865	- 293 620	- 24 125	- 12 620	- 409 925	- 12 878	- 1 196
PT	- 38 078	- 121 955	41 969	- 39 107	47 000	38 400	15 406
RO	- 41 623	- 12 190	52 937	- 86 781	- 3 729	- 7 234	- 1 605
SI	- 4 489	3 713	5 420	- 245	2 747	6 436	11 508
SK	- 5 636	- 35 091	- 11 493	- 2 322	- 22 301	3 403	4 367
FI	- 11 815	- 36 381	- 2 180	8 604	2 410	9 152	14 566
SE	13 115	46 726	9 606	34 814	24 386	26 724	62 614
UK	87 400	- 14 821	- 33 485	24 662	143 871	231 337	182 370
NO	694	- 758	3 741	1796	9 707	18 332	38 589
EU-27	- 26 925	- 712 311	589 797	655 279	722 714	1 760 933	879 644
EA-17	- 51 607	- 347 902	620 948	843 775	960 630	1 472 099	612 367
EA-12	- 43 951	- 320 646	620 589	851 108	979 087	1 460 508	598 023
EU-15	- 117 786	- 449 234	552 470	882 974	1 153 478	1 710 882	856 502
EU-10	- 51 063	- 422 365	- 59 579	- 73 758	- 427 035	57 285	40 476
EU-25	14 765	- 689 090	536 865	836 671	726 443	1 768 167	896 978

Source: Commission services based on Eurostat data

#### 1.4.2. THE EUROPOP 2010 PROJECTION

##### *Projected net migration flows in EUROPOP2010*

The methodology used to project net migration in EUROPOP2010 is described in Eurostat (2011) <sup>(21)</sup>.

Table 1.7 presents the projected net migration flows in the baseline of EUROPOP2010. For the EU as a whole, annual net inflows are projected to increase from about 1 018 000 people in 2010 (equivalent to 0.20 % of the EU population) to 1 217 000 000 by 2020 and

thereafter declining to 878 000 people by 2060 (a slightly smaller proportion, 0.17 % of the EU population).

Over the entire projection period, the cumulative net migration to the EU is 55 million, of which the bulk is concentrated in the euro area (42 million). Net migration flows are projected to be concentrated in a few destination countries: Italy (15.4 million cumulative to 2060), Spain (10.9 million) and the United Kingdom (8.6 million). According to the assumptions, the change of Spain and Italy from countries of origin in the past to destination countries will be confirmed in the coming decades. For countries that currently experience a net outflow (BG, EE, LV, LT, MT and RO), this is projected to taper off or reverse in the coming decades.

<sup>(21)</sup> Eurostat projections of migration flows were based on average levels estimated from 2002 to 2009.

**Table 1.7:**  
Projection of net migration flows in EUROPOP2010

	Net migration ('000)						Total population (%)		Cumulative ('000)	Cumulative net migration as share of population in 2060 (%)
	2010	2020	2030	2040	2050	2060	2010	2060	2010–60	
BE	61.3	46.2	42.6	39.1	35.5	32.0	0.6	0.2	2 147	16.0
BG	– 9.9	– 14.6	– 3.3	5.5	3.8	0.7	– 0.1	0.0	– 110	– 2.0
CZ	30.5	29.0	25.6	29.9	24.1	18.3	0.3	0.2	1 355	13.0
DK	12.3	11.4	12.0	9.9	8.7	8.7	0.2	0.1	528	8.7
DE	41.0	114.6	133.0	82.4	87.7	72.3	0.1	0.1	4 974	7.5
EE	– 0.5	– 1.0	– 0.3	0.6	0.8	0.0	– 0.0	0.0	2	0.2
IE	– 21.5	22.5	20.8	19.0	17.3	15.6	– 0.5	0.2	758	11.6
EL	26.2	37.0	35.8	35.9	29.8	25.3	0.2	0.2	1 667	14.8
ES	79.1	267.4	254.0	249.6	209.7	185.2	0.2	0.4	11 241	21.5
FR	71.9	92.7	87.0	76.8	70.7	62.9	0.1	0.1	4 047	5.5
IT	360.7	344.1	338.7	312.3	269.8	244.3	0.6	0.4	15 938	24.5
CY	2.2	6.0	5.5	5.0	4.7	4.1	0.3	0.4	247	21.8
LV	– 3.4	– 0.5	0.4	1.5	1.9	0.6	– 0.2	0.0	25	1.5
LT	– 13.0	– 5.1	– 1.0	1.2	2.2	0.8	– 0.4	0.0	– 85	– 3.2
LU	6.3	3.7	3.4	3.1	2.8	2.6	1.2	0.4	180	24.7
HU	22.5	27.3	22.1	26.7	22.0	18.9	0.2	0.2	1 194	13.5
MT	– 1.2	0.5	0.4	0.5	0.5	0.4	– 0.3	0.1	14	3.7
NL	35.5	9.3	11.8	5.2	5.9	6.2	0.2	0.0	570	3.3
AT	19.1	35.2	35.6	29.9	27.9	25.8	0.2	0.3	1 542	17.4
PL	11.7	13.0	3.2	26.4	34.2	14.1	0.0	0.0	950	2.9
PT	18.5	36.8	37.2	37.0	30.7	27.8	0.2	0.3	1 669	16.3
RO	– 0.2	8.4	3.2	17.6	16.8	7.6	– 0.0	0.0	564	3.3
SI	11.0	6.3	5.7	5.6	5.0	3.8	0.5	0.2	304	14.8
SK	10.6	9.9	8.2	10.3	9.9	6.8	0.2	0.1	478	9.4
FI	14.8	11.4	9.7	8.6	8.2	7.3	0.3	0.1	507	8.8
SE	59.9	28.2	26.0	23.8	21.7	19.5	0.6	0.2	1 438	12.5
UK	197.9	193.0	178.1	163.3	148.5	133.6	0.3	0.2	8 652	10.9
NO	36.9	17.4	16.0	14.7	13.4	12.0	0.8	0.2	884	13.4
EU-27	1 043.0	1 332.5	1 295.2	1 226.7	1 100.9	945.0	0.21	0.18	60 798	11.77
EA	734.8	1 042.5	1 028.9	920.9	817.0	722.2	0.2	0.2	45 806	13.4
EA-12	722.9	1 029.8	1 017.4	909.8	806.8	713.9	0.2	0.2	45 240	13.7
EU-15	982.8	1 253.4	1 225.6	1 096.0	975.0	868.8	0.2	0.2	55 859	13.1
EU-10	70.3	85.3	69.7	107.5	105.3	67.8	0.1	0.1	4 486	6.8
EU-25	1 053.1	1 338.8	1 295.3	1 203.5	1 080.3	936.6	0.2	0.2	60 344	12.2

Source: Eurostat, EUROPOP2010

### 1.5. OVERALL RESULTS OF THE EUROPOP2010 POPULATION PROJECTION

Table 1.8 presents an overview of the baseline population projection — EUROPOP2010 — used in the 2012 EC-EPC age-related expenditure projection exercise.

The age structure of the EU population will dramatically change in the coming decades due to the dynamics of fertility, life expectancy and migration. The overall size of the population is projected to be slightly greater in 50 years' time, but much older than it is now. The EU population is projected to increase (from 501 million in 2010) up to 2040 by almost 5 %, when it will peak (at 526 million). Thereafter, a steady decline occurs and the population shrinks by nearly 2 %. Nonetheless, according to the

projections, the population in 2060 will be slightly higher than in 2008, at 517 million.

While the EU population as a whole will be slightly greater in 2060 compared to 2010, there are wide differences in population trends until 2060 across Member States. Decreases in the total population are projected for about half of the EU Member States (BG, CZ, DE, EE, EL, LV, LT, HU, MT, PL, PT, RO and SK). For the other Member States (BE, DK, IE, ES, FR, IT, CY, LU, NL, AT, SI, FI, SE and UK) an increase is projected. The strongest population growth is projected to be found in Ireland (+ 46 %), Luxembourg (+ 45 %), Cyprus (+ 41 %), the United Kingdom (+ 27 %), Belgium (+ 24 %) and Sweden (+ 23 %), and the sharpest declines in Bulgaria (– 27 %), Latvia (– 26 %), Lithuania (– 20 %), Romania and Germany (both – 19 %) (Table 1.8).

**Table 1.8:**  
Projection of the total population (million)

	Total population (annual average)						Change (%)		
	2010	2020	2030	2040	2050	2060	2010–20	2020–60	2010–60
BE	10.9	11.6	12.2	12.7	13.1	13.5	6.8	15.8	23.7
BG	7.5	7.1	6.6	6.2	5.9	5.5	– 6.0	– 22.3	– 26.9
CZ	10.5	10.8	10.8	10.7	10.7	10.5	2.8	– 3.4	– 0.7
DK	5.5	5.7	5.9	6.0	6.0	6.1	3.3	6.2	9.7
DE	81.7	80.0	77.7	74.6	70.6	66.2	– 2.0	– 17.3	– 19.0
EE	1.3	1.3	1.3	1.2	1.2	1.2	– 1.3	– 11.5	– 12.6
IE	4.5	4.8	5.3	5.8	6.2	6.6	8.1	35.5	46.5
EL	11.3	11.5	11.6	11.6	11.6	11.3	1.9	– 2.2	– 0.4
ES	46.1	48.1	50.1	51.8	52.7	52.2	4.3	8.7	13.4
FR	64.9	68.0	70.4	72.3	73.2	73.7	4.7	8.5	13.7
IT	60.5	63.0	64.6	65.7	65.9	64.9	4.1	3.1	7.3
CY	0.8	0.9	1.0	1.0	1.1	1.1	10.4	27.6	40.9
LV	2.2	2.1	2.0	1.9	1.8	1.7	– 4.8	– 22.0	– 25.8
LT	3.3	3.2	3.0	2.9	2.8	2.7	– 4.4	– 15.9	– 19.6
LU	0.5	0.6	0.6	0.7	0.7	0.7	13.8	26.6	44.0
HU	10.0	9.9	9.7	9.4	9.2	8.8	– 1.1	– 10.6	– 11.7
MT	0.4	0.4	0.4	0.4	0.4	0.4	0.7	– 6.9	– 6.3
NL	16.6	17.2	17.6	17.6	17.3	17.1	3.8	– 1.1	2.7
AT	8.4	8.6	8.9	9.0	9.0	8.9	2.6	3.0	5.7
PL	38.2	38.4	37.5	36.0	34.5	32.6	0.5	– 15.0	– 14.6
PT	10.6	10.7	10.8	10.8	10.6	10.2	0.8	– 4.5	– 3.7
RO	21.4	21.0	20.2	19.4	18.4	17.2	– 2.2	– 17.8	– 19.6
SI	2.1	2.1	2.2	2.1	2.1	2.1	4.4	– 4.2	0.0
SK	5.4	5.6	5.6	5.5	5.3	5.1	2.7	– 8.6	– 6.1
FI	5.4	5.6	5.7	5.7	5.7	5.7	4.1	2.9	7.1
SE	9.4	10.1	10.6	10.9	11.2	11.5	7.7	14.2	23.0
UK	62.2	66.5	70.4	73.6	76.5	79.0	6.9	18.9	27.0
NO	4.9	5.4	5.8	6.1	6.4	6.6	10.5	22.1	35.0
EU-27	501.8	514.9	522.6	525.7	523.8	516.5	2.6	0.3	2.9
EA	331.4	340.1	345.8	348.6	346.8	340.8	2.6	0.2	2.9
EA-12	321.3	329.7	335.4	338.3	336.6	331.0	2.6	0.4	3.0
EU-15	398.5	412.1	422.3	428.8	430.5	427.7	3.4	3.8	7.3
EU-10	74.3	74.8	73.5	71.3	69.0	66.1	0.6	– 11.6	– 11.1
EU-25	472.8	486.8	495.8	500.1	499.5	493.7	3.0	1.4	4.4

Source: Commission services based on Eurostat EUROPOP2010 data

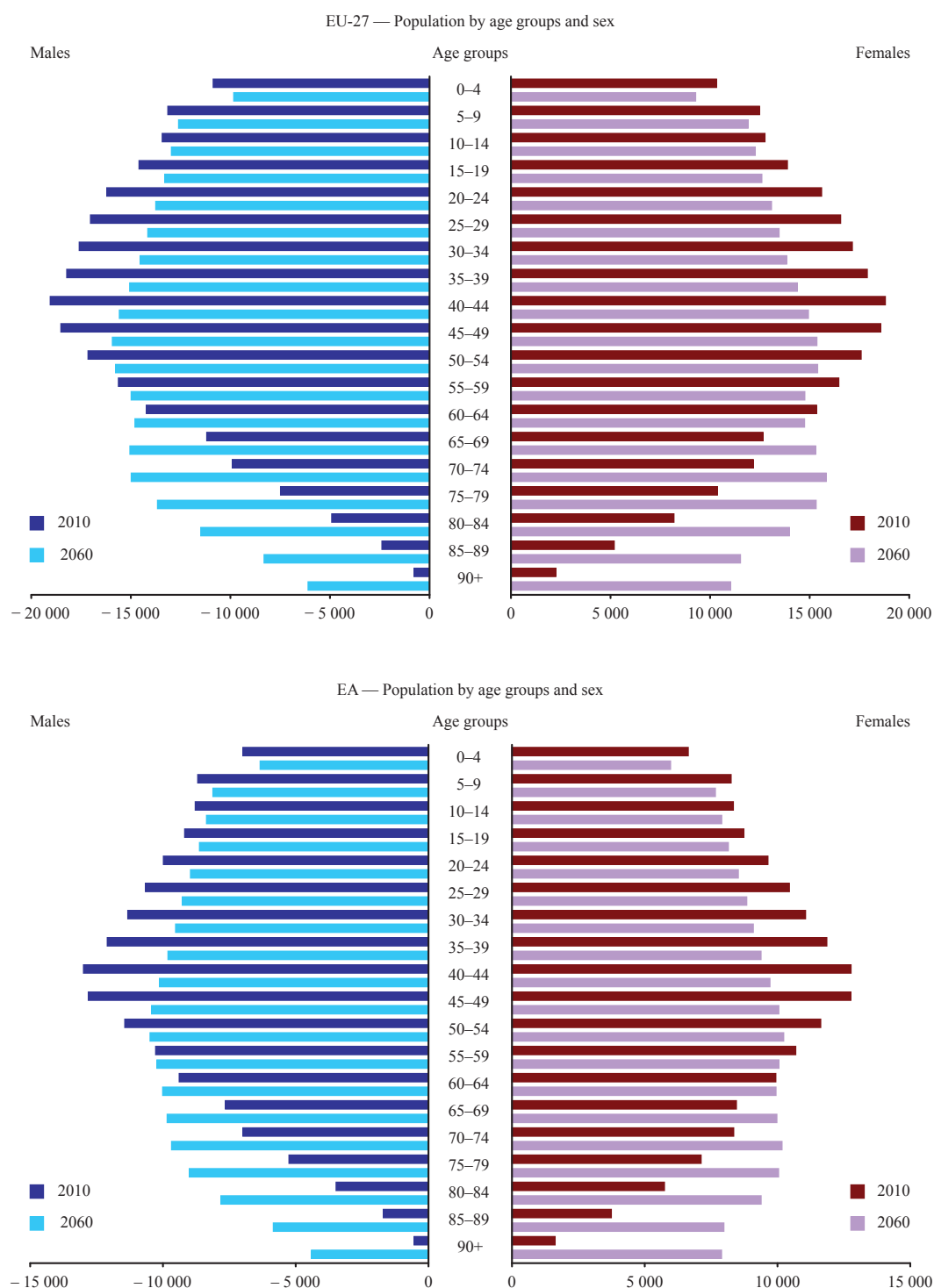
In 2010, the Member States with the largest population were: Germany (82 million), France (65 million), the United Kingdom (62 million), Italy (60 million) and Spain (46 million). In 2060, the United Kingdom will become the most populous EU country (79 million), followed by France (74 million), Germany (66 million), Italy (65 million) and Spain (52 million). In the case of Germany, the main driver for the significant decrease of the projected population is the very low net migration that results from the underlying migration assumptions <sup>(22)</sup>.

<sup>(22)</sup> During the next 50 years, net immigration to Germany is projected to be about 5 million, while in other Member States (e.g. ES and IT), it is between two and three times higher. Reflecting these assumptions, also based on the latest observed trends, the German population will shrink considerably. In 2060, Germany will no longer be the most populous Member State in the EU: it is projected to become the third most populous Member State.

### Age structure

The age structure of the EU population is projected to change dramatically, as shown in the population pyramids presented in Graph 1.2. The most numerous cohorts in 2010 are around 40 years old for men and women. Elderly people are projected to account for an increasing share of the population; this is due to the combination of the arrival at age 65 and more of the numerous cohorts born in the 1950s and 1960s with gains in life expectancy continuing over the projection period. At the same time, the base of the age pyramid becomes smaller during the projection period due to below replacement fertility rates. As a consequence, the shape of the age-pyramids gradually changes from pyramids to pillars. A similar development is projected for the euro area.

**Graph 1.2:** Age structure of the population in 2010 and 2060, EU-27 and EA (persons)



Source: Commission services based on Eurostat EUROPOP2010 data

Tables 1.9 to 1.13 present overviews of different population groups in the EU: the young population (0–14), the working-age population

(15–64), those aged 65 and over and, finally, those aged 80 and over.

**Table 1.9:**  
Projection of young population aged 0–14 (million)

	Population aged 0–14						Change (%)		
	2010	2020	2030	2040	2050	2060	2010–20	2020–60	2010–60
<b>BE</b>	1.8	2.0	2.1	2.1	2.2	2.2	9.5	8.9	19.3
<b>BG</b>	1.0	1.1	0.9	0.8	0.8	0.7	2.4	–31.7	–30.0
<b>CZ</b>	1.5	1.7	1.5	1.4	1.5	1.4	13.0	–16.8	–6.0
<b>DK</b>	1.0	1.0	1.0	1.0	1.0	1.0	–2.7	0.8	–2.0
<b>DE</b>	11.0	10.1	9.7	9.0	8.5	8.3	–8.0	–18.2	–24.7
<b>EE</b>	0.2	0.2	0.2	0.2	0.2	0.2	11.2	–25.6	–17.2
<b>IE</b>	1.0	1.1	1.0	1.1	1.2	1.2	11.5	9.8	22.4
<b>EL</b>	1.6	1.7	1.6	1.5	1.6	1.5	4.7	–10.6	–6.4
<b>ES</b>	6.9	7.1	6.4	6.6	6.9	6.7	3.2	–6.8	–3.8
<b>FR</b>	12.0	12.3	12.2	12.2	12.2	12.1	2.6	–2.0	0.6
<b>IT</b>	8.5	8.5	8.1	8.2	8.3	8.1	–0.1	–4.7	–4.8
<b>CY</b>	0.1	0.2	0.2	0.2	0.2	0.2	13.6	9.4	24.3
<b>LV</b>	0.3	0.3	0.3	0.2	0.2	0.2	3.1	–37.9	–36.0
<b>LT</b>	0.5	0.5	0.5	0.4	0.4	0.4	3.8	–29.0	–26.3
<b>LU</b>	0.1	0.1	0.1	0.1	0.1	0.1	7.3	14.9	23.3
<b>HU</b>	1.5	1.4	1.3	1.2	1.1	1.1	–3.2	–23.4	–25.8
<b>MT</b>	0.1	0.1	0.1	0.1	0.1	0.1	–3.0	–18.8	–21.2
<b>NL</b>	2.9	2.8	2.8	2.8	2.7	2.6	–4.0	–5.2	–9.0
<b>AT</b>	1.2	1.2	1.2	1.2	1.2	1.2	–3.3	0.0	–3.3
<b>PL</b>	5.8	6.0	5.1	4.3	4.3	3.9	3.5	–34.3	–32.0
<b>PT</b>	1.6	1.5	1.3	1.3	1.3	1.2	–9.8	–15.3	–23.7
<b>RO</b>	3.2	3.1	2.6	2.3	2.2	2.0	–4.6	–35.7	–38.7
<b>SI</b>	0.3	0.3	0.3	0.3	0.3	0.3	12.6	–13.9	–3.1
<b>SK</b>	0.8	0.9	0.8	0.7	0.7	0.6	4.7	–27.6	–24.2
<b>FI</b>	0.9	0.9	0.9	0.9	0.9	0.9	6.1	–2.4	3.5
<b>SE</b>	1.6	1.8	1.9	1.8	1.9	1.9	16.3	6.7	24.1
<b>UK</b>	10.9	12.1	12.5	12.7	13.2	13.5	11.5	11.9	24.8
<b>NO</b>	0.9	1.0	1.1	1.1	1.1	1.1	9.4	12.0	22.5
<b>EU-27</b>	78	80	76	75	75	74	2	–8.0	–6.1
<b>EA</b>	51	51	49	48	48	47	–0	–7.0	–7.2
<b>EA-12</b>	51	50	48	48	48	47	–0	–7.0	–7.3
<b>EU-15</b>	63	64	63	63	63	63	2	–2.6	–0.7
<b>EU-10</b>	11	12	10	9	9	8	4	–28.3	–25.1
<b>EU-25</b>	74	76	73	71	72	71	2	–6.5	–4.3

Source: Commission services based on Eurostat EUROPOP2010 data

**Table 1.10:**  
Projection of the working-age population aged 15–64 (million)

	Population aged 15–64						Change (%)		
	2010	2020	2030	2040	2050	2060	2010–20	2020–60	2010–60
<b>BE</b>	7.2	7.4	7.4	7.6	7.7	7.8	2.7	6.4	9.2
<b>BG</b>	5.2	4.5	4.1	3.7	3.3	3.0	– 12.3	– 34.1	– 42.2
<b>CZ</b>	7.4	7.0	6.9	6.6	6.1	5.8	– 5.7	– 16.4	– 21.2
<b>DK</b>	3.6	3.6	3.6	3.5	3.6	3.6	– 0.4	– 1.7	– 2.1
<b>DE</b>	53.9	51.4	46.0	41.9	39.2	36.2	– 4.7	– 29.5	– 32.8
<b>EE</b>	0.9	0.8	0.8	0.8	0.7	0.6	– 7.4	– 23.2	– 28.9
<b>IE</b>	3.0	3.1	3.4	3.5	3.6	3.9	2.0	28.8	31.3
<b>EL</b>	7.5	7.4	7.3	6.8	6.3	6.2	– 1.8	– 15.8	– 17.3
<b>ES</b>	31.3	31.7	32.1	30.7	29.2	29.2	1.1	– 8.0	– 6.9
<b>FR</b>	42.0	41.8	41.8	41.6	41.9	42.1	– 0.5	0.6	0.1
<b>IT</b>	39.7	40.4	39.8	37.8	36.8	36.3	1.6	– 10.1	– 8.7
<b>CY</b>	0.6	0.6	0.6	0.7	0.7	0.7	4.2	11.3	16.0
<b>LV</b>	1.5	1.4	1.3	1.2	1.0	0.9	– 8.9	– 37.9	– 43.4
<b>LT</b>	2.3	2.1	1.9	1.8	1.6	1.5	– 8.4	– 29.9	– 35.8
<b>LU</b>	0.3	0.4	0.4	0.4	0.4	0.4	12.4	9.6	23.1
<b>HU</b>	6.9	6.5	6.3	5.9	5.3	4.9	– 5.5	– 24.5	– 28.6
<b>MT</b>	0.3	0.3	0.3	0.3	0.2	0.2	– 6.6	– 19.3	– 24.6
<b>NL</b>	11.1	11.0	10.5	10.1	10.0	9.8	– 1.1	– 11.3	– 12.3
<b>AT</b>	5.7	5.7	5.5	5.3	5.2	5.1	0.5	– 10.8	– 10.3
<b>PL</b>	27.2	25.4	23.9	22.6	19.6	17.4	– 6.7	– 31.5	– 36.1
<b>PT</b>	7.1	7.1	6.8	6.4	6.0	5.7	– 0.9	– 18.7	– 19.4
<b>RO</b>	15.0	14.2	13.5	12.1	10.5	9.3	– 5.5	– 34.7	– 38.3
<b>SI</b>	1.4	1.4	1.3	1.3	1.2	1.1	– 2.6	– 18.9	– 21.0
<b>SK</b>	3.9	3.8	3.7	3.5	3.1	2.8	– 3.5	– 27.2	– 29.8
<b>FI</b>	3.5	3.4	3.3	3.4	3.3	3.3	– 4.2	– 3.8	– 7.9
<b>SE</b>	6.1	6.2	6.4	6.5	6.6	6.6	1.5	5.9	7.5
<b>UK</b>	41.1	41.9	42.8	43.9	45.4	46.1	2.0	10.0	12.2
<b>NO</b>	3.2	3.4	3.6	3.6	3.8	3.8	6.4	11.1	18.2
<b>EU-27</b>	336.0	330.3	321.6	309.5	298.4	290.4	– 1.7	– 12.1	– 13.6
<b>EA</b>	219.7	217.5	211.0	201.8	195.5	191.4	– 1.0	– 12.0	– 12.8
<b>EA-12</b>	217.4	215.2	208.8	199.6	193.4	189.4	– 1.0	– 12.0	– 12.9
<b>EU-15</b>	263.4	262.3	257.0	249.3	245.2	242.2	– 0.4	– 7.7	– 8.0
<b>EU-10</b>	52.5	49.3	47.0	44.4	39.5	35.9	– 6.1	– 27.1	– 31.6
<b>EU-25</b>	315.8	311.6	304.0	293.7	284.7	278.1	– 1.3	– 10.7	– 11.9

Source: Commission services based on Eurostat EUROPOP2010 data

**Table 1.11:**  
Projection of persons aged 65 and over (million)

	Population aged 65+						Change (%)		
	2010	2020	2030	2040	2050	2060	2010–20	2020–60	2010–60
<b>BE</b>	1.9	2.2	2.7	3.1	3.3	3.4	20.1	52.8	83.5
<b>BG</b>	1.3	1.5	1.6	1.7	1.8	1.8	12.2	20.3	35.0
<b>CZ</b>	1.6	2.1	2.4	2.7	3.1	3.2	32.6	49.2	97.9
<b>DK</b>	0.9	1.1	1.3	1.5	1.5	1.6	24.7	35.6	69.1
<b>DE</b>	16.8	18.6	22.1	23.7	22.8	21.7	10.4	16.8	28.9
<b>EE</b>	0.2	0.3	0.3	0.3	0.3	0.4	11.8	39.7	56.1
<b>IE</b>	0.5	0.7	0.9	1.2	1.4	1.4	37.2	104.3	180.2
<b>EL</b>	2.2	2.4	2.8	3.3	3.6	3.5	12.5	45.0	63.2
<b>ES</b>	7.8	9.2	11.6	14.5	16.6	16.4	18.2	77.6	109.9
<b>FR</b>	10.8	13.8	16.5	18.5	19.1	19.6	27.4	41.9	80.8
<b>IT</b>	12.3	14.1	16.6	19.7	20.8	20.5	15.1	45.6	67.6
<b>CY</b>	0.1	0.1	0.2	0.2	0.3	0.3	39.2	111.3	194.1
<b>LV</b>	0.4	0.4	0.5	0.5	0.6	0.6	5.3	44.7	52.4
<b>LT</b>	0.5	0.6	0.7	0.7	0.8	0.8	5.2	48.0	55.6
<b>LU</b>	0.1	0.1	0.1	0.2	0.2	0.2	28.7	111.8	172.6
<b>HU</b>	1.7	2.0	2.1	2.4	2.7	2.8	18.5	44.0	70.7
<b>MT</b>	0.1	0.1	0.1	0.1	0.1	0.1	38.0	40.1	93.4
<b>NL</b>	2.6	3.4	4.3	4.8	4.7	4.6	33.8	35.1	80.8
<b>AT</b>	1.5	1.7	2.2	2.5	2.5	2.6	15.8	51.0	74.9
<b>PL</b>	5.2	7.0	8.5	9.1	10.6	11.3	35.3	61.2	118.1
<b>PT</b>	1.9	2.2	2.6	3.0	3.3	3.3	16.1	47.4	71.2
<b>RO</b>	3.2	3.7	4.1	5.0	5.7	6.0	15.7	62.0	87.5
<b>SI</b>	0.3	0.4	0.5	0.6	0.6	0.6	26.9	50.8	91.3
<b>SK</b>	0.7	0.9	1.2	1.3	1.6	1.7	36.5	87.2	155.4
<b>FI</b>	0.9	1.2	1.4	1.5	1.5	1.6	34.4	25.0	68.0
<b>SE</b>	1.7	2.1	2.4	2.6	2.8	3.0	21.8	45.4	77.1
<b>UK</b>	10.3	12.5	15.0	17.0	17.9	19.4	21.4	55.4	88.6
<b>NO</b>	0.7	1.0	1.2	1.4	1.5	1.6	30.0	72.8	124.7
<b>EU-27</b>	87.5	104.7	124.6	141.7	150.2	152.6	19.7	45.8	74.4
<b>EA</b>	60.6	71.6	86.0	98.4	102.8	102.0	18.2	42.4	68.3
<b>EA-12</b>	60.1	71.0	85.2	97.5	101.8	100.9	18.1	42.2	67.9
<b>EU-15</b>	72.1	85.5	102.5	117.0	122.1	122.9	18.6	43.6	70.3
<b>EU-10</b>	10.8	13.9	16.4	18.0	20.6	21.9	29.1	57.3	103.0
<b>EU-25</b>	82.9	99.5	118.9	135.0	142.7	144.8	19.9	45.6	74.6

Source: Commission services based on Eurostat EUROPOP2010 data



**Table 1.12:**  
Projection of persons aged 80 and over (million)

	Population aged 80+						Change (%)		
	2010	2020	2030	2040	2050	2060	2010–20	2020–60	2010–60
<b>BE</b>	0.5	0.6	0.8	1.0	1.3	1.3	19.2	106.6	146.2
<b>BG</b>	0.3	0.3	0.4	0.5	0.6	0.7	17.5	107.0	143.3
<b>CZ</b>	0.4	0.4	0.7	0.8	0.9	1.3	15.5	192.5	237.9
<b>DK</b>	0.2	0.3	0.4	0.5	0.6	0.6	17.4	130.2	170.3
<b>DE</b>	4.2	5.9	6.4	8.0	10.2	8.9	40.4	52.3	113.9
<b>EE</b>	0.1	0.1	0.1	0.1	0.1	0.1	31.3	78.6	134.4
<b>IE</b>	0.1	0.2	0.2	0.4	0.5	0.6	27.1	274.4	376.0
<b>EL</b>	0.5	0.8	0.8	1.0	1.3	1.5	38.2	101.3	178.2
<b>ES</b>	2.3	2.8	3.5	4.5	6.1	7.5	24.0	164.3	227.7
<b>FR</b>	3.5	4.1	5.3	6.8	7.8	8.1	18.6	98.5	135.5
<b>IT</b>	3.5	4.5	5.3	6.4	8.3	9.2	27.9	101.8	158.1
<b>CY</b>	0.0	0.0	0.1	0.1	0.1	0.1	42.5	211.9	344.6
<b>LV</b>	0.1	0.1	0.1	0.2	0.2	0.2	30.0	82.3	136.9
<b>LT</b>	0.1	0.2	0.2	0.2	0.3	0.3	27.0	84.4	134.2
<b>LU</b>	0.0	0.0	0.0	0.0	0.1	0.1	31.9	200.4	296.3
<b>HU</b>	0.4	0.5	0.6	0.8	0.8	1.1	18.3	137.1	180.4
<b>MT</b>	0.0	0.0	0.0	0.0	0.0	0.0	41.6	122.7	215.2
<b>NL</b>	0.7	0.8	1.3	1.6	2.0	1.9	27.2	126.2	187.7
<b>AT</b>	0.4	0.5	0.6	0.8	1.1	1.0	19.4	112.4	153.6
<b>PL</b>	1.3	1.6	2.1	3.3	3.3	4.1	27.4	149.2	217.4
<b>PT</b>	0.5	0.6	0.8	1.0	1.2	1.4	31.3	118.5	186.8
<b>RO</b>	0.7	0.9	1.0	1.5	1.8	2.3	34.4	152.1	238.7
<b>SI</b>	0.1	0.1	0.1	0.2	0.2	0.3	36.1	134.3	218.9
<b>SK</b>	0.1	0.2	0.3	0.4	0.5	0.6	19.9	249.6	319.0
<b>FI</b>	0.3	0.3	0.5	0.6	0.6	0.6	24.1	90.8	136.8
<b>SE</b>	0.5	0.5	0.8	0.9	1.1	1.1	9.8	111.0	131.8
<b>UK</b>	2.9	3.5	4.7	5.7	7.2	7.3	19.7	111.7	153.4
<b>NO</b>	0.2	0.2	0.4	0.5	0.6	0.6	4.2	176.0	187.7
<b>EU-27</b>	23.7	30.0	37.1	47.3	57.9	62.4	26.5	108.3	163.4
<b>EA</b>	16.8	21.6	26.0	32.9	41.2	43.3	28.5	100.4	157.5
<b>EA-12</b>	16.7	21.4	25.7	32.6	40.8	42.9	28.4	100.0	156.8
<b>EU-15</b>	20.1	25.5	31.3	39.2	49.0	51.3	26.6	101.2	154.7
<b>EU-10</b>	2.6	3.2	4.3	6.1	6.5	8.2	24.5	151.7	213.2
<b>EU-25</b>	22.7	28.7	35.6	45.3	55.5	59.4	26.4	106.9	161.5

Source: Commission services based on Eurostat EUROPOP2010 data

The proportion of young people (aged 0–14) is projected to remain fairly constant until 2060 in the EU-27 and the euro area (around 15 %), while those aged 15–64 will become a substantially smaller share, declining from 67 % to 56 %. Those aged 65 and over

will become a much larger share (rising from 18 % to 30 % of the population), and those aged 80 and over (rising from 5 % to 12 %) will become almost as numerous as the young population in 2060.

**Table 1.13:**  
Disaggregation of the population by age groups

SHARE OF TOTAL POPULATION								
	2010				2060			
	0–14 (%)	15–64 (%)	65+ (%)	80+ (%)	0–14 (%)	15–64 (%)	65+ (%)	80+ (%)
BE	17	66	17	5	16	58	26	10
BG	14	69	18	4	13	54	33	13
CZ	14	70	15	4	14	56	31	12
DK	18	65	17	4	16	58	26	10
DE	13	66	21	5	12	55	33	14
EE	15	68	17	4	14	55	30	11
IE	22	67	11	3	18	60	22	9
EL	14	67	19	5	14	55	31	13
ES	15	68	17	5	13	56	31	14
FR	18	65	17	5	16	57	27	11
IT	14	66	20	6	12	56	32	14
CY	17	70	13	3	15	58	28	9
LV	14	69	17	4	12	52	36	13
LT	15	69	16	4	14	55	31	11
LU	18	68	14	4	15	58	26	10
HU	15	69	17	4	12	55	32	13
MT	16	69	15	3	13	56	31	11
NL	18	67	15	4	16	57	27	11
AT	15	68	18	5	14	57	29	12
PL	15	71	14	3	12	53	35	13
PT	15	67	18	5	12	56	32	14
RO	15	70	15	3	12	54	35	13
SI	14	69	16	4	14	55	32	13
SK	15	72	12	3	12	54	34	12
FI	17	66	17	5	16	57	27	10
SE	17	65	18	5	17	57	26	10
UK	17	66	17	5	17	58	25	9
NO	19	66	15	5	17	58	25	10
EU-27	16	67	17	5	14	56	30	12
EA	15	66	18	5	14	56	30	13
EA-12	16	68	19	5	14	57	30	13
EU-15	16	66	18	5	15	57	29	12
EU-10	15	71	15	4	13	54	33	12
EU-25	16	67	18	5	14	56	29	12

Source: Commission services based on Eurostat EUROPOP2010 data

As a result of these different trends among the age groups, the demographic old-age dependency ratio (persons aged 65 and over relative to persons aged 15–64) is projected to increase from 26 % to 52.5 % in the EU as a whole over the projection period (Table 1.14). This means that the EU would move from having four working-age people for every person aged over 65 years to just two working-age persons.

The increase in the total age-dependency ratio (people aged 14 and under and aged 65 and

over divided by the total population aged 15–64) is projected to be even greater, rising from 49.3 to 77.9. The difference is noticeable among individual EU Member States. A relatively small increase in the total age-dependency ratio (less than 20 percentage points) is projected in Belgium, Denmark, Ireland and the United Kingdom, while in Latvia, Poland, Romania and Slovakia an increase of 40 percentage points or more is projected by 2060 (Table 1.15).

**Table 1.14:**  
Old-age dependency ratio (65+/(15–64))

	Demographic dependency ratio (65+)						Change (percentage points)
	2010	2020	2030	2040	2050	2060	2010–60
BE	26.1	30.5	37.0	41.0	42.5	43.8	17.7
BG	25.7	32.8	38.9	46.5	56.5	60.0	34.3
CZ	21.8	30.7	34.5	40.7	50.5	54.9	33.0
DK	25.3	31.7	37.4	42.1	41.8	43.7	18.4
DE	31.2	36.2	48.0	56.4	58.2	59.8	28.6
EE	25.2	30.4	36.0	40.8	48.8	55.3	30.1
IE	17.1	23.0	27.8	33.3	39.7	36.5	19.4
EL	28.6	32.8	38.1	48.4	57.6	56.5	27.9
ES	24.9	29.1	36.0	47.4	57.0	56.2	31.3
FR	25.8	33.0	39.4	44.4	45.5	46.6	20.8
IT	30.8	34.9	41.7	52.2	56.4	56.6	25.8
CY	18.9	25.2	31.0	33.4	40.2	47.8	29.0
LV	25.2	29.1	36.4	43.7	55.1	67.9	42.7
LT	23.4	26.9	35.6	42.0	47.8	56.7	33.3
LU	20.4	23.4	30.4	37.4	42.1	45.2	24.8
HU	24.3	30.5	33.7	40.2	50.6	58.1	33.8
MT	21.8	32.2	39.3	40.4	46.9	55.9	34.1
NL	23.0	31.2	40.7	47.3	46.5	47.5	24.5
AT	26.1	30.0	39.4	46.9	48.6	50.8	24.8
PL	19.0	27.5	35.4	40.4	53.8	64.8	45.8
PT	26.9	31.6	38.3	47.3	55.8	57.2	30.3
RO	21.3	26.1	30.3	41.3	54.5	64.8	43.5
SI	23.7	30.9	39.3	46.6	55.4	57.5	33.7
SK	17.0	24.1	31.7	38.6	52.1	61.9	44.9
FI	26.1	36.6	43.0	43.5	44.9	47.6	21.5
SE	28.1	33.7	37.5	40.5	41.9	46.2	18.2
UK	25.0	29.8	35.2	38.8	39.6	42.1	17.1
NO	22.7	27.7	33.3	38.6	40.4	43.1	20.4
EU-27	26.0	31.7	38.7	45.8	50.3	52.5	26.5
EA	27.6	32.9	40.8	48.8	52.6	53.3	25.7
EA-12	27.7	33.0	40.8	48.8	52.6	53.3	25.6
EU-15	27.4	32.6	39.9	46.9	49.8	50.7	23.3
EU-10	20.6	28.3	34.9	40.5	52.2	61.0	40.5
EU-25	26.3	31.9	39.1	46.0	50.1	52.1	25.8

Source: Commission services based on Eurostat EUROPOP2010 data

**Table 1.15:**  
Demographic total age-dependency ratio (0–14 plus 65+/(15–64))

	Total dependency ratio						Change (percentage points)
	2010	2020	2030	2040	2050	2060	2010–60
BE	51.8	57.9	64.7	68.6	70.6	71.9	20.1
BG	45.6	56.1	60.0	68.4	80.9	84.1	38.5
CZ	42.2	55.1	56.2	62.3	75.1	79.1	36.9
DK	52.8	58.5	65.3	70.5	69.0	71.3	18.5
DE	51.6	55.8	69.0	77.9	80.0	82.6	31.1
EE	47.7	57.4	60.3	63.9	75.1	81.5	33.9
IE	49.3	58.2	57.3	64.4	73.3	66.5	17.2
EL	50.3	55.9	59.5	71.0	82.6	81.0	30.7
ES	47.0	51.7	55.9	68.9	80.7	79.0	32.0
FR	54.3	62.5	68.5	73.7	74.8	75.3	21.0
IT	52.2	56.0	62.0	74.0	78.8	78.9	26.7
CY	42.9	51.4	56.8	56.6	64.6	73.6	30.7
LV	45.2	51.8	56.8	63.2	76.8	90.5	45.3
LT	45.1	51.5	59.6	63.7	71.9	81.7	36.5
LU	46.2	48.0	55.5	62.3	67.4	71.0	24.8
HU	45.7	52.4	54.2	60.4	72.2	80.3	34.6
MT	44.2	55.5	62.2	61.3	68.8	79.3	35.1
NL	49.2	56.5	67.7	74.9	73.1	74.6	25.4
AT	47.9	51.1	61.7	69.7	71.3	74.4	26.5
PL	40.2	51.0	56.8	59.6	75.9	87.3	47.2
PT	49.6	52.2	57.8	68.1	77.4	78.7	29.1
RO	43.0	47.9	49.7	60.6	75.5	86.3	43.4
SI	44.0	54.4	61.2	68.4	80.5	82.4	38.3
SK	38.2	47.0	52.7	58.1	74.1	84.7	46.6
FI	51.1	64.3	71.3	70.6	72.7	75.7	24.6
SE	53.6	62.9	66.9	68.3	70.5	75.7	22.1
UK	51.5	58.7	64.5	67.7	68.7	71.5	20.0
NO	51.1	56.9	63.2	67.8	69.6	72.6	21.5
EU-27	49.3	55.9	62.5	69.9	75.5	77.9	28.5
EA	50.9	56.4	63.9	72.7	77.4	78.0	27.2
EA-12	50.9	56.4	64.0	72.8	77.4	78.0	27.1
EU-15	51.3	57.1	64.3	72.0	75.5	76.5	25.2
EU-10	41.7	51.8	56.3	60.5	74.9	84.1	42.5
EU-25	49.7	56.2	63.1	70.3	75.4	77.5	27.8

Source: Commission services based on Eurostat EUROPOP2010 data

## 1.6. POPULATION AGEING IN THE EU IN A GLOBAL CONTEXT

Considering demographic trends in a global perspective, using UN statistics and projections, the share of the population of what is the EU today halved from 14.7 % of the world population in 1950 to 7.2 % in 2010, and it is projected to drop close to 5.4 % in 2050, despite the net migration flows projected <sup>(23)</sup>. The share

of the populations of China, Japan and the United States has also declined over the last five decades. These declining trends over the period 1950–2010, is in contrast with the trends shown in Africa, Asia or Latin America, where the share of world population was rising.

Over the period 2010–50, the share of the population in Africa is projected to increase quickly, exceeding 20 % of the world population in 2050. In Asia, as a whole, a slight decline is projected though it is projected it will still account for close to 60 % of the world population in 2050. The decline is particularly evident

<sup>(23)</sup> The United Nations Population Division produces global population projections revised every two years. The latest projections are the 2008 Revision.

**Table 1.16:**  
Geographic distribution of world population based on the UN 2008 Revision

Distribution of world population													
	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050	Change 1950–2000	Change 2000–50
<b>Africa</b>	8.8	9.3	9.8	10.8	12.0	13.4	15.0	16.6	18.3	20.1	21.8	4.6	8.4
<b>Asia</b>	55.6	56.2	57.8	59.2	60.1	60.5	60.3	59.9	59.2	58.2	57.2	4.9	– 3.3
<b>China</b>	21.9	21.7	22.5	22.4	21.7	20.7	19.6	18.6	17.6	16.5	15.5	– 1.1	– 5.3
<b>India</b>	14.7	14.7	14.9	15.5	16.2	17.1	17.6	17.8	17.9	17.8	17.6	2.4	0.6
<b>Japan</b>	3.3	3.1	2.8	2.6	2.3	2.1	1.8	1.6	1.4	1.2	1.1	– 1.2	– 1.0
<b>Russian Federation</b>	4.1	4.0	3.5	3.1	2.8	2.4	2.0	1.8	1.6	1.4	1.3	– 1.6	– 1.1
<b>Europe</b>	21.6	20.0	17.8	15.6	13.6	11.9	10.6	9.6	8.7	8.0	7.6	– 9.7	– 4.3
<b>EU-27</b>	14.7	13.3	11.8	10.3	8.9	7.9	7.2	6.6	6.1	5.7	5.4	– 6.9	– 2.5
<b>EA</b>	9.5	8.5	7.6	6.6	5.7	5.1	4.7	4.3	4.0	3.8	3.6	– 4.4	– 1.6
<b>Latin America</b>	6.6	7.3	7.8	8.2	8.4	8.5	8.6	8.6	8.6	8.5	8.4	1.9	– 0.1
<b>Northern America</b>	6.8	6.7	6.3	5.7	5.4	5.2	5.1	5.0	4.9	4.9	4.9	– 1.6	– 0.3
<b>United States</b>	6.2	6.1	5.7	5.2	4.8	4.7	4.6	4.5	4.4	4.4	4.4	– 1.6	– 0.3
<b>Oceania</b>	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.0	0.1

Source: UN World Population Prospects: The 2008 Revision

for China, where the share of the population in the world population is projected to fall from 19.6 % to 15.5 % between 2010 and 2050. The population of the European continent will become relative smaller by 2050 with its share shrinking by 3 percentage points (from 10.6 % to 7.6 %). The Northern America and the United States shares (5.1 % and 4.6 %, respectively) will decline only marginally. The other regions of the world will roughly keep their share in the sharply growing world population (6 895 889 inhabitants projected to become 9 615 189 in 2060, i.e. an increase of 39.4 % over 40 years).

Table 1.17 shows the old-age dependency ratio (persons aged 65 and over in relation to the working-age population) around the world. The UN projects an old-age dependency

ratio of 50.7 in the EU in 2050 (compared with 50.3 according to EUROPOP2010), which is much greater than the rest of the world with the exception of Japan, where it is projected to reach 74.3. The EU of today already had the highest old-age dependency ratio in 1950 (and higher still in the euro area), slightly higher than the United States, but its increase has been faster over the period 1950–2010 (up by 13 percentage points in the EU compared with 6 percentage points in the United States). Sharper increases in the old-age dependency ratio are projected during the period 2010–50 than between 1950 and 2000 everywhere. The largest increases are projected to take place in Japan (by close to 50 percentage points) and in China, the EU and the euro area (by almost 30 percentage points).

**Table 1.17:**  
Old-age dependency ratio based on the UN 2008 Revision (65+/(15–64))

	Old-age dependency ratio											Change 1950–2000	Change 2000–50
	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050		
<b>World</b>	8.5	9.1	9.5	9.9	9.9	10.9	11.6	14.2	17.8	21.9	25.3	2.4	14.4
<b>Africa</b>	5.9	5.9	6.2	6.1	6.0	6.1	6.1	6.6	7.4	8.5	10.8	0.1	4.7
<b>Asia</b>	6.8	7.2	7.1	7.4	7.7	9.1	9.9	12.8	17.0	22.4	26.7	2.3	17.6
<b>China</b>	7.2	8.6	7.7	7.9	8.1	10.0	11.4	16.8	23.7	34.6	38.0	2.8	28.0
<b>India</b>	5.3	5.3	5.8	6.3	6.8	7.6	7.7	9.4	12.2	15.4	20.2	2.3	12.6
<b>Japan</b>	8.3	9.0	10.3	13.4	17.2	25.3	35.1	47.7	52.8	65.2	74.3	17.0	49.0
<b>Russian Federation</b>	9.5	9.9	11.7	15.0	14.8	17.7	17.9	22.8	29.7	31.6	38.8	8.1	21.1
<b>Europe</b>	12.5	13.7	16.3	18.9	19.0	21.8	23.8	29.0	36.1	42.0	47.5	9.2	25.7
<b>EU-27</b>	13.4	15.2	18.2	20.6	20.8	23.4	26.1	31.5	38.7	46.1	50.7	10.0	27.2
<b>EA</b>	14.2	16.1	19.4	21.4	21.6	24.9	28.4	33.8	42.4	51.6	55.8	10.8	30.9
<b>Latin America</b>	6.2	6.8	7.6	7.9	8.2	9.2	10.6	13.4	18.0	23.3	29.2	3.0	20.0
<b>Northern America</b>	12.7	15.1	15.6	16.6	18.3	18.6	19.5	25.2	32.2	34.6	35.9	5.9	17.3
<b>United States</b>	12.8	15.3	15.9	16.9	18.5	18.6	19.0	24.5	31.1	33.0	34.1	5.9	15.5
<b>Oceania</b>	11.7	12.2	11.8	12.8	14.1	15.3	16.6	20.8	25.5	28.6	30.0	3.6	14.7

Source: UN World Population Prospects: The 2008 Revision

**Table 1.18:**  
Old-age dependency ratio based on the UN 2008 Revision (80+/(15–64))

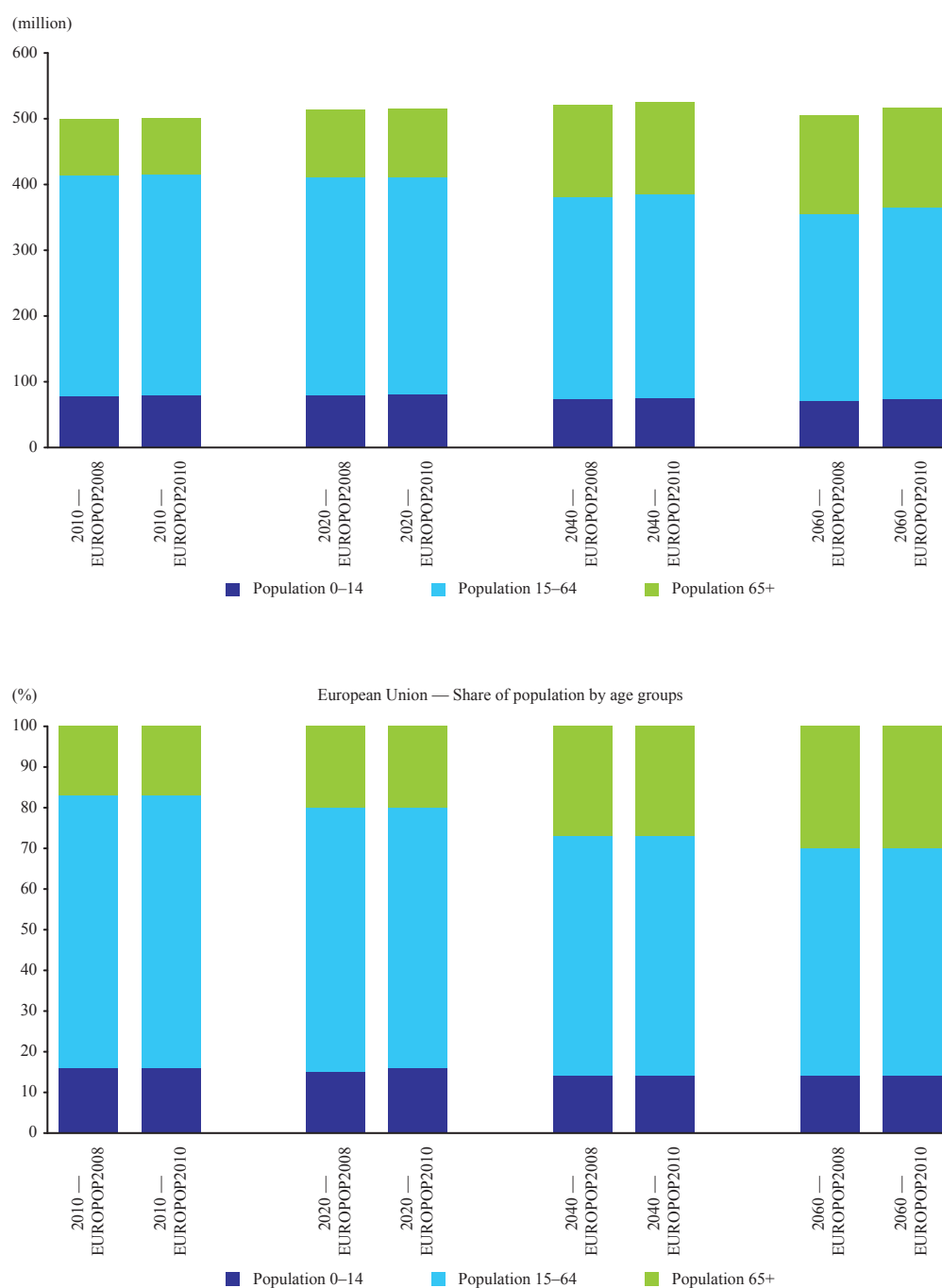
	Very old-age dependency ratio											Change 1950–2000	Change 2000–50
	1950	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050		
<b>World</b>	0.9	1.1	1.3	1.4	1.6	1.8	2.3	2.8	3.6	5.0	6.7	0.9	4.9
<b>Africa</b>	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.8	1.0	1.3	1.6	0.2	0.9
<b>Asia</b>	0.6	0.7	0.8	0.8	0.9	1.3	1.7	2.2	3.0	4.6	6.7	0.7	5.5
<b>China</b>	0.5	0.6	0.9	0.7	0.9	1.3	2.0	2.8	4.2	7.2	11.6	0.9	10.3
<b>India</b>	0.6	0.6	0.6	0.6	0.7	1.0	1.0	1.4	1.8	2.8	3.9	0.4	2.9
<b>Japan</b>	0.8	1.1	1.3	2.0	3.4	5.6	9.9	15.3	22.1	26.1	30.6	4.8	25.1
<b>Russian Federation</b>	1.5	1.6	1.8	2.0	2.7	2.7	4.1	5.5	5.6	8.9	10.0	1.2	7.3
<b>Europe</b>	1.7	2.1	2.5	3.1	4.1	4.3	6.2	7.9	9.7	13.2	16.6	2.6	12.3
<b>EU-27</b>	1.7	2.2	2.8	3.6	4.7	5.0	7.1	9.0	11.3	14.9	19.0	3.3	14.0
<b>EA</b>	1.8	2.4	3.1	3.9	5.1	5.5	7.9	10.2	12.8	17.1	22.2	3.7	16.7
<b>Latin America</b>	0.8	0.8	0.9	1.1	1.3	1.7	2.3	2.8	3.9	5.8	8.2	0.9	6.6
<b>Northern America</b>	1.8	2.3	2.9	3.5	3.9	4.8	5.7	6.1	8.4	11.7	13.1	3.0	8.3
<b>United States</b>	1.8	2.4	3.0	3.6	3.9	4.9	5.5	5.7	8.0	11.1	12.3	3.1	7.5
<b>Oceania</b>	1.6	1.8	2.0	2.2	2.7	3.4	4.4	5.0	6.8	8.9	10.5	1.9	7.1

Source: UN World Population Prospects: The 2008 Revision

## 1.7. COMPARISON WITH THE EUROPOP2008 DEMOGRAPHIC PROJECTION USED IN THE 2009 AGEING REPORT

This section provides a comparison of the main features of the EUROPOP2010 projection with the EUROPOP2008 projection used in the 2009 Ageing Report.

**Graph 1.3:** Population projections in the European Union, compared by age groups



Source: Commission services based on Eurostat EUROPOP2010 data

In the EU as a whole, the population in 2010 was 2 403 000 greater than the EUROPOP2008 projection (Table 1.19). By 2030, the population is projected to be about 2.6 million greater and by 2060 about 10.7 million greater (+ 2.1 %). The higher population in 2060 is mostly concentrated in the working-age population (15–64), but more young persons and older persons are projected too (Table 1.20 and Table 1.22).

As a result of the differences between the two rounds of population projections, the increase in old-age dependency ratio (persons aged 65 and over relative to persons aged 15–64) is lower in the EUROPOP2010 projection compared to the EUROPOP2008 projection, and increasing less: 26.5 percentage points between 2010 and 2060 (compared to 27.6 percentage points in the previous projection over the same period) (Table 1.23). Due to diverging changes in assumptions, the projected increase in the old-age dependency ratio is significantly lower in the Czech Republic, Ireland, Lithuania and Slovakia, and significantly higher in Cyprus, Latvia, Luxembourg and Portugal.

Total fertility rates in the EU as a whole are higher in the EUROPOP2010 projection compared to the previous projection and in particular at the beginning of the projection period (up by 0.05 in 2010). This pattern is especially the case in Bulgaria, the Czech Republic, Ireland, Greece, Poland, Slovakia, Slovenia and the United Kingdom (higher by 0.1 or more in 2010). By contrast, the total fertility rate is lower in 2010 compared with EUROPOP2008 in Denmark, Latvia, Luxembourg, Hungary, Austria and Portugal.

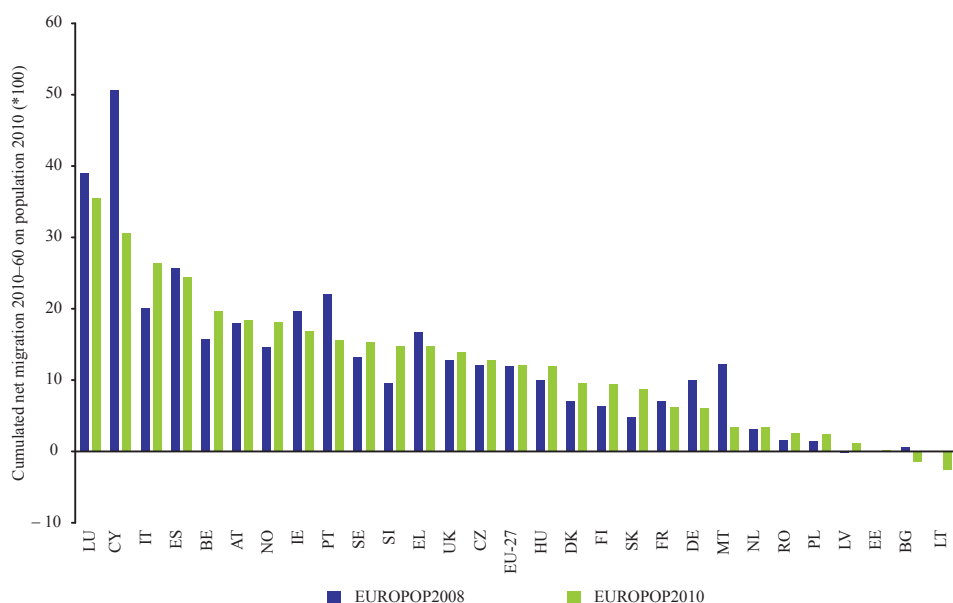
Over the projection period to 2060, the increase is now expected to be slightly lower in the EU (Table 1.24).

Life expectancy at birth in 2010 in the EU as a whole is assumed to be higher in EUROPOP2010 than EUROPOP2008 for both males (+ 0.2 year) and females (+ 0.1 year). The largest increases in 2010 (0.5 year or more) for males occurs in Estonia, Spain, Latvia, Lithuania, Luxembourg, Malta, Slovenia and the United Kingdom and for females in Estonia, Spain, Cyprus, Latvia, Lithuania, Luxembourg, Malta and the United Kingdom. Over the projection period to 2060, the increase is now expected to be slightly lower in the EU, with a rise of 0.1 year less for both males and females (Table 1.25).

In light of the recent observed decreases in net migration inflows to the EU, especially in some Member States (DE, IE, ES), net migration flows in the EU are projected to be about 545 000 lower in 2010 in the EUROPOP2010 projection than in the EUROPOP2008 projection. Overall, EU net inward migration is projected to be 4.4 million lower by 2060 in EUROPOP2010 than EUROPOP2008 (Table 1.26). The revised methodology for the migration projections in EUROPOP2010 compared with EUROPOP2008 affects the EU Member States differently (Table 1.26).

Graph 1.4 shows the projected cumulative net migration per capita 2010–60 on the basis of EUROPOP2008 and EUROPOP2010 as used for the 2011 pension projections. Differences are the results of the revised methodology for the migration projections only, since projections for 50 years' time are based on the average migration from 2002 to 2009 only.



**Graph 1.4:** Projected cumulative net migration per capita 2010–60 according to EUROPOP2008 and EUROPOP2010 sorted by value of EUROPOP2010

Source: Commission services based on Eurostat EUROPOP2010 data

**Table 1.19:**  
Total population compared (EUROPOP2010/EUROPOP2008) ('000)

	2010	2020	2030	2040	2050	2060	Difference in 2060 as % of total population EUROPOP2008
BE	98	303	487	708	949	1 166	9.5
BG	-20	-93	-164	-111	-42	27	0.5
CZ	132	281	415	579	770	938	9.9
DK	32	68	93	113	145	162	2.7
DE	-480	-1 467	-2 412	-3 189	-3 907	-4 609	-6.5
EE	6	11	10	20	30	38	3.4
IE	-136	-565	-582	-439	-304	-192	-2.8
EL	14	-24	7	64	121	159	1.4
ES	-595	-3 032	-2 608	-1 499	-535	323	0.6
FR	2 301	2 351	2 432	2 356	2 173	1 947	2.7
IT	485	1 549	2 695	3 732	4 651	5 534	9.3
CY	-14	-64	-95	-128	-159	-184	-13.9
LV	-5	-16	-17	-9	-12	-18	-1.0
LT	-17	-46	-46	4	69	121	4.8
LU	12	25	22	15	8	-3	-0.4
HU	-15	1	40	78	101	125	1.4
MT	-1	-11	-15	-17	-18	-18	-4.4
NL	113	345	381	384	433	461	2.8
AT	-21	-118	-129	-142	-162	-174	-1.9
PL	96	420	523	818	1 185	1 468	4.7
PT	-80	-376	-536	-689	-864	-1 018	-9.0
RO	109	142	158	233	282	318	1.9
SI	20	86	131	182	235	276	15.5
SK	27	148	243	346	459	556	12.2
FI	26	85	138	206	279	344	6.4
SE	76	248	326	444	576	662	6.1
UK	238	821	1 157	1 588	2 038	2 366	3.1
NO	71	224	299	380	481	560	9.3
EU-27	2 403	1 075	2 655	5 647	8 500	10 776	2.1
EA	:	:	:	:	:	:	:
EA-12	1 739	-923	-105	1 508	2 843	3 938	1.2
EU-15	2 085	215	1 471	3 652	5 602	7 127	1.7
EU-10	229	811	1 190	1 873	2 659	3 303	5.3
EU-25	2 314	1 026	2 661	5 525	8 260	10 431	2.2

Source: Commission services based on Eurostat EUROPOP2010 and EUROPOP2008 data

**Table 1.20:**  
Working-age (15–64) population compared (EUROPOP2010/EUROPOP2008) ('000)

	2010	2020	2030	2040	2050	2060	Difference in 2060 as % of working-age population EUROPOP2008
<b>BE</b>	53	144	278	433	559	718	10.1
<b>BG</b>	– 42	– 155	– 213	– 185	– 90	41	1.4
<b>CZ</b>	75	115	243	357	504	664	12.8
<b>DK</b>	17	39	68	95	82	77	2.2
<b>DE</b>	– 325	– 1 289	– 1 880	– 2 218	– 2 639	– 2 674	– 6.9
<b>EE</b>	1	– 4	– 4	– 1	5	19	3.0
<b>IE</b>	– 137	– 489	– 457	– 419	– 246	34	0.9
<b>EL</b>	– 21	– 56	– 11	– 8	1	70	1.1
<b>ES</b>	– 530	– 2 193	– 1 869	– 1 116	39	754	2.7
<b>FR</b>	1 456	1 401	1 366	1 332	1 156	869	2.1
<b>IT</b>	349	1 094	1 729	2 449	3 118	3 537	10.8
<b>CY</b>	– 13	– 56	– 78	– 94	– 109	– 122	– 15.8
<b>LV</b>	– 6	– 16	– 18	– 28	– 29	– 24	– 2.6
<b>LT</b>	– 23	– 83	– 63	– 10	43	122	9.1
<b>LU</b>	11	21	19	12	– 3	– 15	– 3.3
<b>HU</b>	– 3	25	66	59	88	75	1.6
<b>MT</b>	– 2	– 11	– 10	– 9	– 7	– 6	– 2.9
<b>NL</b>	56	112	120	163	140	183	1.9
<b>AT</b>	– 6	– 89	– 111	– 103	– 89	– 90	– 1.7
<b>PL</b>	25	– 27	297	493	694	1 070	6.6
<b>PT</b>	– 60	– 221	– 353	– 486	– 545	– 613	– 9.7
<b>RO</b>	70	32	103	72	108	188	2.1
<b>SI</b>	12	43	84	119	143	170	17.8
<b>SK</b>	11	51	138	213	282	364	15.2
<b>FI</b>	8	46	94	145	182	222	7.3
<b>SE</b>	32	117	170	254	302	373	6.0
<b>UK</b>	2	– 116	– 22	117	317	1 076	2.4
<b>NO</b>	50	133	187	259	288	329	9.4
<b>EU-27</b>	1 010	– 1 566	– 317	1 637	4 006	7 084	2.5
<b>EA</b>	:	:	:	:	:	:	:
<b>EA-12</b>	5 694	3 116	3 370	4 396	5 419	6 403	3.5
<b>EU-15</b>	904	– 1 481	– 861	652	2 374	4 522	1.9
<b>EU-10</b>	78	38	655	1 099	1 614	2 332	6.9
<b>EU-25</b>	982	– 1 443	– 206	1 750	3 988	6 854	2.5

Source: Commission services based on Eurostat EUROPOP2010 and EUROPOP2008 data

**Table 1.21:**  
Population aged 0–14 compared (EUROPOP2010/EUROPOP2008) ('000)

	2010	2020	2030	2040	2050	2060	Difference in 2060 as % of 0–14 population EUROPOP2008
<b>BE</b>	30	121	147	188	249	274	14.2
<b>BG</b>	13	31	19	46	65	66	10.0
<b>CZ</b>	40	154	167	201	252	250	21.4
<b>DK</b>	0	23	15	– 2	13	15	1.6
<b>DE</b>	– 75	– 173	– 464	– 474	– 468	– 632	– 7.1
<b>EE</b>	3	5	2	7	11	11	6.7
<b>IE</b>	11	– 63	– 121	12	66	36	3.2
<b>EL</b>	9	45	48	66	81	87	6.1
<b>ES</b>	– 90	– 785	– 636	– 169	– 113	– 49	– 0.7
<b>FR</b>	477	384	379	253	138	97	0.8
<b>IT</b>	91	279	541	667	736	883	12.2
<b>CY</b>	– 4	– 13	– 17	– 22	– 27	– 29	– 14.9
<b>LV</b>	3	– 10	– 16	– 5	– 8	– 9	– 4.2
<b>LT</b>	6	40	23	34	59	51	16.0
<b>LU</b>	1	3	– 1	– 6	– 6	– 8	– 6.7
<b>HU</b>	– 15	– 41	– 23	– 12	– 21	– 14	– 1.2
<b>MT</b>	– 0	– 0	– 2	– 1	– 1	– 1	– 1.5
<b>NL</b>	20	143	135	93	142	160	6.4
<b>AT</b>	– 17	– 52	– 47	– 40	– 47	– 49	– 3.9
<b>PL</b>	66	370	252	333	466	388	11.0
<b>PT</b>	– 30	– 152	– 165	– 161	– 199	– 211	– 14.6
<b>RO</b>	27	41	28	66	59	51	2.6
<b>SI</b>	8	34	34	41	54	53	23.2
<b>SK</b>	11	77	84	96	123	124	24.5
<b>FI</b>	3	28	34	48	67	69	8.2
<b>SE</b>	20	94	89	102	151	145	8.1
<b>UK</b>	101	457	358	587	871	845	6.7
<b>NO</b>	12	75	83	77	113	119	11.8
<b>EU-27</b>	708	1 040	864	1 949	2 713	2 602	3.7
<b>EA</b>	:	:	:	:	:	:	:
<b>EA-12</b>	1 466	875	814	1 328	1 501	1 457	3.2
<b>EU-15</b>	551	351	313	1 165	1 681	1 662	2.7
<b>EU-10</b>	116	616	504	672	909	823	11.0
<b>EU-25</b>	668	967	817	1 837	2 590	2 485	3.6

Source: Commission services based on Eurostat EUROPOP2010 and EUROPOP2008 data

**Table 1.22:**  
Population aged 65 and over compared (EUROPOP2010/EUROPOP2008) ('000)

	2010	2020	2030	2040	2050	2060	Difference in 2060 as % of 65+ population EUROPOP2008
<b>BE</b>	15	39	62	87	141	174	5.3
<b>BG</b>	9	31	30	28	- 17	- 80	- 4.3
<b>CZ</b>	17	13	4	22	14	25	0.8
<b>DK</b>	16	6	10	19	50	70	4.7
<b>DE</b>	- 80	- 4	- 68	- 496	- 799	- 1 303	- 5.7
<b>EE</b>	2	9	11	13	14	9	2.5
<b>IE</b>	- 9	- 13	- 4	- 32	- 124	- 262	- 15.4
<b>EL</b>	26	- 13	- 30	7	39	2	0.1
<b>ES</b>	26	- 53	- 103	- 215	- 461	- 382	- 2.3
<b>FR</b>	368	567	687	770	880	981	5.3
<b>IT</b>	44	177	425	616	797	1 114	5.7
<b>CY</b>	3	5	1	- 11	- 24	- 32	- 9.4
<b>LV</b>	- 1	10	18	23	24	15	2.5
<b>LT</b>	- 0	- 3	- 6	- 19	- 32	- 51	- 5.8
<b>LU</b>	0	2	4	9	17	20	11.7
<b>HU</b>	3	17	- 2	32	34	64	2.3
<b>MT</b>	1	- 1	- 3	- 7	- 10	- 11	- 8.1
<b>NL</b>	37	89	126	128	151	118	2.6
<b>AT</b>	2	23	29	1	- 26	- 35	- 1.3
<b>PL</b>	4	77	- 26	- 9	26	10	0.1
<b>PT</b>	10	- 4	- 18	- 42	- 120	- 194	- 5.6
<b>RO</b>	12	68	28	95	115	79	1.3
<b>SI</b>	0	9	14	23	38	53	8.9
<b>SK</b>	5	21	21	37	53	68	4.1
<b>FI</b>	15	12	10	12	30	52	3.5
<b>SE</b>	25	38	67	87	123	144	5.0
<b>UK</b>	135	480	820	884	849	444	2.3
<b>NO</b>	9	16	29	45	80	112	7.3
<b>EU-27</b>	685	1601	2 108	2 062	1 781	1 091	0.7
<b>EA</b>	:	:	:	:	:	:	:
<b>EA-12</b>	1 353	1 989	2 563	2 487	2 452	2 352	2.4
<b>EU-15</b>	630	1 345	2 018	1 835	1 546	943	0.8
<b>EU-10</b>	34	157	31	103	136	149	0.7
<b>EU-25</b>	664	1 502	2 050	1 938	1 682	1 092	0.8

Source: Commission services based on Eurostat EUROPOP2010 and EUROPOP2008 data

**Table 1.23:**  
Old-age dependency ratio (65+/(15–64)) compared (EUROPOP2010/EUROPOP2008)

	2010	2020	2030	2040	2050	2060	2010–60
BE	0.0	–0.1	–0.6	–1.3	–1.4	–2.0	–2.0
BG	0.4	1.7	2.6	2.9	1.0	–3.5	–3.9
CZ	0.0	–0.3	–1.2	–2.0	–4.3	–6.6	–6.6
DK	0.3	–0.2	–0.4	–0.6	0.5	1.1	0.7
DE	0.0	0.9	1.7	1.7	1.8	0.8	0.7
EE	0.2	1.2	1.6	1.8	1.7	–0.2	–0.4
IE	0.5	2.8	3.2	2.7	–0.7	–7.0	–7.5
EL	0.4	0.1	–0.4	0.2	0.6	–0.6	–1.0
ES	0.5	1.7	1.7	1.0	–1.7	–2.8	–3.3
FR	–0.0	0.3	0.4	0.4	0.9	1.4	1.4
IT	–0.2	–0.5	–0.8	–1.9	–2.8	–2.7	–2.6
CY	0.9	2.9	3.5	2.6	2.6	3.4	2.5
LV	0.0	1.0	1.9	3.0	3.9	3.4	3.4
LT	0.2	0.9	0.9	–0.8	–3.3	–9.0	–9.2
LU	–0.7	–0.9	–0.4	1.0	4.3	6.1	6.7
HU	0.1	0.1	–0.4	0.1	–0.2	0.4	0.4
MT	0.6	0.9	0.2	–1.3	–2.9	–3.2	–3.8
NL	0.2	0.5	0.7	0.5	0.9	0.3	0.1
AT	0.1	0.9	1.3	0.9	0.3	0.2	0.1
PL	–0.0	0.3	–0.6	–0.9	–1.8	–4.2	–4.2
PT	0.4	0.9	1.6	2.7	2.8	2.5	2.1
RO	–0.0	0.4	–0.0	0.5	0.5	–0.5	–0.5
SI	–0.2	–0.3	–1.5	–2.8	–4.0	–4.7	–4.6
SK	0.1	0.2	–0.6	–1.4	–3.4	–6.6	–6.7
FI	0.4	–0.2	–0.9	–1.6	–1.7	–1.8	–2.1
SE	0.3	–0.0	0.1	–0.3	–0.1	–0.5	–0.7
UK	0.3	1.2	1.9	1.9	1.6	–0.0	–0.3
NO	–0.1	–0.6	–1.0	–1.6	–1.1	–0.8	–0.8
EU-27	0.1	0.6	0.7	0.4	–0.1	–0.9	–1.1
EA	:	:	:	:	:	:	:
EA-12	–0.1	0.5	0.6	0.2	–0.2	–0.6	–0.5
EU-15	0.1	0.7	0.9	0.6	0.2	–0.6	–0.7
EU-10	0.0	0.3	–0.4	–0.8	–1.9	–3.8	–3.8
EU-25	0.1	0.6	0.7	0.4	–0.1	–0.9	–1.0

Source: Commission services based on Eurostat EUROPOP2010 and EUROPOP2008 data

**Table 1.24:**  
Fertility rates compared (EUROPOP2010/EUROPOP2008)

	Fertility rate						Change 2010–60
	2010	2020	2030	2040	2050	2060	
<b>BE</b>	0.08	0.08	0.07	0.06	0.06	0.05	– 0.03
<b>BG</b>	0.17	0.16	0.14	0.14	0.13	0.12	– 0.06
<b>CZ</b>	0.15	0.14	0.14	0.12	0.11	0.10	– 0.05
<b>DK</b>	– 0.01	– 0.01	– 0.01	– 0.01	– 0.01	– 0.01	0.00
<b>DE</b>	0.01	0.02	0.01	0.02	0.01	0.01	– 0.01
<b>EE</b>	0.07	0.07	0.06	0.05	0.05	0.04	– 0.03
<b>IE</b>	0.17	0.15	0.15	0.13	0.12	0.11	– 0.06
<b>EL</b>	0.11	0.10	0.09	0.08	0.08	0.07	– 0.04
<b>ES</b>	0.01	0.00	0.00	0.01	0.01	0.00	– 0.01
<b>FR</b>	0.02	0.02	0.02	0.02	0.02	0.02	– 0.00
<b>IT</b>	0.03	0.03	0.02	0.02	0.02	0.02	– 0.01
<b>CY</b>	0.04	0.03	0.03	0.03	0.03	0.02	– 0.01
<b>LV</b>	– 0.05	– 0.05	– 0.04	– 0.04	– 0.03	– 0.03	0.01
<b>LT</b>	0.20	0.18	0.16	0.14	0.12	0.12	– 0.08
<b>LU</b>	– 0.06	– 0.06	– 0.05	– 0.05	– 0.05	– 0.04	0.02
<b>HU</b>	– 0.03	– 0.03	– 0.02	– 0.02	– 0.03	– 0.02	0.01
<b>MT</b>	0.05	0.05	0.04	0.04	0.04	0.04	– 0.01
<b>NL</b>	0.07	0.06	0.06	0.05	0.05	0.04	– 0.03
<b>AT</b>	– 0.03	– 0.02	– 0.02	– 0.02	– 0.02	– 0.01	0.01
<b>PL</b>	0.12	0.11	0.10	0.10	0.09	0.07	– 0.05
<b>PT</b>	– 0.05	– 0.04	– 0.04	– 0.03	– 0.04	– 0.03	0.02
<b>RO</b>	0.05	0.04	0.04	0.04	0.03	0.03	– 0.02
<b>SI</b>	0.21	0.19	0.18	0.16	0.15	0.13	– 0.08
<b>SK</b>	0.15	0.14	0.14	0.13	0.11	0.10	– 0.05
<b>FI</b>	0.02	0.02	0.02	0.02	0.02	0.02	– 0.00
<b>SE</b>	0.09	0.08	0.07	0.07	0.06	0.05	– 0.03
<b>UK</b>	0.10	0.09	0.09	0.08	0.07	0.07	– 0.03
<b>NO</b>	0.10	0.09	0.09	0.08	0.07	0.06	– 0.04
<b>EU-27</b>	0.05	0.05	0.05	0.04	0.04	0.03	– 0.02
<b>EA</b>	:	:	:	:	:	:	:
<b>EA-12</b>	0.06	0.06	0.06	0.06	0.05	0.05	– 0.01
<b>EU-15</b>	0.04	0.04	0.04	0.04	0.03	0.03	– 0.01
<b>EU-10</b>	0.11	0.10	0.09	0.08	0.08	0.06	– 0.04
<b>EU-25</b>	0.05	0.05	0.04	0.04	0.04	0.03	– 0.02

Source: Commission services based on Eurostat EUROPOP2010 and EUROPOP2008 data

**Table 1.25:**  
Life expectancy at birth compared (EUROPOP2010/EUROPOP2008)

	Males							Females						
	2010	2020	2030	2040	2050	2060	Change 2010-60	2010	2020	2030	2040	2050	2060	Change 2010-60
BE	0.3	0.3	0.3	0.2	0.2	0.1	-0.1	-0.0	-0.0	0.0	0.0	0.0	0.1	0.1
BG	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.2	0.2	0.1	0.1	-0.2
CZ	0.1	0.1	0.0	0.0	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.0	-0.0	-0.0	0.0
DK	0.2	0.2	0.2	0.2	0.2	0.2	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.0	0.2
DE	-0.0	-0.0	-0.0	-0.0	-0.1	-0.1	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.0
EE	1.2	1.1	1.0	0.9	0.8	0.8	-0.4	1.0	0.8	0.7	0.6	0.5	0.4	-0.5
IE	-0.9	-0.8	-0.8	-0.8	-0.7	-0.7	0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.3	-0.1
EL	-0.0	0.0	0.0	0.1	0.1	0.1	0.1	-0.1	-0.1	-0.2	-0.3	-0.3	-0.4	-0.3
ES	0.9	0.8	0.7	0.6	0.5	0.5	-0.4	0.5	0.5	0.4	0.4	0.3	0.3	-0.2
FR	0.1	0.1	0.1	0.0	0.0	-0.0	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0
IT	0.1	0.0	0.0	0.0	0.0	0.0	-0.0	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	0.1
CY	-0.2	-0.2	-0.1	-0.1	-0.1	-0.0	0.2	0.8	0.7	0.6	0.5	0.4	0.3	-0.5
LV	1.7	1.4	1.2	1.0	0.8	0.6	-1.1	0.8	0.7	0.6	0.5	0.5	0.4	-0.4
LT	1.2	0.9	0.7	0.5	0.4	0.2	-1.0	0.8	0.6	0.5	0.4	0.3	0.2	-0.6
LU	1.1	0.9	0.7	0.6	0.5	0.4	-0.7	1.3	1.3	1.2	1.1	1.1	1.0	-0.4
HU	0.2	0.1	0.1	0.1	0.1	0.1	-0.1	-0.1	-0.0	0.0	0.0	0.1	0.1	0.1
MT	1.2	1.0	0.9	0.8	0.7	0.6	-0.7	0.9	0.8	0.6	0.5	0.4	0.3	-0.6
NL	0.4	0.4	0.3	0.3	0.3	0.2	-0.2	0.3	0.3	0.2	0.2	0.2	0.2	-0.1
AT	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	0.1	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	0.1
PL	-0.2	-0.2	-0.2	-0.2	-0.2	-0.1	0.0	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	0.1
PT	0.4	0.3	0.3	0.2	0.2	0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.0
RO	-0.3	-0.3	-0.2	-0.2	-0.1	-0.1	0.2	0.4	0.3	0.2	0.2	0.2	0.2	-0.2
SI	0.7	0.6	0.5	0.4	0.3	0.2	-0.5	0.1	0.0	0.0	-0.0	-0.0	-0.0	-0.1
SK	0.2	0.2	0.2	0.2	0.2	0.2	-0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
FI	0.1	0.1	0.1	0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.0	0.1
SE	0.2	0.2	0.1	0.1	0.1	0.1	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	-0.0
UK	0.6	0.5	0.4	0.3	0.3	0.2	-0.4	0.5	0.5	0.4	0.3	0.2	0.2	-0.4
NO	0.0	0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0	0.0	0.0
EU-27	0.2	0.2	0.2	0.1	0.1	0.1	-0.1	0.1	0.0	0.0	0.0	0.0	-0.0	-0.1
EA	;	;	;	;	;	;	;	;	;	;	;	;	;	;
EA-12	1.7	1.7	1.7	1.7	1.6	1.6	-0.0	1.7	1.7	1.7	1.7	1.6	1.6	-0.0
EU-15	0.2	0.2	0.2	0.2	0.1	0.1	-0.1	0.1	0.0	0.0	0.0	0.0	-0.0	-0.1
EU-10	0.1	0.1	0.0	0.0	0.0	-0.0	-0.1	-0.0	-0.0	-0.0	-0.0	-0.0	-0.0	0.0
EU-25	0.2	0.2	0.2	0.1	0.1	0.1	-0.1	0.0	0.0	0.0	0.0	-0.0	-0.0	-0.1

Source: Commission services based on Eurostat EUROPOP2010 and EUROPOP2008 data

**Table 1.26:**  
Net migration flows compared (EUROPOP2010/EUROPOP2008) ('000)

	Net migration ('000)							Difference in cumulative net migration (2010–60) in % of total population in 2060 in EUROPOP2010
	2010	2020	2030	2040	2050	2060	2010–60	
<b>BE</b>	14	10	11	12	10	9	467	3.5
<b>BG</b>	– 10	– 15	– 3	3	2	2	– 153	– 2.8
<b>CZ</b>	5	4	3	3	2	2	102	1.0
<b>DK</b>	2	3	3	3	3	3	139	2.3
<b>DE</b>	– 106	– 59	– 54	– 49	– 48	– 44	– 3 209	– 4.9
<b>EE</b>	– 0	– 1	0	1	0	0	3	0.3
<b>IE</b>	– 75	1	12	13	10	7	– 111	– 1.7
<b>EL</b>	– 13	– 1	– 1	– 1	– 1	– 1	– 208	– 1.8
<b>ES</b>	– 461	4	93	99	75	55	– 414	– 0.8
<b>FR</b>	– 26	0	0	– 0	1	– 0	– 328	– 0.4
<b>IT</b>	105	103	90	83	76	70	3 944	6.1
<b>CY</b>	– 7	– 3	– 2	– 2	– 2	– 2	– 155	– 13.6
<b>LV</b>	– 3	– 0	1	1	1	1	30	1.8
<b>LT</b>	– 11	– 5	– 1	1	1	1	– 80	– 3.0
<b>LU</b>	2	– 0	– 0	– 0	– 0	– 0	– 9	– 1.2
<b>HU</b>	3	5	5	4	4	4	185	2.1
<b>MT</b>	– 2	– 1	– 1	– 0	– 0	– 0	– 36	– 9.4
<b>NL</b>	28	– 1	– 2	– 1	– 1	– 2	58	0.3
<b>AT</b>	– 14	5	4	4	3	3	41	0.5
<b>PL</b>	27	– 1	5	9	8	6	412	1.3
<b>PT</b>	– 33	– 11	– 9	– 8	– 8	– 7	– 678	– 6.6
<b>RO</b>	5	2	4	5	4	4	207	1.2
<b>SI</b>	6	2	2	2	2	2	111	5.4
<b>SK</b>	7	5	4	4	4	3	219	4.3
<b>FI</b>	5	4	4	4	3	3	173	3.0
<b>SE</b>	18	1	6	7	5	4	226	2.0
<b>UK</b>	14	27	27	25	22	20	831	1.1
<b>NO</b>	16	2	4	4	3	2	189	2.9
<b>EU-27</b>	– 520	80	202	221	177	142	1767	0.3
<b>EA</b>	:	:	:	:	:	:	:	:
<b>EA-12</b>	– 564	64	157	166	130	100	– 274	– 0.1
<b>EU-15</b>	– 540	87	185	190	150	119	922	0.2
<b>EU-10</b>	25	6	16	23	20	17	791	1.2
<b>EU-25</b>	– 515	93	201	213	170	136	1 713	0.3

Source: Commission services based on Eurostat EUROPOP2010 and EUROPOP2008 data



## 2. LABOUR FORCE PROJECTIONS

### 2.1. INTRODUCTION

The cohort simulation model (CSM) <sup>(24)</sup> developed by the European Commission (Directorate-General for Economic and Financial Affairs) is used to project participation rates by gender and single age. This methodology is based on the calculation of the average probability of labour force entry and exit observed over the last 10 years (2001–10) <sup>(25)</sup>. The last decade's average entry and exit rates are then used to project future participation rates as older generations are progressively replaced by younger ones. For those Member States having legislated pension reforms, average exit rates are changed (after 50 years of age) to take into account their projected impact, according to the best reasoned judgement of the EPC and Commission services. Otherwise, both average entry and exit rates are kept constant throughout the projection period (at the average values for the period 2001–10), reflecting a 'no policy change' assumption <sup>(26)</sup>.

### 2.2. PAST TRENDS AND MAIN DRIVERS OF LABOUR MARKET DEVELOPMENTS

The rationale for using the CSM is to reflect the substantial changes in labour market behaviour in recent decades across different cohorts and gender groups. In recent times, labour force participation has undergone profound changes, especially for the young, women and the elderly. There are basically four sets of stylised facts underlying these changes, namely:

- *social factors*, such as longer schooling or change in the role of women in households;

- *demographic factors*, including the decline of fertility rates and delays in childbearing;
- *institutional factors*, in particular changes in early retirement or changes in the statutory/effective age of retirement; and/or
- *economic factors*, such as substitution and income effects of labour taxation particularly relevant for second earners, take-up rates of part-time employment, and the share (relative prices) of services in the economy.

Despite a large cross-country labour force variability (Table 2.1), some common features call for attention and need to be catered for in any projection exercise <sup>(27)</sup>. They can be summarised as follows.

- The participation rates of prime-age male workers (25–54), at around 90 %, remain the highest of all groups. The participation rates of men aged 55–64, which had recorded a steady decline in the past 25 years, have been showing clear signs of a reversal in most countries since the turn of the century — mostly due to pension reforms raising the statutory retirement age.
- Women's participation rates have steadily increased over the past 25 years.
- The participation rates of young people (aged 15–24) have declined, mostly due to longer participation in school.

Given these trends, the main drivers of change in the total participation rate will be changes in the labour force attachment of prime-age women, older workers (especially men) and, to a lesser extent, young people.

---

<sup>(24)</sup> The methodology was initially developed at the OECD; refer Burniaux, J.-M., Duval, R., Jaumotte, F. (2003).

<sup>(25)</sup> A more detailed description of the methodology and results can be found in Carone (2005).

<sup>(26)</sup> For a given set of exogenous macroeconomic assumptions and using partial equilibrium methodologies, a 'no policy change' assumption tries to measure future outcomes corresponding to unchanged policies. It should not be interpreted as a forecast, because no assumptions are made regarding (entry/exit) probability distributions, but more as an 'unbiased' estimate.

---

<sup>(27)</sup> Values reported in Tables 2.1 to 2.5 are taken from Eurostat's Labour Force Survey (LFS) and refer to average annual participation rates.

**Table 2.1:**  
Historical participation rates: workers aged 15–64

	Total										Men										Women									
	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009
	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO	EU-27	EA-17
	59.6	58.7	62.1	65.2	66.7	66.9	74.2	71.3	72.3	73.8	73.9	72.8	45.1	46.1	51.7	56.6	59.5	60.9	45.1	46.1	51.7	56.6	59.5	60.9	45.1	46.1	51.7	56.6	59.5	60.9
	61.6	62.1	62.1	67.2	67.2	67.2	67.4	67.0	72.0	72.0	72.0	72.0	67.4	67.0	72.0	72.0	72.0	72.0	67.4	67.0	72.0	72.0	72.0	72.0	67.4	67.0	72.0	72.0	72.0	72.0
	71.2	70.4	70.1	70.1	70.1	70.1	79.0	78.4	78.5	78.5	78.5	78.5	79.0	78.4	78.5	78.5	78.5	78.5	79.0	78.4	78.5	78.5	78.5	78.5	79.0	78.4	78.5	78.5	78.5	78.5
	80.3	82.4	79.5	80.0	79.8	80.7	86.0	87.1	85.6	84.0	83.6	84.0	74.6	77.6	73.3	75.9	77.3	77.3	74.6	77.6	73.3	75.9	75.9	77.3	74.6	77.6	73.3	75.9	75.9	77.3
	66.2	69.9	70.5	71.0	74.3	76.9	81.1	82.1	79.6	78.8	80.6	82.3	51.7	57.6	61.3	63.0	68.0	71.4	51.7	57.6	61.3	63.0	68.0	71.4	51.7	57.6	61.3	63.0	68.0	71.4
	69.6	70.1	74.0	74.0	74.0	74.0	74.9	73.6	77.6	77.6	77.6	77.6	74.9	73.6	77.6	77.6	77.6	77.6	74.9	73.6	77.6	77.6	77.6	77.6	74.9	73.6	77.6	77.6	77.6	77.6
	60.9	60.7	61.6	67.5	70.8	70.2	82.3	78.8	76.1	79.3	80.6	78.1	39.1	41.9	47.1	55.6	60.8	62.4	39.1	41.9	47.1	55.6	60.8	62.4	39.1	41.9	47.1	55.6	60.8	62.4
	60.0	59.1	60.1	63.9	66.8	67.8	80.6	76.8	77.2	77.6	79.2	79.0	41.0	42.6	44.3	50.6	54.5	56.5	41.0	42.6	44.3	50.6	54.5	56.5	41.0	42.6	44.3	50.6	54.5	56.5
	58.7	58.7	60.6	65.1	69.7	73.0	77.6	77.6	75.5	78.5	80.9	81.0	40.6	40.6	45.8	51.8	58.3	64.8	40.6	40.6	45.8	51.8	58.3	64.8	40.6	40.6	45.8	51.8	58.3	64.8
	67.6	67.1	67.6	68.8	70.0	70.6	78.9	76.5	74.9	75.2	75.3	75.1	56.7	58.0	60.6	62.5	64.8	66.2	56.7	58.0	60.6	62.5	64.8	66.2	56.7	58.0	60.6	62.5	64.8	66.2
	58.8	59.8	57.6	59.9	62.5	62.4	78.6	77.0	73.2	73.8	74.6	73.7	39.7	43.2	42.4	46.2	50.4	51.1	39.7	43.2	42.4	46.2	50.4	51.1	39.7	43.2	42.4	46.2	50.4	51.1
	68.9	72.4	74.0	74.0	74.0	74.0	81.3	82.9	82.0	81.3	82.9	82.0	73.0	74.4	77.0	77.0	77.0	77.0	81.3	82.9	82.0	81.3	82.9	82.0	73.0	74.4	77.0	77.0	77.0	77.0
	67.1	69.6	73.9	73.9	73.9	73.9	74.9	72.1	72.0	74.9	72.1	72.0	74.9	72.1	72.0	74.9	72.1	72.0	74.9	72.1	72.0	74.9	72.1	72.0	74.9	72.1	72.0	74.9	72.1	72.0
	60.3	60.1	60.3	64.2	66.6	68.7	79.2	77.4	75.9	76.4	76.0	76.6	41.5	42.4	44.1	51.7	57.0	60.7	41.5	42.4	44.1	51.7	57.0	60.7	41.5	42.4	44.1	51.7	57.0	60.7
	59.9	61.3	61.6	61.6	61.6	61.6	67.6	67.9	68.2	67.6	67.9	68.2	67.6	67.9	68.2	67.6	67.9	68.2	67.6	67.9	68.2	67.6	67.9	68.2	67.6	67.9	68.2	67.6	67.9	68.2
	58.2	58.1	59.0	59.0	59.0	59.0	80.3	79.1	76.6	80.3	79.1	76.6	41.1	52.4	58.3	65.7	70.0	74.1	41.1	52.4	58.3	65.7	70.0	74.1	41.1	52.4	58.3	65.7	70.0	74.1
	69.2	74.9	76.9	79.7	79.7	79.7	75.4	79.7	79.9	83.9	83.7	85.3	80.1	79.3	81.0	81.0	81.0	81.0	75.4	79.7	79.9	83.9	83.7	85.3	80.1	79.3	81.0	81.0	81.0	81.0
	71.5	71.3	72.4	75.3	75.3	75.3	80.8	80.8	80.8	80.1	79.3	81.0	71.8	70.8	71.8	71.8	71.8	71.8	80.8	80.1	79.3	81.0	81.0	81.0	71.8	70.8	71.8	71.8	71.8	71.8
	66.1	64.4	64.7	64.7	64.7	64.7	71.8	70.8	71.8	71.8	70.8	71.8	66.1	64.4	64.7	64.7	64.7	64.7	66.1	64.4	64.7	64.7	64.7	64.7	66.1	64.4	64.7	64.7	64.7	64.7
	68.8	67.4	71.1	73.4	73.7	73.7	81.4	76.4	76.4	78.7	79.0	78.5	57.1	59.1	63.7	63.6	63.6	63.6	57.1	59.1	63.7	63.6	63.6	63.6	57.1	59.1	63.7	63.6	63.6	63.6
	69.6	62.3	63.1	63.1	63.1	63.1	75.7	69.4	70.9	75.7	69.4	70.9	69.6	62.3	63.1	63.1	63.1	63.1	69.6	62.3	63.1	63.1	63.1	63.1	69.6	62.3	63.1	63.1	63.1	63.1
	67.4	70.7	71.8	71.8	71.8	71.8	71.7	75.1	75.6	71.7	75.1	75.6	67.4	70.7	71.8	71.8	71.8	71.8	67.4	70.7	71.8	71.8	71.8	71.8	67.4	70.7	71.8	71.8	71.8	71.8
	69.5	68.9	68.4	68.4	68.4	68.4	76.5	76.5	76.3	76.5	76.5	76.3	69.5	68.9	68.4	68.4	68.4	68.4	69.5	68.9	68.4	68.4	68.4	68.4	69.5	68.9	68.4	68.4	68.4	68.4
	72.1	76.8	74.7	75.0	75.0	75.0	74.8	79.4	76.6	76.6	76.6	76.4	72.1	76.8	74.7	75.0	75.0	75.0	72.1	76.8	74.7	75.0	75.0	75.0	72.1	76.8	74.7	75.0	75.0	75.0
	77.7	75.3	78.7	78.9	78.9	78.9	79.6	77.2	80.9	81.4	81.4	81.4	77.7	75.3	78.7	78.9	78.9	78.9	77.7	75.3	78.7	78.9	78.9	78.9	77.7	75.3	78.7	78.9	78.9	78.9
	73.6	76.5	74.7	75.2	75.4	75.7	86.2	86.8	83.3	82.8	82.0	82.0	73.6	76.5	74.7	75.2	75.4	75.7	86.2	86.8	83.3	82.8	82.0	82.0	73.6	76.5	74.7	75.2	75.4	75.7
	76.8	80.7	78.3	78.9	78.9	78.9	81.2	84.8	81.6	81.6	81.6	81.3	76.8	80.7	78.3	78.9	78.9	78.9	76.8	80.7	78.3	78.9	78.9	78.9	76.8	80.7	78.3	78.9	78.9	78.9
	68.5	69.8	71.0	71.0	71.0	71.0	77.1	77.3	77.8	77.1	77.3	77.8	68.5	69.8	71.0	71.0	71.0	71.0	68.5	69.8	71.0	71.0	71.0	71.0	68.5	69.8	71.0	71.0	71.0	71.0
	67.5	70.1	71.5	71.5	71.5	71.5	77.2	78.2	78.5	77.2	78.2	78.5	67.5	70.1	71.5	71.5	71.5	71.5	67.5	70.1	71.5	71.5	71.5	71.5	67.5	70.1	71.5	71.5	71.5	71.5

Source: Commission services

**Table 2.2:**  
Historical participation rates: workers aged 20–64

Total																	Men					Women				
	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009								
BE	65.1	64.2	67.6	70.8	72.4	72.7	81.5	78.2	78.7	80.1	80.2	79.2	48.7	50.3	56.4	61.3	64.6	66.2	BE							
BG				67.1	68.6	73.7				73.4	74.2	79.1				61.0	63.1	68.4	BG							
CZ				77.4	76.5	75.8				86.2	85.3	85.0				68.8	67.7	66.5	CZ							
DK	82.2	84.6	80.8	81.4	81.7	82.4	88.0	89.5	87.2	85.7	85.8	86.1	76.3	79.6	74.3	77.1	77.6	78.6	DK							
DE	69.3	72.6	73.8	74.6	78.7	81.0	86.0	85.7	83.5	82.9	85.4	86.8	53.2	59.4	63.9	66.2	71.9	75.2	DE							
EE				77.2	78.1	80.7				83.8	82.3	85.1				71.3	74.2	76.7	EE							
IE	65.4	66.7	68.5	73.0	75.7	75.3	90.2	87.7	85.1	86.2	86.5	84.0	40.1	45.1	51.9	59.9	64.8	66.7	IE							
EL	64.7	64.0	65.5	69.6	71.6	72.6	87.4	83.7	84.5	85.1	84.9	84.5	43.7	45.6	47.8	54.6	58.4	60.6	EL							
ES		63.5	65.9	69.8	73.6	77.1		85.0	82.7	84.4	85.5	85.6		42.9	49.4	55.2	61.5	68.5	ES							
FR	72.7	72.9	73.7	74.9	75.9	76.1	85.0	83.1	81.6	81.9	81.6	81.0	60.9	63.0	66.1	68.1	70.4	71.4	FR							
IT	62.5	64.0	61.7	63.6	66.5	66.7	84.8	83.2	78.5	78.6	79.5	78.9	41.3	45.6	45.2	48.9	53.6	54.6	IT							
CY				75.6	78.5	79.9				89.2	89.3	88.0				62.8	68.2	72.0	CY							
LV				73.7	77.0	80.7				80.5	82.6	84.2				67.6	71.8	77.5	LV							
LT				78.6	76.9	77.8				82.8	81.6	80.6				74.7	72.7	75.2	LT							
LU	62.9	64.1	64.1	69.0	72.1	74.0	84.2	82.7	81.0	82.2	82.2	82.4	41.8	45.0	46.7	55.5	61.9	65.3	LU							
HU				65.0	66.9	67.1				73.6	74.2	74.5				56.7	59.9	60.1	HU							
MT				60.5	61.4	62.4				85.8	85.2	81.6				35.1	37.5	42.3	MT							
NL	63.5	69.1	71.6	76.0	78.5	81.3	83.2	84.1	83.2	85.8	86.0	87.5	43.4	53.8	59.7	66.0	70.9	75.0	NL							
AT			73.9	74.1	75.2	78.2			83.4	83.2	82.2	84.0			64.4	65.1	68.3	72.5	AT							
PL				72.9	70.9	70.6				79.4	78.1	78.6				66.7	63.9	63.0	PL							
PT		72.3	73.4	76.4	78.4	78.9		86.6	83.8	84.8	84.5	84.1		59.5	63.8	68.3	72.5	73.8	PT							
RO				75.9	68.4	68.0				82.6	76.2	76.4				69.4	60.8	59.7	RO							
SI				73.4	76.0	76.3				78.0	80.6	80.3				68.8	71.2	72.1	SI							
SK				76.5	76.5	75.1				84.7	85.1	83.9				68.5	68.0	66.5	SK							
FI			76.1	79.6	79.0	79.4			79.3	82.6	81.3	81.3			72.8	76.6	76.7	77.5	FI							
SE			83.5	80.7	83.9	84.5			85.9	83.1	86.9	87.6			80.9	78.3	80.8	81.2	SE							
UK	75.9	78.6	77.4	77.7	78.3	79.1	90.1	89.9	86.8	86.1	85.7	86.2	61.8	67.2	67.9	69.6	71.0	72.1	UK							
NO			80.8	82.9	81.2	82.8			85.9	87.4	85.0	85.8			75.7	78.3	77.3	79.6	NO							
EU-27				73.1	74.5	75.6				82.4	82.6	83.0				63.9	66.4	68.3	EU-27							
EA-17				71.9	74.5	76.0				82.4	83.3	83.4				61.4	65.8	68.5	EA-17							

Source: Commission services

**Table 2.3:**  
Historical participation rates: workers aged 20–24

	Total										Men										Women									
	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009
	BE	67.6	60.1	57.9	60.7	59.6	51.3	53.2	55.3	69.3	62.7	60.5	65.5	63.1	59.2	61.3	58.3	58.3	61.3	65.9	57.6	55.3	55.8	56.1	51.5	57.6	55.3	55.8	56.1	51.5
	BG	48.5	48.5	51.3	53.2	55.3	51.3	53.2	55.3	69.3	62.7	60.5	65.5	63.1	59.2	61.3	58.3	58.3	61.3	65.9	57.6	55.3	55.8	56.1	51.5	57.6	55.3	55.8	56.1	51.5
	CZ	69.3	69.3	57.3	53.1	53.1	53.1	53.1	53.1	69.3	62.7	60.5	65.5	63.1	59.2	61.3	58.3	58.3	61.3	65.9	57.6	55.3	55.8	56.1	51.5	57.6	55.3	55.8	56.1	51.5
	DK	85.0	82.5	78.9	79.1	77.3	79.9	79.9	79.9	86.5	86.0	83.4	84.4	80.1	82.0	82.0	80.1	80.1	82.0	83.4	78.9	74.7	74.2	74.5	77.7	74.2	74.7	74.2	74.5	77.7
	DE	74.5	76.2	71.9	71.1	70.2	71.1	71.1	71.1	77.3	77.9	74.3	74.6	73.1	73.6	73.6	73.1	73.1	73.6	71.8	74.6	69.6	67.8	67.4	68.6	67.4	69.6	67.8	67.4	68.6
	EE	62.9	61.4	63.9	63.9	61.4	63.9	63.9	63.9	88.5	82.0	76.8	79.2	79.1	73.7	73.7	79.1	79.1	73.7	75.4	73.9	69.2	67.9	70.5	68.6	75.4	69.2	67.9	70.5	68.6
	IE	82.0	78.1	73.0	73.6	74.8	71.0	71.0	71.0	74.7	70.4	69.7	69.3	58.2	56.0	56.0	58.2	58.2	56.0	49.1	54.0	51.9	57.1	48.6	47.7	49.1	54.0	51.9	57.1	48.6
	EL	60.3	61.6	60.3	63.1	53.4	52.0	52.0	52.0	74.7	70.4	69.7	69.3	58.2	56.0	56.0	58.2	58.2	56.0	49.1	54.0	51.9	57.1	48.6	47.7	49.1	54.0	51.9	57.1	48.6
	ES	68.8	61.8	60.9	60.9	67.0	66.5	66.5	66.5	82.5	74.9	62.1	63.2	65.9	67.9	67.9	65.9	65.9	67.9	71.7	66.8	56.5	55.7	57.5	59.8	71.7	66.8	56.5	55.7	57.5
	FR	76.8	70.7	59.1	59.3	61.7	63.8	63.8	63.8	82.5	74.9	62.1	63.2	65.9	67.9	67.9	65.9	65.9	67.9	71.7	66.8	56.5	55.7	57.5	59.8	71.7	66.8	56.5	55.7	57.5
	IT	66.7	68.0	55.8	55.8	52.8	48.1	48.1	48.1	76.1	74.3	62.7	61.9	59.7	55.9	55.9	59.7	59.7	55.9	57.6	62.0	49.1	49.9	45.7	40.0	57.6	62.0	49.1	49.9	45.7
	CY	72.6	71.6	70.8	70.8	71.6	70.8	70.8	70.8	78.2	74.9	70.4	78.2	74.9	70.4	70.4	74.9	74.9	70.4	78.2	74.9	70.4	78.2	74.9	71.1	78.2	74.9	70.4	78.2	74.9
	LV	64.8	63.3	66.1	66.1	63.3	66.1	66.1	66.1	74.7	73.3	73.1	74.7	73.3	73.1	73.1	73.3	73.3	73.1	74.7	73.3	73.1	74.7	73.3	58.8	74.7	73.3	73.1	74.7	73.3
	LT	64.6	64.6	48.0	54.0	48.0	54.0	54.0	54.0	79.1	68.4	63.3	61.5	54.4	54.7	60.0	56.1	56.1	60.0	75.5	67.6	60.5	59.1	39.6	47.7	75.5	67.6	60.5	59.1	39.6
	LU	77.2	68.0	61.9	56.3	50.4	51.5	51.5	51.5	79.1	68.4	63.3	61.5	54.4	54.7	60.0	56.1	56.1	60.0	75.5	67.6	60.5	59.1	39.6	47.7	75.5	67.6	60.5	59.1	39.6
	HU	57.6	57.6	47.4	44.2	44.2	44.2	44.2	44.2	79.1	68.4	63.3	61.5	54.4	54.7	60.0	56.1	56.1	60.0	75.5	67.6	60.5	59.1	39.6	47.7	75.5	67.6	60.5	59.1	39.6
	MT	79.5	76.9	74.4	74.4	76.9	74.4	74.4	74.4	79.1	68.4	63.3	61.5	54.4	54.7	60.0	56.1	56.1	60.0	75.5	67.6	60.5	59.1	39.6	47.7	75.5	67.6	60.5	59.1	39.6
	NL	71.1	75.6	76.4	80.6	81.7	81.9	81.9	81.9	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	AT	71.7	74.8	74.8	75.9	74.8	75.9	75.9	75.9	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	PL	63.7	59.1	57.6	57.6	59.1	57.6	57.6	57.6	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	PT	74.1	62.0	63.6	63.3	63.3	62.8	62.8	62.8	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	RO	60.9	48.9	44.6	44.6	48.9	44.6	44.6	44.6	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	SI	59.4	61.9	59.0	59.0	61.9	59.0	59.0	59.0	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	SK	70.1	63.2	53.5	53.5	63.2	53.5	53.5	53.5	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	FI	68.1	77.7	69.7	70.5	69.7	70.5	70.5	70.5	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	SE	66.7	61.3	71.0	71.9	71.0	71.9	71.9	71.9	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	UK	81.6	83.3	77.7	76.9	76.6	75.4	75.4	75.4	91.4	90.7	84.8	83.8	82.4	80.2	80.2	82.4	82.4	80.2	71.6	75.6	70.2	70.1	70.8	70.5	71.6	75.6	70.2	70.1	70.8
	NO	69.1	74.6	72.9	73.3	72.9	73.3	73.3	73.3	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	EU-27	65.0	64.0	63.3	63.3	64.0	63.3	63.3	63.3	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1
	EA-17	64.0	64.6	64.0	64.0	64.6	64.0	64.0	64.0	72.5	75.6	76.0	82.5	82.4	82.4	82.4	82.4	82.4	82.4	69.7	75.5	76.8	78.7	81.1	81.4	69.7	75.5	76.8	78.7	81.1

Source: Commission services

**Table 2.4:**  
Historical participation rates: workers aged 25–54

	Total										Men										Women									
	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009
	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO	EU-27	EA-17
	75.7	76.7	80.4	82.8	84.6	85.6	84.0	92.2	92.3	92.1	92.2	91.8	57.1	60.8	68.2	73.2	76.8	79.2	57.1	60.8	68.2	73.2	76.8	79.2	57.1	60.8	68.2	73.2	76.8	79.2
	81.6	80.2	84.3	88.5	88.3	87.7	88.0	86.0	87.8	93.5	94.5	91.8	91.5	91.7	92.4	92.4	93.6	93.4	93.4	92.3	92.0	92.1	92.2	91.8	84.5	87.8	82.1	84.3	84.5	87.0
	88.5	88.3	87.7	88.1	88.0	87.8	88.0	86.0	87.8	93.5	94.5	91.8	91.5	91.7	92.4	92.4	93.6	93.4	93.4	92.3	92.0	92.1	92.2	91.8	84.5	87.8	82.1	84.3	84.5	87.0
	89.1	91.2	87.1	87.9	88.1	89.7	88.0	86.0	87.8	93.5	94.5	91.8	91.5	91.7	92.4	92.4	93.6	93.4	93.4	92.3	92.0	92.1	92.2	91.8	84.5	87.8	82.1	84.3	84.5	87.0
	77.0	80.0	83.3	85.4	87.1	88.0	88.0	86.0	87.8	93.5	94.5	91.8	91.5	91.7	92.4	92.4	93.6	93.4	93.4	92.3	92.0	92.1	92.2	91.8	84.5	87.8	82.1	84.3	84.5	87.0
	66.1	69.6	72.8	78.4	80.9	80.6	80.9	80.9	80.6	94.3	93.3	90.9	92.0	92.1	92.4	92.4	93.6	93.4	93.4	92.3	92.0	92.1	92.2	91.8	84.5	87.8	82.1	84.3	84.5	87.0
	70.6	72.2	74.2	78.3	81.5	82.8	81.5	80.9	80.6	94.8	94.3	92.9	94.5	94.6	94.4	94.4	94.6	94.4	94.4	92.3	92.0	92.1	92.2	91.8	84.5	87.8	82.1	84.3	84.5	87.0
	70.0	74.3	78.0	80.9	84.7	84.7	80.9	80.9	84.7	94.2	94.2	92.9	93.2	92.4	92.3	92.3	92.4	92.3	92.3	92.3	92.3	92.4	92.4	92.4	84.5	87.8	82.1	84.3	84.5	87.0
	82.2	83.8	86.1	86.4	87.5	88.8	86.4	87.5	88.8	96.0	95.6	95.1	94.3	94.0	94.4	94.4	94.0	91.2	90.0	90.0	91.2	91.2	91.2	91.2	84.5	87.8	82.1	84.3	84.5	87.0
	70.4	72.8	71.9	74.2	77.4	77.2	74.2	77.4	77.2	95.2	94.0	90.3	90.4	91.2	90.0	90.0	91.2	90.0	90.0	90.0	91.2	91.2	91.2	91.2	84.5	87.8	82.1	84.3	84.5	87.0
	81.6	85.7	86.6	85.5	85.6	88.5	85.5	85.6	88.5	95.3	95.3	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5	93.5	84.5	87.8	82.1	84.3	84.5	87.0
	85.5	85.6	88.5	89.3	87.9	87.3	89.3	87.9	87.3	94.8	94.3	92.9	93.9	94.2	95.5	94.1	94.1	94.1	94.1	94.1	94.1	94.1	94.1	94.1	84.5	87.8	82.1	84.3	84.5	87.0
	69.5	72.8	73.8	79.8	83.9	84.8	79.8	83.9	84.8	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	77.3	78.7	80.2	77.3	78.7	80.2	77.3	78.7	80.2	94.3	94.3	92.9	93.5	93.2	93.8	93.8	93.8	93.8	93.8	93.8	93.8	93.8	93.8	93.8	84.5	87.8	82.1	84.3	84.5	87.0
	64.2	65.7	71.9	64.2	65.7	71.9	64.2	65.7	71.9	92.7	93.4	92.6	93.8	93.8	94.4	94.4	93.8	93.8	93.8	93.8	93.8	93.8	93.8	93.8	84.5	87.8	82.1	84.3	84.5	87.0
	69.6	76.0	79.4	83.6	86.5	88.8	83.6	86.5	88.8	92.7	93.4	92.6	93.8	93.8	94.4	94.4	93.8	93.8	93.8	93.8	93.8	93.8	93.8	93.8	84.5	87.8	82.1	84.3	84.5	87.0
	83.3	85.3	86.4	87.7	88.8	89.6	83.3	85.3	86.4	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	82.7	82.5	83.4	82.7	82.5	83.4	82.7	82.5	83.4	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	79.8	83.4	84.6	87.1	87.9	87.9	83.4	84.6	87.1	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	84.4	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	87.7	88.8	89.6	87.7	88.8	89.6	87.7	88.8	89.6	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	88.3	88.0	87.2	88.3	88.0	87.2	88.3	88.0	87.2	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	88.1	87.7	88.2	88.1	87.7	88.2	88.1	87.7	88.2	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	89.9	86.8	89.5	90.0	90.0	90.0	89.9	86.8	89.5	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	81.6	84.0	83.4	84.0	84.1	85.1	84.0	83.4	84.0	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	86.3	87.7	86.5	88.1	88.1	88.1	86.3	87.7	86.5	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	82.7	83.8	84.9	82.7	83.8	84.9	82.7	83.8	84.9	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0
	82.1	84.1	85.3	82.1	84.1	85.3	82.1	84.1	85.3	94.9	95.0	93.9	90.4	90.1	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	88.3	84.5	87.8	82.1	84.3	84.5	87.0

Source: Commission services

**Table 2.5:**  
Historical participation rates: workers aged 55–64

	Total										Men										Women									
	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009	1985	1990	1995	2000	2005	2009
	BE	BG	CZ	DK	DE	EE	IE	EL	ES	FR	IT	CY	LV	LT	LU	HU	MT	NL	AT	PL	PT	RO	SI	SK	FI	SE	UK	NO	EU-27	EA-17
	27.3	22.2	24.2	25.9	33.3	37.2	45.1	35.4	35.9	36.3	43.4	45.2	11.0	9.9	13.3	15.8	23.4	29.3	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2
	25.1	25.1	25.1	25.1	38.0	49.2	45.1	35.4	35.9	36.3	43.4	45.2	11.0	9.9	13.3	15.8	23.4	29.3	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2
	38.1	38.1	38.1	38.1	46.9	49.6	45.1	35.4	35.9	36.3	43.4	45.2	11.0	9.9	13.3	15.8	23.4	29.3	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2	45.2
	53.2	57.1	53.6	56.9	62.8	60.3	65.8	69.1	67.9	64.5	68.7	67.7	42.4	45.9	40.1	48.2	56.8	53.0	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7	67.7
	39.5	42.4	42.8	42.9	52.1	61.1	58.8	58.3	54.5	52.5	61.2	69.4	24.3	27.5	31.3	33.4	43.1	53.0	69.4	69.4	69.4	69.4	69.4	69.4	69.4	69.4	69.4	69.4	69.4	69.4
	47.2	47.2	47.2	47.2	59.0	66.7	73.6	66.5	65.0	64.6	67.7	66.2	18.9	18.9	21.0	27.7	38.2	66.1	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4
	45.8	42.6	43.0	46.3	53.1	54.6	73.6	66.5	65.0	64.6	67.7	66.2	18.9	18.9	21.0	27.7	38.2	66.1	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4
	46.1	41.5	41.9	40.9	43.2	44.2	67.3	59.5	61.1	57.7	60.8	60.1	26.4	24.3	24.5	25.9	27.1	29.3	60.1	60.1	60.1	60.1	60.1	60.1	60.1	60.1	60.1	60.1	60.1	60.1
	40.1	40.1	36.6	40.8	45.9	50.2	62.3	62.3	55.0	60.3	63.2	64.0	19.6	19.6	19.6	22.5	29.6	37.2	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0	64.0
	35.6	32.9	31.4	31.7	40.7	41.4	44.3	39.3	36.1	35.5	43.8	44.2	27.7	26.9	27.1	28.2	37.7	38.8	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2	44.2
	33.8	32.5	29.0	28.6	32.6	37.0	54.4	51.7	45.2	42.2	44.3	48.5	15.1	15.0	14.2	15.9	21.5	26.1	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5
	51.2	51.2	52.4	58.5	58.5	58.5	69.5	73.2	69.5	73.2	74.9	74.9	33.6	32.8	33.6	32.8	42.6	42.6	74.9	74.9	74.9	74.9	74.9	74.9	74.9	74.9	74.9	74.9	74.9	74.9
	39.0	39.0	39.0	39.0	53.8	61.4	53.8	61.0	53.8	61.0	63.8	63.8	28.0	28.0	28.0	28.0	48.5	59.7	63.8	63.8	63.8	63.8	63.8	63.8	63.8	63.8	63.8	63.8	63.8	63.8
	45.6	45.6	45.6	45.6	52.8	57.6	59.0	63.8	59.0	63.8	63.8	63.8	35.4	35.4	35.4	35.4	44.5	52.9	63.8	63.8	63.8	63.8	63.8	63.8	63.8	63.8	63.8	63.8	63.8	63.8
	27.6	27.6	27.6	27.6	32.4	39.4	40.2	43.2	35.1	38.6	39.4	47.7	13.6	13.8	13.3	16.8	25.1	30.6	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7
	22.6	22.6	22.6	22.6	34.3	35.0	34.3	42.3	34.3	42.3	42.6	42.6	13.2	13.2	13.2	13.2	27.7	28.8	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6
	29.5	29.5	29.5	29.5	31.9	29.6	52.9	53.1	52.9	53.1	47.6	47.6	8.6	12.4	11.8	8.6	12.4	11.8	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6
	30.3	30.9	29.9	38.6	48.1	56.8	49.2	45.8	41.4	50.8	59.5	67.6	13.2	16.8	18.6	26.4	36.5	46.0	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6	67.6
	30.2	30.2	30.2	30.2	33.0	42.1	42.6	44.5	42.6	44.5	43.0	52.3	18.8	18.8	18.8	18.8	23.5	32.4	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3
	32.1	32.1	32.1	32.1	30.5	34.5	41.1	40.9	41.1	40.9	40.9	47.5	24.4	21.5	24.4	21.5	23.2	32.4	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5	47.5
	47.6	47.6	47.4	53.0	53.8	53.9	65.9	61.9	64.5	62.4	62.4	62.7	31.5	34.5	34.5	42.9	46.1	45.9	62.7	62.7	62.7	62.7	62.7	62.7	62.7	62.7	62.7	62.7	62.7	62.7
	52.5	52.5	52.5	52.5	40.4	43.9	58.4	48.4	58.4	48.4	54.5	54.5	14.8	18.9	18.9	25.6	34.7	34.7	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5	54.5
	23.7	23.7	23.7	23.7	32.1	36.9	33.5	45.4	33.5	45.4	48.2	48.2	11.1	18.1	18.1	29.0	59.5	69.9	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2	48.2
	24.6	24.6	24.6	24.6	35.0	42.8	41.0	55.1	41.0	55.1	58.7	58.7	37.7	44.6	44.6	59.5	69.9	69.9	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7
	39.6	39.6	39.6	39.6	56.6	59.1	41.6	46.4	41.6	46.4	56.9	58.7	37.7	44.6	44.6	59.5	69.9	69.9	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7	58.7
	67.2	68.4	67.2	68.4	72.6	73.9	71.0	72.1	71.0	72.1	76.2	77.8	63.4	64.6	63.4	64.6	69.0	69.9	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8	77.8
	51.4	53.1	51.5	52.8	58.4	60.3	69.2	68.3	62.5	63.3	68.3	70.3	35.0	38.7	40.9	42.6	48.9	50.6	70.3	70.3	70.3	70.3	70.3	70.3	70.3	70.3	70.3	70.3	70.3	70.3
	63.2	63.2	63.2	63.2	66.5	69.5	70.6	72.7	70.6	72.7	72.1	73.9	56.0	59.7	56.0	59.7	60.9	65.0	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9	73.9
	39.7	39.7	39.7	39.7	45.2	49.1	50.6	55.2	50.6	55.2	58.6	58.6	29.6	35.8	29.6	35.8	40.2	40.2	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6	58.6
	37.2	37.2	37.2	37.2	43.7	48.4	48.4	53.8	48.4	53.8	57.4	57.4	26.5	34.0	26.5	34.0	39.9	39.9	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4

Source: Commission services

### 2.3. MAIN FEATURES OF THE COHORT SIMULATION MODEL (CSM) AND MAIN ASSUMPTIONS OF THE 2012 EXERCISE

The CSM is used to project participation rates, as in the 2006 and 2009 long-term exercises. This methodology is particularly adapted to take into account the significant rise in the labour force participation of women over recent decades, as younger women, with a much stronger attachment to the labour force, gradually replace older women with relatively low participation rates. Simultaneously, the cohort methodology also caters for a (relatively small) decline in the participation rate of men over generations in a large majority of countries, a trend opposite to that observed for women.

The 2012 projection is made using the EUROPOP2010 population projections <sup>(28)</sup> prepared by Eurostat with the close involvement of national institutes of statistics. Population projections are the major driving force of labour force projections: in the present round of projections, there are significant changes in population values compared to the previous exercise of 2009, mainly reflecting different (net) migration assumptions (Chapter 1).

The EPC agreed on the following specifications for the CSM.

- The starting year for labour market projections is 2010.
- Labour market participation rates are calculated by gender and single age <sup>(29)</sup>, using average entry/exit rates in the labour force observed over the last 10 years (2001–10) <sup>(30)</sup>.
- A correction mechanism is applied for the younger generation (15–24) in order

to avoid the situation where any increase in enrolment rates (and the corresponding decline in participation rates) feeds into future declines of participation rates for prime-age workers: this assumption implies that participation rates cannot decline in the age bracket 15–24.

- As in the 2009 Ageing Report, the impact of pension reforms continues to be modelled through their estimated <sup>(31)</sup> impact on the labour market exit rates of older workers (50–74). This is largely a judgemental approach, using the probabilistic nature of the CSM of labour force participation. Specifically, exit rates of older workers (50–74) are adjusted relatively to average historical values (2001–10) in order to incorporate the expected future effects of legislated pension reforms on retirement behaviour.

#### 2.3.1. THE TWO MAIN STEPS TO PROJECT THE LABOUR FORCE/SUPPLY

Firstly, participation rates by single year and gender are projected up to 2060 using the CSM. Aggregate values for participation rates are a weighted average of participation rates by single age and gender using as weights population shares. For example, the average participation rate for age groups  $\underline{a}$  (lower age) to  $\bar{a}$  (upper age) in period  $t$  is calculated as:

$$PR(\underline{a}, \bar{a}, t) = \sum_{a=\underline{a}}^{\bar{a}} \sum_{g=m,f} PR_{a,g}^t * p_{a,g}^t$$

where:

$$p_{a,g}^t = \frac{pop_{a,g}^t}{\sum_{a=\underline{a}}^{\bar{a}} \sum_{g=m,f} pop_{a,g}^t}$$

where:

$a$  is the age index;

$g$  is the gender index;

$PR_{a,g}^t$  is the participation rate for single age  $a$  and gender  $g$  in period  $t$ ;

$pop$  is the population; and

$p$  is the structure of the population.

<sup>(28)</sup> In order to be consistent with the Labour Force Survey data, rather than using the EUROPOP2010 population projections on 1 January, the projections are adjusted to reflect the average over the year. This could explain some discrepancies with reported figures in Chapter 1.

<sup>(29)</sup> For Luxembourg, in line with the 2009 exercise, an adjustment is made that takes into account the high incidence of non-resident workers (cross-border workers).

<sup>(30)</sup> In the 2009 Ageing Report, participation rates were calculated using average entry/exit rates over the period 1998–2007.

<sup>(31)</sup> By Commission services in close cooperation with EPC-AWG delegates: a more detailed description of the methodology can be found in Carone (2005).



Secondly, the labour force ( $LF_{a,g}^t$ )/labour supply (for each single age and gender combination) is derived by multiplying the age/gender labour force participation rate by the corresponding population projection:

$$LF_{a,g}^t = PR_{a,g}^t * pop_{a,g}^t$$

The total labour supply for age groups  $\underline{a}$  (lower age) to  $\bar{a}$  (upper age) in period  $t$  is calculated as:

$$LF(\underline{a}, \bar{a}, t) = \sum_{a=\underline{a}}^{\bar{a}} \sum_{g=m,f} LF_{a,g}^t = \sum_{a=\underline{a}}^{\bar{a}} \sum_{g=m,f} PR_{a,g}^t * pop_{a,g}^t$$

Age aggregates commonly used are for example the groupings (15–64; 20–64; 25–54; 55–64; 20–71; 20–74).

### 2.3.2. DATA SOURCES AND AN ADDITIONAL ASSUMPTION ON LABOUR INPUT

Labour force participation rates are derived from the harmonised EU Labour Force Surveys of Member States (as compiled by Eurostat) <sup>(32)</sup>. Detailed data by single age and gender are used, covering individuals aged 15–74 for the period 2001–10. The starting point of the projections is 2010, the year for which the most recent figures are available.

For the current round of projections, the EPC decided to:

- use the production function methodology to project GDP growth (Chapter 3), using total hours worked as the labour input variable; and
- the split between full and part-time work (for the age groupings 15–24, 25–54, 55–64, and 65–74), as well as the corresponding weekly hours of work are fixed at the average values for the last available year (2010), during the entire projection period.

Although part-time versus full-time rates and the corresponding average weekly hours of work are frozen per age group considered over

the projection period, per capita hours worked change due to ‘compositional effects’ that mostly reflect the expected increase in labour force participation of women, for which the incidence of part-time is higher than for men.

## 2.4. LEGISLATED PENSION REFORMS IN EU MEMBER STATES

A strong point of the CSM is that the baseline scenario takes into account the expected effects on the participation rate of older workers of legislated pension reforms, including measures to be phased in gradually. A description of recent legislated pension reforms covering 22 EU Member States is provided in Box 2.1 <sup>(33)</sup>.

This framework for analysis is able to incorporate a broad typology of measures, inter alia, increases in the statutory retirement age, the convergence of women’s lower statutory retirement age to that of men, the linking of the statutory retirement age to changes in life expectancy, the tightening of conditions for early retirement, and changes in (price) incentives affecting the retirement decision. Moreover, policy changes can be incorporated as one-off measures or be phased in progressively within a specified period.

Findings in the literature based on both microdata <sup>(34)</sup> and cross-country regressions <sup>(35)</sup> suggest that changing pension schemes have large and significant effects on the labour force participation of older workers (Duval, 2003; Gruber and Wise, 2002 and 2005; and Bassanini and Duval, 2006).

Duval (2003) builds an indicator of implicit taxes on continued work and uses it to assess participation effects of the retirement incentives embedded in pension schemes. Across OECD countries, there is a significant negative correlation between the fall in male labour force participation and the corresponding implicit

<sup>(32)</sup> For Luxembourg, an adjustment is made to correct for the large non-resident workforce (i.e. cross-border workers).

<sup>(33)</sup> This information was provided by EPC and AWG delegates.

<sup>(34)</sup> Matching information on individual’s characteristics with their retirement incentives and decisions.

<sup>(35)</sup> Using macrodata.



tax rate on continuing work (OECD, 2005) <sup>(36)</sup>. Bassanini and Duval (2006) find that a 10 percentage point cut in the implicit tax rate on continuing work raises the average employment rate of older workers (55–64) by 1 percentage point.

Using microdata, Gruber and Wise (2002) consider the average effect across 12 OECD countries of a reform that would delay benefit eligibility to a statutory pension by three years. They find that such a reform can engineer a dramatic rise in (male) participation rates <sup>(37)</sup>.

<sup>(36)</sup> The implicit tax on continued work can be seen as a key summary indicator of retirement incentives embedded in statutory pension and early retirement schemes. At a given age, it measures the cost of remaining (an additional year) in the labour force in terms of foregone pensions and higher social security contributions paid against the discounted gains of higher future pensions (resulting from additional contributions paid and possibly also higher accrual rates).

<sup>(37)</sup> Cross-country comparisons can be distorted by the wide variation in the age at which (normal) retirement begins. In order to account for this, Gruber and Wise (2002) define the first age at which at least 25 % of men are out of the labour force as the '25 % age'. Then they consider the five ages beginning with the '25 % age' (i.e. '25 % age + 4 years'. Within the '25 % age + 4 years' range, they find that the proportion of men out of the labour force declines on average by 47 % following a pension reform that delays benefit eligibility by three years.

### Box 2.1: Pension reforms legislated in the Member States and reflected in the labour force projections

#### Austria

The minimum retirement age for men will increase from 61.5 years to 65 years (currently, 63.5 years); for women, from 56.5 to 60 years (currently, 58.5 years). The increases have been phased in gradually since July 2004 and by 2017, early retirement will be eliminated. In general, early retirement reduces pension claims by 4.2 % per year. The statutory retirement age for women will be increased gradually between 2024 and 2033 to reach the same retirement age for men (65). A bonus for later retirement up to the age of 68 (4.2 % per year, up to a maximum of 10 %) has been introduced. Since January 2005, harmonised guaranteed pension accounts have been established (Act on the harmonisation of pension system, approved in November 2004). The new system of individual pension accounts provides for a transparent reporting of benefits accrued from contributions paid in and other credits acquired, such as from active child and elderly care. This system aims to provide an 80 % replacement rate for people retiring aged 65 with 45 years of contributions. Pension benefits are adjusted to the consumer price index, while pensionable earnings are adjusted to the average insured wage.

In December 2010, the government approved measures to foster rehabilitation and keep people

in the workforce, thereby decreasing expenditure on disability pensions. Specifically, it will be necessary to apply for rehabilitation before applying for a disability pension. During rehabilitation, payments are higher than unemployment benefits, and unemployment benefits are paid for longer periods if an individual does not find a job after rehabilitation.

From 2014 onwards, long-term insurance pensions (*hacklerregelung*) will be increased by two years (men to 62 and women to 57 years) and the purchase of schooling and study years will be abolished.

#### Bulgaria

Since 1 October 2008, all old-age pension entitlements calculated before 31 December 2007 have been recalculated using the 2007 average insurance income (about EUR 203.6) in order to standardise the set of parameters used to calculate pension entitlements, namely the individual coefficients and length of service.

On 1 January 2009, the insurance contribution rate to the Public Social Security Pension Fund was reduced from 22 % to 18 %. The contribution rate of employers was set at 10 % and that of employees at 8 %. In addition, the government budget provides a 12 % contribution to the Public Social Security Pension Fund. In 2010, this

(Continued on the next page)

transfer amounted to EUR 1.18 billion, or 34 % of all pension expenditure.

On 1 January 2009, minimum pensions were increased by 10 %.

On 1 April 2009, the annual accrual rate for old-age pensions increased from 1 to 1.1. In addition, the maximum pension amount (excluding bonuses) was increased to EUR 357.9, from EUR 250.5.

On 1 July 2009, pensions were updated by 9.0 % following the so-called Swiss rule.

New pension system measures entered into force on 1 January 2011, with amendments to the Social Security Code (SSC), including:

- financial strengthening of the first pillar of the pension system through:
  - raising, as of 2011, the social security contribution by 1.8 percentage points;
  - introducing differentiated insurance income levels for the self-employed on the basis of taxable income;
  - as of 1 January 2012, increasing the length of service for workers in the third labour category by four months every year until reaching 37 years of career for women and 40 years for men by 2020;
  - as of 1 January 2021, increasing the retirement age for men and women — by six months, until 63 for women (2026) and 65 for men (2024);
  - extending until 31 December 2014 the period when early retirement of first and second labour category workers will be covered by the public social security instead of the professional pension funds;
  - the pensions' indexation in accordance with the so-called Swiss rule (Article 100 of the SSC) will be applied after 2013;
- increasing the adequacy of social security pensions:
  - as of 1 January 2017, the weight of each year length of service is increased from 1.1 % to 1.2 % for social security pensions <sup>(1)</sup>;

<sup>(1)</sup> This means that a length of service of 37 years will be automatically equal to 44.4, and 40 years will be equal to 48 years. The objective is that, in 2025, the net income replacement ratio from the first and the second pillar will reach 65 %.

- as of 1 January 2014, the maximum levels of newly awarded pensions will be abolished and the maximum levels of old pensions will be gradually increased.

As of 1 January 2017, the contribution for universal pension funds will be increased by 2 percentage points to 7 %.

### Czech Republic

In October 2011, a pension reform was approved. The statutory retirement age was increased to over 65 years, depending on the year of birth. Younger cohorts (both genders) are subject to an additional increase of two months. As an example, for persons born in 1978, the statutory retirement age is 67 years and two months; for persons born in 1979, the statutory retirement age is 67 years and four months.

### Germany

*Forthcoming increases in the statutory retirement age (latest reform of 2007)*

- For persons born after 1946, the statutory retirement age is increased in steps of either one or two months from 65 years of age, depending on the year of birth (as shown in the table following). As an example, the statutory retirement age for persons born in 1946 or earlier remains at 65; for persons born in 1947, the statutory retirement age is 65 years and one month; for persons born in 1948, the statutory retirement age is 65 years and two months; for persons born in 1958, the statutory retirement age is 65 years and 12 months (i.e. 66 years); for persons born in 1963, the statutory retirement age is 65 years and 22 months. For those born in 1964 and younger, the statutory retirement age will be 67.

Born in	Additional number of months
1947	1
1948	2
1949	3
1950	4
1951	5
1952	6
1953	7
1954	8
1955	9
1956	10
1957	11
1958	12
1959	14
1960	16
1961	18
1962	20
1963	22
1964	24

(Continued on the next page)

- Early retirement for persons with a minimum contributory period of 35 years will remain at 63 years. Since the statutory retirement age is planned to increase in the next two decades, the maximum penalties for early retirement at age 63 will rise from 7.2 to 14.4 %.
- Persons with a contributory career of 45 years or more can retire at the full rate at 65.

*Effects on the statutory retirement age (of previous reforms)*

In the last two decades, the statutory and early retirement ages have also increased for different types of old-age pensions. In some cases, further increases are still expected on account of past reforms. For example, women born before 1952 are entitled to a special old-age pension. In the coming years, the relevance of these special pension types will decline further.

#### Denmark

In 2006, Denmark introduced a major reform package known as the 'Welfare Agreement'. This reform package affects mainly people younger than 48 years at the end of 2006. It reverses the 2004 decision to lower retirement age from 67 to 65. It also increases the Voluntary Early Retirement Benefit (VERB) scheme from age 60 to age 62 between 2019 and 2022 with a minimum contribution period of 30 years instead of 25 for taking a VERB. The normal retirement age is increased from age 65 to 67 between 2024 and 2027. Finally, it indexes retirement age to the average life expectancy of 60-year-olds from 2025 onwards.

#### Estonia

The Estonian pension system has three pillars: (i) the first is the pay-as-you-go public pension; (ii) the second, a mandatory fully funded pension scheme; and (iii) the third pillar is a voluntary additional saving scheme.

The funded second pillar pension scheme provides supplementary income for pensioners. It is a retirement savings plan where a working person saves for their own pension, contributing 2 % of their gross salary to the pension fund. The State contributes an additional 4 % of the 20 % of the social tax used for pensions to the individual's personal account, and retains the remaining 16 % for members of the first pillar. Subscription to the funded pension is mandatory for individuals born in 1983 or later, but is voluntary for those born before 1983. A large majority of the labour force has joined the second pillar.

Retirement age will be increased to 65 years for both males and females gradually by 2026.

Contributions to the second pillar were halted for the period of 1.7.2009 to 31.12.2010. For 2011, the contribution rates were halved. From 2012 onwards, the normal system will be restored.

#### Greece

In July 2010, the parliament adopted a comprehensive pension reform of the main pension schemes. The reform simplified the highly fragmented pension system, enhanced transparency and fairness, postponed the retirement age, and decreased the generosity of benefits. The new universally binding rules on entitlements, contributions, accumulation rules and indexation of pension rights applies to the main pension funds (IKA, OGA, OAEE, public sector scheme, Bank of Greece scheme). The pension reform is applied pro rata to all current and future workers.

The main elements of the reform are:

- the introduction of a new basic pension of EUR 360 per month (12 yearly payments);
- the new system introduces accrual rates with the same profile for all workers that depend only on the length of the career (0.8–1.5 % of earnings);
- the reform increases the statutory retirement age from 60 to 65 — the minimum age for retirement is set to 60 and penalties apply for persons with less than the full contributory career;
- the full contributory career is increased to 40 years (compared to, generally, 35 years previously);
- as from 2021, the minimum and statutory retirement ages will be adjusted in line with changes in life expectancy every three years;
- there will be equalisation in the retirement ages of men and women in both the private and public sector by 2013;
- indexation of benefits (including basic pension) will not exceed the Harmonised Index of Consumer Prices (HICP) inflation;
- pensionable earnings will be calculated based on the full earnings history.

The new legislation includes a sustainability clause (Article 11.b.1, of Law 3863, 15 July 2010) which stipulates that, if long-term projections (to

*(Continued on the next page)*

be run by the NAA every two years) show the rise in public pension expenditure between 2009 and 2060 to exceed 2.5 percentage points of GDP, then relevant parameters of the pension system will be changed to bring the increase of expenditure below the targeted threshold.

## Spain

### *The 2002 pension reform (Law 35/2002)*

This law abolished mandatory retirement at 65 in the private sector. Workers remaining active after 65 will increase their pension benefit by 2 % per year, and both employers and employees are exempted from paying most social security contributions. For workers aged at least 60, social contributions are reduced by 50 %, and this amount is increased by 10 % to reach 100 % for those aged 65. Early retirement is possible from 61 years, with at least 30 years of paid contributions and registered as unemployed for at least six months, but with a high associated penalty from 6 % to 8 % per year (8 % for those with only 30 years of contributions, 6 % for those with at least 40 years of contributions). Pensions became compatible with part-time work (but the pension benefit was reduced according to the length of the working day).

### *A new law on Social Security measures was enacted in 2007*

This package of reforms contains the following main measures:

- an increase in the effective contribution period to be eligible for a retirement pension;
- partial retirement from age 61 instead of 60 for people entering the system after 1967 (and a minimum of 30 years of contributions instead of 15);
- incentives for people working after age 65;
- more restrictive rules to qualify for an invalidity pension.

### *The 2011 pension reform (Law on Social Security Reform 27/2011, 1 August 2011)*

This reform contains the following main measures:

- the statutory retirement age will gradually increase from 65 in 2013 to 67 in 2027;
- early retirement can be taken at age 63 (previously 61); eligibility for early retirement requires 33 years of contributions (previously 30) and penalties are increased to 7.5 % per year of early retirement for

careers less than 38.5 years of contributions and 6.5 % for careers longer than 38.5 years of contributions;

- early retirement at 61 is still possible during economic crises for workers with contributory careers longer than 33 years;
- partial retirement at 61 is still allowed, but it will be less attractive because the part-time employee will have to pay total social security contributions;
- depending on the length of the contributory career, bonuses for delaying retirement are increased: + 2 %, + 2.75 %, and + 4 % for an extra year, respectively, for careers of less than 25, between 25 and 37, and over 37 years;
- the period used to calculate pensionable earnings will be gradually increased from 15 to 25 years (by 2022);
- the contributory career for a full pension will be gradually increased from 35 to 37 years, with calculations being made on a monthly basis, instead of rounding to the next full year;
- the percentage of the full pension received will be proportional to the length of the contributory career, starting at 50 % for careers of less than 15 years and rising to 100 % for a career of 37 years: this is expected to eliminate the previous bias favouring shorter careers.

### *Sustainability factor*

Beginning in 2027, the fundamental parameters of the pension system will be revised every five years to take into account changes in life expectancy. Calculations will be based on projections carried out by official agencies.

### *Exceptions*

- Workers with contributory careers of more than 38.5 years are allowed to retire at 65 with a full pension.
- Women having interrupted their careers due to childcare can add up to 112 days per child (less than six years) starting in 2013, and increasing up to 270 days per child in 2018.

## Finland

Since 2005, there has been flexible old-age retirement (63 to 68 years) with an increase of the accrual rate to 4.5 % for those continuing to work beyond the age of 63. The ceiling on the maximum pension was abolished. A new early retirement

(Continued on the next page)

scheme was introduced with a minimum age of 62 and an actuarial reduction of 0.6 % per month prior to 63. Those born after 1949 are not eligible for the unemployment pension scheme, which is replaced by an extended period of unemployment benefit (the so-called unemployment pipeline to retirement, currently from 57 for those born before 1950, age 59 for those born 1950–54 and age 60 for those born 1955 and later).

## France

Between 2004 and 2008, public sector pensions have been gradually aligned with private sector pensions by increasing the number of contribution years needed for a full pension (from 37.5 to 40 years). Since 2009, the number of contribution years has increased with life expectancy following a rule that keeps the ratio of the number of contribution years to the number of years spent in pension at the constant level of 1.79 reached in 2003. The number of contribution years will be increased to 41 for the 1952 generation and 41.5 for the 1960 generation, reflecting the expected gains in life expectancy (of 1.5 years every 10 years). A yearly 3 % bonus has been in effect for postponing retirement since 2003 and this bonus increased to 5 % in 2009. The penalty for early retirement (before 40 years of contributions) has also been modified. Between 2006 and 2015, the yearly penalty (*la décote*) for early retirement will gradually decrease from 10 % to 5 % of pension benefits for private sector workers, while increasing from 0.5 % to 5 % for civil servants.

### *The 2010 Pension Reform (Law No 2010-1330)*

- A progressive rise in age limits
  - The standard pension age will gradually be increased, for all pension schemes, from 60 to 62 years. Simultaneously, the full-rate pension age will rise from 65 to 67 years. These two rises imply a four-month increase in the age limits every year from the 1951 generation to the 1956 generation. (For example, people born in 1956 will be able to claim pension at 62 in 2018 and a full-rate pension at 67 in 2023.)
  - The early retirement age for long contributory careers will also be increased by two years.
- Convergence of pension rules between the public and private sectors
  - Closing down of the pathways to early retirement in the public sector: (i) for

parents with three children after a 15-year career; (ii) provisions in the ‘Cessation Progressive d’Activité’ programme.

- The minimum pension in the public sector (*minimum garanti*) will be computed using the same rule as in the private sector (*minimum contributif*). To be entitled to the minimum pension, insured persons will have first to reach the full-rate pensionable age.
- *Discriminatory positive measures partly limiting the favourable effect on labour force participation of the pension reform*
  - Some categories/groups will still be granted a full-rate pension at 65 years of age.
  - People suffering from a professional disease or an accident that results in a permanent incapacity of at least 10 % can continue to retire at 60 with a full-rate pension.

## Hungary

The 1997 pension reform:

- aimed to raise gradually (by one year every two years) the statutory pension age for men from 60 to 62 and for women from 55 to 62 by 2009;
- started to build a new framework for the mandatory pension system, by splitting the existing one into two parts: (a) a dominant pay-as-you-go (PAYG) pension pillar; and (b) a partly funded pension pillar;
- the new mixed system (approximately three quarters PAYG and one quarter funded pillar) is obligatory for new entrants to the labour market — for others, it is optional.

In 2006–07, parliament adopted a package of reforms (two laws) which specifies that early retirement is allowed only two years before normal retirement (previously three years). Thus, from 2013 onwards, early retirement is possible from age 60 for both women and men. From 2013 onwards, all early pensions will be subject to a penalty. The rate of reduction, depending on the time remaining until the statutory retirement age, will be 0.3 % per month for those aged 61–62, and 0.4 % per month for those aged less than 61. It also introduces changes in the calculation of benefits: a minimum contribution of 40–41 years for early retirement,

(Continued on the next page)



and some favourable retirement conditions for those working in occupation potentially hazardous to health.

#### *The 2009 pension reform*

- The statutory retirement age is increased from 62 to 65 between 2014 and 2022 (i.e. by six months every year). The early retirement age is also gradually increased from 60 to 63.
- The use of a less generous indexation rule for pensions, depending on GDP growth. The Swiss indexation formula used earlier will be applied only if GDP growth exceeds 5.0 %.

Weights in the indexation formula		
GDP growth	CPI	Wages
< 3.0	100	0
3.0–3.9	80	20
4.0–4.9	60	40
> 5.0	50	50

- The abolition of the 13th month for pensions from the second half of 2009: in its place, a pension premium was introduced.

The 13th month for pensions was in place between 2004 and 2006 and was then capped at HUF 80 000 (average pension benefit) in 2008, and abolished in the second half of 2009. Instead, a pension supplement will now be paid, starting with GDP growth of 3.5 %, and rising with GDP growth. For GDP growth of 7.5 % or more, the pension premium will equal the 13th month for pensions, but it will also be capped at HUF 80 000.

#### **Italy**

There have been major changes to pension legislation since 2006.

1. *Law 127/2007* increases low pension benefits through an additional annual lump sum (EUR 420 from 2008) given to pensioners aged 64 and over with income less than 1.5 times the annual minimum pension (EUR 9 133 in 2011). Such an increase is reduced or augmented by 20 % for contribution careers less than 15 years or higher than 25, respectively (18 and 28, for the self-employed).

Additional increases are also foreseen in social assistance pensions (improving upon legislation passed in 2002), through the so-called social assistance additional lump sums (*maggiorazioni sociali*). They are provided to the elderly with a personal income (in the case of a single person)

or couple's income (in case of a married couple), including social security pensions, below certain limits and up to them. In 2011, personal income limits are EUR 5 600 per year for those aged 65–69 and EUR 7 850 for those aged 70+. For married couples, the income limits are EUR 11 680 per year for those (referring to the beneficiary) aged 65–69, and EUR 13 290 for those aged 70+.

2. *Law 247/2007* includes the following measures.

- *Minimum requirements for early retirement:* the process of increasing the minimum requirements for early retirement has been slowed down, keeping unchanged the phased-in values foreseen by Law 243/2004. In particular, in 2008 the age requirement, for those with a contributory career of 35 years, is 58 for employees and 59 for the self-employed instead of 60 and 61. From 2013 onwards (previously 2014, according to Law 243/2004), the age requirement, for those with a contributory career of 35 years, is 62 for employees and 63 for the self-employed. In addition, from July 2009 onwards, workers may retire one year earlier provided that they have a contributory career of at least 36 years.
- *Revision of transformation coefficients:* the new transformation coefficients, revised on the basis of the procedure foreseen in Law 335/95, have been applied since January 2010. Subsequent revisions will be made every three years, instead of every 10 years, through a simplified procedure falling entirely under the application of administrative rules.
- *Contribution rate of atypical workers:* the contribution rate for atypical workers has been increased by 3 percentage points (up to 26 % from 2010) in order to improve pension adequacy for this category.

3. *Law 133/2008* states that old-age and seniority pensions may be fully accumulated with labour income. The new legislation improves upon the previous which foresaw some restrictions in the possibility of accumulating, especially for employees.

4. *Article 12 of the law 122/2010 (amending decree law 78/2010)* introduces three changes to the public pension system.

- *'Exit window' mechanism:* the 'exit window' mechanism, which, after attainment of the minimum age and/or completion of the contribution period postpones pension

(Continued on the next page)

receipt, has been increased. It applies to those qualifying for a pension after 1 January 2011. It involves a one-year postponement for employees and one-and-a-half-years for the self-employed, concerning both early (including those with a 40-year contributory career) and old-age pensions.

- *Indexation of retirement age*: age requirements for early and old-age pensions and old-age allowances (*assegno sociale*) have been indexed to changes in life expectancy at 65, as measured by the National Statistical Institute over the preceding three years. Indexation to life expectancy will be first applied in 2015, when the gradual increase in age requirements for retirement, according to previous legislation, has been fully phased in, but cannot exceed three months. Subsequent retirement age indexations are envisaged for 2019 and then every three years, so as to align this mechanism with the revision of the transformation coefficients used to calculate pension entitlements according to the contributions-based method.
- *Statutory retirement age of women in the public sector*: in the public sector, the statutory retirement age of women (60 in 2009) will be equalised with that of men (currently 65) in 2012 (61 in 2010–11), instead of 2018 as previously foreseen in Law 102/2009. This accelerated pace of convergence reflects a European Court of Justice recommendation to remove any discrimination based on gender.

5. *Law 111/2011* <sup>(1)</sup> (amending Decree Law 98/2011), approved 15 July 2011, further strengthens the eligibility requirements, keeping unchanged the ‘exit window’ mechanism, with the exception of early retirement with 40 years of contributions, as indicated below. The major interventions may be summarised as follows.

- *Statutory retirement age of women in the private sector*: the statutory retirement age of women in the private sector will be gradually equalised to that of men (and women in the public sector) passing from the current level of 60 to 65 over the period 2020–32.
- *Indexation of retirement age*: the indexation of the eligibility requirements (early and old-age pensions, and old-age allowance), previously foreseen to start from 2015 (Law 122/2010), has been brought forward to 2013. This implies a further increase in the age requirements of four months starting from 2016, compared to previous legislation (Law 122/2010).

- *Early pension with 40 years of contributions*: for those retiring with 40 years of contributions regardless of age, the postponement envisaged by the ‘exit window’ mechanism has been further increased by three months starting from 2014 (one month in 2012 and two months in 2013).

- *Benefit indexation*: for the two-year period 2012–13 and limited to pensions above five times the minimum pension, the indexation to price inflation is reduced to 70 % and only applied to the part of pension up to three times the minimum. For the part exceeding such a threshold, the indexation is nil.

6. *Law 148/2011* <sup>(1)</sup> (amending Decree Law 138/2011), approved 14 September 2011, foresees two further interventions on retirement age.

- *Statutory retirement age of women in the private sector*: the alignment of the statutory retirement age of women in the private sector to that of men (and women in the public sector) has been brought forward six years, from 2020–32 to 2014–26.
- *‘Exit window’ mechanism*: further postponement due to the ‘exit window’ mechanism is also applied to workers in the public educational system, previously exempt.

## Cyprus

On 20 March 2009, the Social Insurance Law No 22(I)/2009 was approved regarding the pension reform package for securing the long-term viability of the Social Insurance Scheme. The two measures of the reform expected to impact in future labour force participation rates are:

- stricter eligibility conditions to old-age pensions, which are to be introduced gradually over the period until January 2012, namely increase of the minimum contributory period to 10 years (previously three years);
- a maximum limit of six years of credits granted to an insured person at the lower end of the income distribution for any time spent in full-time education or approved training after 16 years of age (previously, there was no maximum). This measure came into effect in January 2010.

<sup>(1)</sup> Measures legislated after June 2011 are not yet reflected in the macroeconomic assumptions.

(Continued on the next page)

### Lithuania

In June 2011, a new law was passed that gradually increases the statutory retirement age from 62.5 to 65 for men and from 60 to 65 for women by 2026. Under the new law, the retirement age will increase every year by two months for men and by four months for women, starting in January 2012. In order to receive a full pension, workers must also have a career contribution of 30 years.

### Malta

In December 2006, the government completed the legislative process associated with the enactment of the Pensions Reform law. Following the implementation of the reform, the pension age was raised to 65 years. However, a number of provisos apply: for persons born on or before 31 December 1951, the pension age is 61 years while, for females, the pension age is 60 years; in the case of a person born 1952–55, the pension age is 62 years; for persons born 1956–58, the pension age is 63 years; for persons born 1959–61, the pension age is 64 years.

Secondly, following the reform, a person aged 61, not having attained pensionable age, may claim a pension if they are no longer employed provided that the claimant has accumulated since their 18th birthday a total of: (i) 40 years of paid or credited contributions (for those born after 1962); or (ii) 35 years of paid or credited contributions (for those born between 1952 and 1961).

According to the Pension Reform law, for those born after 1962, the pension shall be determined by taking the yearly average of the basic wage/salary/net income/net earnings as the case may be, during the best 10 calendar years within the last 40 years immediately preceding their retirement or invalidity. In determining pensionable income, past wages and incomes are indexed to the cost of living (i.e. HICP).

The contribution period was also changed: (i) a 30-year period is expected for persons born before 1952; (ii) 35 years for persons born 1952–61; and (iii) 40 years for persons born after 1962.

Following enactment of the Pension Reform law, those born after 1962 who are not entitled to a (contributory) pension are entitled to a guaranteed national minimum pension not lower than 60 % of the national median income. Furthermore, the categories of persons benefiting from credit contributions is extended to individuals born after 1962, who have the legal care and custody of a child younger than six years, or 10 years in the case of a child suffering from a serious disability. Following the pension reform, persons born after 1962 will have their pension

updated annually by a sum corresponding to 70 % of the increase in the national average wage and 30 % to consumer price inflation.

The Maltese Government also introduced changes to the regime regulating the award of invalidity pensions and the procedures for their review, including changes in: (i) application; (ii) the medical panel; (iii) the specific medical criteria for their award; and (iv) the setting up of an independent audit system.

### The Netherlands

Since 1 January 2006, the Dutch early retirement scheme has been integrated with the second pillar old-age pension system by a law called VPL (*VUT-Prepensioen-Levensloop*). The installation of this law implied a replacement of a previous scheme that facilitated actuarially unfair early retirement, called the VUT scheme. The old scheme had an important impact on the participation rate. Since January 2009, older workers have received an age-related tax credit on their wage income in order to increase participation (at 62, this credit is 5 % of gross wages; at 63, it is 7 %; at 64, it is 10 %; then at 65 and 66 it is 2 %; and then it decreases to 1 % at 67).

### Poland

The general system allows that all insured persons born after 1948 are covered by the new defined contribution pay-as-you-go (PAYG) system with notional accounts and three pillars. The standard retirement age remains at 65 years for men and 60 for women. There are no early pensions for those born after 1948 and retiring after 2008, with the exception of miners. Since 2007, the disability pension insurance contributions have been reduced.

In 2009, ‘bridging’ pensions and compensation benefits replaced early retirement pensions for eligible workers. This only affects those that started working in special conditions before 1999.

Since May 2010, contributions to the funded tier are modelled accordingly to the PAYG contribution. From 2017 onwards, after the transition period of the existing 7.3 % contribution, 3.5 % will remain in the funded system, while an extra 3.8 % will be paid into the public system to dedicated accounts.

### Portugal

In 2007, Portugal introduced a ‘sustainability factor’ linking initial benefits to average life expectancy at retirement (i.e. at the legal retirement age of 65). Individuals can opt to postpone retirement beyond the legal retirement age to compensate (at least partially) for the financial penalty associated with the sustainability factor.

(Continued on the next page)



Simultaneously, a 'national strategy for the promotion of active ageing' was introduced aiming to encourage older workers to remain in the labour force longer through: better access to vocational training; improvements in older workers' employment conditions; a higher penalty for early retirement; and benefits granted in cases of longer contribution careers.

In the framework of the 2006 Agreement on the Social Security Reform, a new law defining the social security contributory code to the general regime was approved (Law 110/2009, 119/2009 and 55-A/2010), and this law has been in force since 1 January 2011.

#### Romania

In 2007, a three pillar pension system was introduced. As regards the first pillar, the retirement age for men will increase from 64 to 65 while for women, the retirement age will increase to 63 by 2030. There will also be an increase in the mandatory contributory period. Additionally, the indexation of public pensions will also become less generous, with the current earnings-related indexation rule being replaced by a Swiss indexation rule. Penalties for early retirement will be increased, while eligibility for disability pensions will be tightened.

#### Sweden

The pension reform was approved by parliament in 1999. Under the new notional defined contribution system, it is possible to retire after 61 years of age, with actuarially fair compensation for those who stay in the labour force. Every year of contributions enters into the calculation of pensions. A person with an average wage will increase their yearly pension benefit by nearly 60 % if they postpone retirement until 67 years of age compared to leaving at 61. A yearly 'statement of account' informs workers of the costs and benefits of retirement. The new system is being phased in gradually for generations born between 1938 and 1953, while fully affecting those born after 1953.

#### Slovenia

Under the Pension and Disability Insurance Act entered into force on 1 January 2000 (comprising a three pillar defined benefit pay-as-you-go (PAYG) system plus compulsory and voluntary supplementary funded schemes), the standard retirement age has been increased. It is now possible to retire between 58 and 63 for men and 61 for women (before the reform, the minimum retirement age was 58 for men and 53 for women). Women who worked before the age of 18 can retire

earlier (but not before the age of 55). Special regulations reduce the age of retirement to 55 in certain cases (before the reform, it was even possible to retire before 50). The minimum retirement age is raised from 53 to 58 for women (the same as for men). The accrual rate was reduced by 2 % to 1.5 % in 2000. Later retirement has been encouraged: a person who fulfils the requirement for pension but continues to work beyond the age of 63/61 will receive an additional pension increase (3.6 % in the first additional year, 2.4 % in the second year and 1.2 % in the third year, in addition to the normal rate of accrual of 1.5 % per year).

#### Slovakia

Under the reformed (from 2004) three pillar pension system, the standard retirement age has been increased from 60 to 62 for men (nine months per year) since 2006, while for women, it will be increased from 57 to 62 by 2014. A worker can still retire earlier if the combined benefit from the first and the newly introduced second pillar equals at least 60 % of the minimum living standard set by the government. In case of early retirement, the pension is reduced by 6 % per year, while increased by 6 % per year of postponement. It is now possible to accumulate pension benefit with labour income.

##### *Opening of a second pillar*

- For a second time, between 15 November 2008 and 30 June 2009, all pension savers were given (as in 2008) an opportunity to leave the second pillar while, at the same time, those individuals who had not yet entered it were allowed to join. During this period, 66 000 people left the second pillar, while 14 600 people joined it, leading to a net decline of 3.5 % in the number of individuals covered by the second pillar.

On 1 January 2008, eligibility conditions for early pensions were tightened: it can now be granted only two years before reaching the normal retirement age.

As of 1 January 2008, the minimum contributory period was increased from 10 to 15 years.

As of 1 January 2011, it is not possible to cumulate an early pension with labour income.

#### The United Kingdom

Between 2010 and 2020, women's pensionable age will gradually increase from 60 to 65 (the same age as men). The Pension Act 2007 adds also several measures, including the gradual increase in the state pension age between 2024 and 2046 to 68 for men and women (previously 65).

Source: EPC/AWG delegates

## 2.5. THE IMPACT OF PENSION REFORMS ON THE PARTICIPATION RATE OF OLDER WORKERS

The impact of pension reforms on the participation rate of older workers is simulated through its estimated effects on the retirement decision (or labour market exit). The likely impact of pension reforms is incorporated in the baseline labour force projection by appropriately changing (average) labour market exit probabilities calculated using the CSM for the period 2001–10. More specifically, the distribution of labour market exit probabilities (between the ages of 50 and 74), calculated separately for both genders, is ‘shifted’ according to the expected effects of pension reforms. The estimation of the ‘shift’ takes into account country-specific information about the relationship between retirement behaviour and the parameters of the pension system, together with cross-country econometric evidence of the impact of changes in the implicit tax rate on continuing work and retirement decisions.

An estimation of the effects of pension reforms is highlighted by the following. Although the age profiles of the probability of retirement vary across countries, reflecting the heterogeneity of pension systems, a common feature is that the distribution of retirement decisions is markedly skewed towards the earliest possible retirement age. In fact, a typical distribution of the retirement age tends to have spikes/modes at both the minimum age for early retirement and the normal (statutory) retirement ages <sup>(38)</sup>.

A comprehensive assessment of how to shift the distribution of retirement ages ultimately depends on the considered judgement of all the relevant factors underlying retirement decisions; this is carried out by Commission services (Directorate-General for Economic and Financial Affairs) in close cooperation with EPC and AWG delegates.

Finally, historical retirement/exit rates (the average over the period 2001–10) are replaced in the CSM with the new estimated exit rates, according to the phasing in of the reforms. Consequently, pension reforms change estimated participation rates for older workers. The magnitude of the expected impact of pension reforms can be assessed by comparing participation rates calculated with and without the effect of reforms.

### 2.5.1. ESTIMATES OF THE IMPACT OF PENSION REFORMS

The *average exit age* from the labour force has increased by approximately 1.5 years in the EU-27 between 2001 and 2009, reaching 61.4 years (Table 2.6), and showing an increasing trend in a large majority of EU Member States.

The *average exit age* from the labour force (in 2060) can be seen as a summary measure of the long-term impact of all currently legislated pension reforms; this report deals with the impact of enacted pension reforms in 22 Member States <sup>(39)</sup>. Projections show an average increase of 1.9 years in the effective retirement rate for men <sup>(40)</sup>. In Italy and Malta, the expected increase exceeds three years, while it is between two and three years in the Czech Republic, Germany, Spain, France, Hungary, Poland and Slovenia. The expected increase in the retirement age for women is slightly higher (2.4 years on average) reflecting, in a number of countries, the progressive convergence of the retirement age of women to that of men.

<sup>(38)</sup> For example, assume that in a given country the (historical) retirement probability is concentrated at age 58 and then a reform ends early retirement schemes or increases the minimum years of contribution. In order to calculate the impact of this reform, the peak of the retirement probability distribution is shifted away from the historical peak of 58 years and moved closer to the statutory retirement age (usually 65 for men and 60 for women).

<sup>(39)</sup> BG, CZ, DK, DE, EE, EL, ES, FR, IT, CY, LT, HU, MT, AT, PL, PT, RO, SI, SK, FI, SE and UK.

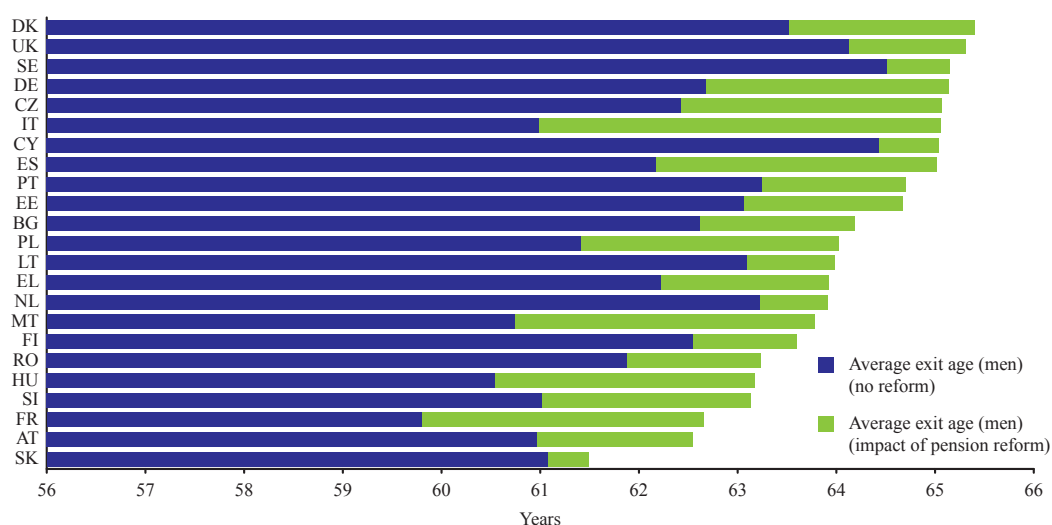
<sup>(40)</sup> Non-weighted average of the 22 Member States considered.

**Table 2.6:**  
Historical average exit age from the labour force

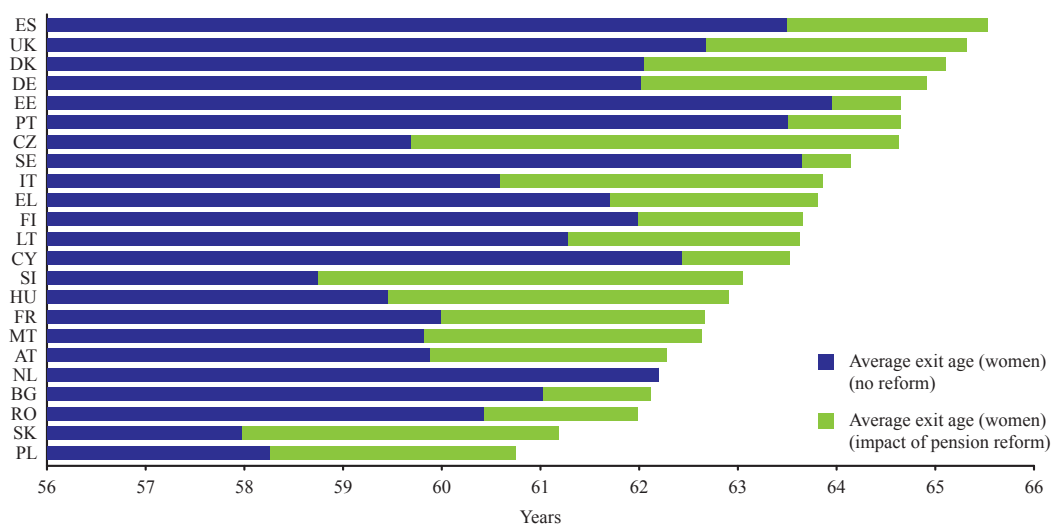
	Weighted Total			Men			Women		
	2001	2005	2009	2001	2005	2009	2001	2005	2009
AT	59.2	59.9		59.9	60.3		58.5	59.4	
BE	56.8	60.6		57.8	61.6		55.9	59.6	
BG		60.2			62.4			58.4	
CY	62.3		62.8						
CZ	58.9	60.6	60.5	60.7	62.3	61.5	57.3	59.1	59.6
DK	61.6	61.0	62.3	62.1	61.2	63.2	61.0	60.7	61.4
EE	61.1	61.7	62.6						
FI	61.4	61.7	61.7	61.5	61.8	62.3	61.3	61.7	61.1
FR	58.1	59.0	60.0	58.2	58.7	60.3	58.0	59.3	59.8
DE	60.6		62.2	60.9		62.6	60.4		61.9
EL		61.7	61.5		62.5	61.3		61.0	61.6
HU	57.6	59.8	59.3	58.4	61.2	60.1	57.0	58.7	58.7
IE	63.2	64.1		63.4	63.6		63.0	64.6	
IT	59.8	59.7	60.1	59.9	60.7	60.8	59.8	58.8	59.4
LV	62.4	62.1							
LT	58.9	60.0							
LU	56.8	59.4							
MT	57.6	58.8	60.3						
NL	60.9	61.5	63.5	61.1	61.6	63.9	60.8	61.4	63.1
PL	56.6	59.5		57.8	62.0		55.5	57.4	
PT	61.9	63.1		62.3	62.4		61.6	63.8	
RO	59.8	63.0		60.5	64.7		59.2	61.5	
SK	57.5	59.2	58.8	59.3	61.1	60.4	56.0	57.6	57.5
SI		58.5							
ES	60.3	62.4	62.3	60.6	62.0	61.2	60.0	62.8	63.4
SE	62.1	63.6	64.3	62.3	64.3	64.7	61.9	63.0	64.0
UK	62.0	62.6	63.0	63.0	63.4	64.1	61.0	61.9	62.0
NO	63.3	63.1	63.2	63.0	63.1	63.0	63.6	63.1	63.3
EA-17	59.9	60.7	61.2	60.2	60.9	61.4	59.6	60.5	61.0
EU-27	59.9	61.0	61.4	60.4	61.6	61.8	59.4	60.4	61.0

Source: Commission services

**Graph 2.1:** Impact of pension reforms on the average effective retirement age <sup>(41)</sup> from the labour force (men v women)



<sup>(41)</sup> Based on the reference age group 50–70.



Source: Commission services, EPC

**Table 2.7:**  
Estimated impact of pension reforms on participation rates (2020, 2040, 2060), in percentage points  
(comparison of projections with and without incorporating pension reforms)

Age group	Gender	AT			BG			CY			CZ			DE		
		2020	2040	2060	2020	2040	2060	2020	2040	2060	2020	2040	2060	2020	2040	2060
15–64	M	1.8	2.0	2.2	0.2	2.8	2.1	0.7	0.8	0.8	0.6	3.2	2.8	2.8	2.9	3.1
	F	1.5	3.6	3.9	0.0	1.9	1.5	0.8	1.1	1.1	1.2	6.2	6.3	2.8	3.8	4.1
	T	1.7	2.8	3.0	0.1	2.4	1.8	0.7	1.0	1.0	0.9	4.6	4.5	2.8	3.4	3.6
15–74	M	1.5	2.2	2.4	0.3	2.7	2.1	0.3	0.4	0.2	0.7	4.1	4.2	3.4	4.1	4.4
	F	1.4	3.4	3.9	0.1	1.7	1.4	1.0	1.4	1.5	1.0	6.2	7.1	3.0	4.3	4.7
	T	1.4	2.8	3.1	0.2	2.2	1.8	0.6	0.9	0.8	0.9	5.2	5.7	3.2	4.2	4.5
20–64	M	2.0	2.2	2.4	0.3	3.0	2.4	0.7	0.9	0.9	0.7	3.4	3.1	3.1	3.2	3.4
	F	1.6	4.0	4.2	0.0	2.1	1.6	0.8	1.2	1.2	1.3	6.7	6.9	3.0	4.2	4.5
	T	1.8	3.1	3.3	0.2	2.6	2.0	0.8	1.0	1.0	1.0	5.0	5.0	3.1	3.6	3.9
55–64	M	8.1	9.7	10.2	0.9	10.2	10.0	3.1	3.5	3.5	3.2	12.6	14.2	10.9	12.6	13.1
	F	6.3	17.2	17.6	–0.0	6.4	6.4	3.6	4.5	5.0	5.9	24.3	31.8	10.9	16.6	17.5
	T	7.2	13.5	13.9	0.4	8.3	8.2	3.4	4.0	4.3	4.5	18.4	22.9	10.9	14.6	15.3
20–74	M	1.6	2.3	2.6	0.3	2.9	2.3	0.3	0.4	0.2	0.7	4.4	4.6	3.6	4.4	4.7
	F	1.5	3.6	4.1	0.1	1.9	1.5	1.1	1.5	1.6	1.1	6.7	7.7	3.2	4.5	5.0
	T	1.5	3.0	3.4	0.2	2.4	1.9	0.7	1.0	0.9	0.9	5.5	6.1	3.4	4.5	4.9
Age group	Gender	DK			EE			EL			ES			FI		
		2020	2040	2060	2020	2040	2060	2020	2040	2060	2020	2040	2060	2020	2040	2060
15–64	M	0.9	1.5	2.0	0.5	2.8	2.2	1.3	3.4	3.8	1.4	3.6	3.0	1.5	1.5	1.5
	F	0.7	2.9	3.5	1.0	1.9	1.5	1.4	2.8	3.3	1.0	2.3	1.9	2.0	2.0	2.0
	T	0.8	2.2	2.7	0.8	2.3	1.8	1.3	3.1	3.5	1.2	2.9	2.4	1.7	1.8	1.7
15–74	M	0.4	1.7	2.6	0.7	2.8	2.4	0.4	1.8	2.4	1.9	5.3	4.5	1.1	1.5	1.4
	F	0.5	3.8	4.6	–0.3	0.8	0.2	1.0	1.9	2.5	1.3	3.8	3.2	2.2	2.4	2.5
	T	0.5	2.7	3.6	0.2	1.8	1.3	0.7	1.8	2.5	1.6	4.6	3.8	1.6	1.9	1.9
20–64	M	1.0	1.7	2.2	0.6	3.0	2.5	1.4	3.7	4.2	1.5	3.9	3.3	1.6	1.7	1.6
	F	0.8	3.2	3.9	1.1	2.1	1.6	1.5	3.1	3.6	1.1	2.4	2.0	2.2	2.2	2.2
	T	0.9	2.4	3.0	0.9	2.5	2.0	1.4	3.4	3.9	1.3	3.2	2.7	1.9	1.9	1.9
55–64	M	4.2	7.9	9.7	2.1	10.9	10.9	4.7	12.0	16.8	6.1	13.9	13.3	6.7	7.3	7.3
	F	2.8	14.5	16.3	4.7	8.2	8.2	5.9	10.9	15.0	4.6	9.0	8.6	8.5	9.0	9.3
	T	3.5	11.3	12.9	3.6	9.5	9.5	5.3	11.4	15.9	5.3	11.5	10.9	7.6	8.1	8.3
20–74	M	0.5	1.9	2.8	0.8	3.1	2.6	0.5	1.9	2.6	2.1	5.7	4.8	1.2	1.6	1.5
	F	0.5	4.1	5.0	–0.3	0.8	0.3	1.0	2.1	2.7	1.4	4.0	3.5	2.3	2.6	2.7
	T	0.5	3.0	3.9	0.2	1.9	1.4	0.7	2.0	2.7	1.7	4.9	4.1	1.8	2.1	2.1

Age group	Gender	FR			HU			IT			LT			MT		
		2020	2040	2060	2020	2040	2060	2020	2040	2060	2020	2040	2060	2020	2040	2060
15–64	M	3.0	4.3	4.4	2.3	4.6	4.0	2.9	5.2	5.7	0.5	1.1	1.2	2.5	5.4	5.6
	F	2.4	4.0	4.0	3.8	6.3	5.5	2.1	4.1	4.6	2.0	4.2	3.8	1.0	3.8	3.7
	T	2.7	4.2	4.2	3.0	5.5	4.8	2.5	4.6	5.1	1.3	2.6	2.5	1.8	4.6	4.7
15–74	M	2.4	4.1	4.2	1.9	4.4	3.7	2.5	5.3	6.2	0.5	1.3	1.3	2.0	4.9	4.8
	F	2.1	4.0	4.0	2.9	5.7	4.9	1.8	3.5	4.1	1.6	3.6	3.2	0.8	3.2	2.9
	T	2.2	4.1	4.1	2.4	5.1	4.3	2.2	4.4	5.2	1.1	2.4	2.3	1.4	4.1	3.9
20–64	M	3.4	4.8	4.9	2.5	5.0	4.4	3.2	5.6	6.2	0.6	1.2	1.3	2.7	5.9	6.1
	F	2.7	4.4	4.4	4.1	6.8	6.0	2.2	4.4	5.0	2.1	4.5	4.2	1.0	4.1	4.0
	T	3.0	4.6	4.7	3.3	5.9	5.2	2.7	5.0	5.6	1.4	2.9	2.7	1.9	5.0	5.1
55–64	M	14.7	22.3	22.3	12.1	18.1	17.1	12.3	22.4	24.6	2.6	5.1	6.0	12.4	24.6	26.2
	F	11.1	19.4	19.5	18.7	24.8	24.3	8.1	16.4	19.5	8.2	17.4	18.5	3.6	14.0	14.8
	T	12.8	20.8	20.9	15.7	21.5	20.7	10.2	19.3	22.1	5.7	11.6	12.3	8.0	19.2	20.6
20–74	M	2.6	4.5	4.6	2.1	4.7	4.0	2.7	5.6	6.7	0.6	1.4	1.4	2.2	5.3	5.1
	F	2.2	4.4	4.4	3.1	6.1	5.3	1.9	3.7	4.3	1.7	3.8	3.5	0.8	3.5	3.1
	T	2.4	4.4	4.5	2.6	5.4	4.6	2.3	4.7	5.5	1.2	2.6	2.5	1.5	4.4	4.2
Age group	Gender	NL			PL			PT			RO			SE		
		2020	2040	2060	2020	2040	2060	2020	2040	2060	2020	2040	2060	2020	2040	2060
15–64	M	1.8	2.3	2.6	1.9	4.2	3.5	1.0	2.3	2.1	1.6	2.7	2.3	0.2	0.2	0.2
	F	0.2	0.2	0.2	1.6	4.0	3.1	0.8	2.1	2.0	0.6	2.6	2.2	0.1	0.1	0.1
	T	1.0	1.3	1.4	1.7	4.1	3.3	0.9	2.2	2.1	1.1	2.6	2.2	0.2	0.2	0.2
15–74	M	1.5	2.1	2.4	1.6	4.3	3.7	0.9	2.8	2.6	1.1	2.4	2.0	0.7	1.0	1.0
	F	0.1	0.1	0.1	1.5	4.0	3.2	0.6	2.0	1.9	0.3	1.9	1.7	0.7	0.8	0.9
	T	0.8	1.1	1.2	1.5	4.2	3.5	0.7	2.4	2.3	0.7	2.2	1.8	0.7	0.9	1.0
20–64	M	1.7	2.3	2.6	2.0	4.5	3.8	1.1	2.5	2.3	1.8	2.9	2.5	0.3	0.3	0.3
	F	0.1	0.1	0.1	1.7	4.3	3.3	0.9	2.3	2.2	0.6	2.7	2.3	0.1	0.1	0.1
	T	0.9	1.2	1.4	1.8	4.4	3.6	1.0	2.4	2.2	1.2	2.8	2.4	0.2	0.2	0.2
55–64	M	4.8	5.1	5.8	8.8	15.4	15.7	4.6	9.0	8.6	8.5	9.7	9.3	1.2	1.3	1.3
	F	–0.0	0.0	0.0	5.5	12.1	11.3	2.9	7.6	7.5	2.1	8.2	7.9	0.5	0.5	0.5
	T	2.4	2.6	3.0	7.1	13.7	13.5	3.7	8.3	8.0	5.1	8.9	8.6	0.8	0.9	0.9
20–74	M	1.4	2.0	2.3	1.7	4.6	3.9	0.9	2.9	2.8	1.2	2.6	2.1	0.8	1.0	1.1
	F	0.0	–0.0	–0.0	1.5	4.3	3.5	0.6	2.1	2.0	0.4	2.1	1.8	0.7	0.9	1.0
	T	0.7	1.0	1.2	1.6	4.4	3.7	0.8	2.5	2.4	0.8	2.3	2.0	0.7	1.0	1.1
Age group	Gender	SI			SK			UK			EA-17			EU-27		
		2020	2040	2060	2020	2040	2060	2020	2040	2060	2020	2040	2060	2020	2040	2060
15–64	M	3.0	4.7	3.6	0.7	1.0	0.8	0.1	0.6	0.9	2.4	3.5	3.6	1.9	3.0	3.0
	F	3.7	8.6	6.9	4.4	6.9	5.4	1.2	2.4	2.5	2.0	3.3	3.3	1.7	3.2	3.1
	T	3.3	6.6	5.3	2.5	3.9	3.1	0.7	1.5	1.7	2.2	3.4	3.5	1.8	3.1	3.1
15–74	M	1.9	3.8	2.9	0.5	0.7	0.5	0.0	0.7	1.5	2.3	4.1	4.2	1.8	3.4	3.5
	F	2.6	7.2	5.9	3.4	5.8	4.3	0.8	3.2	3.4	1.9	3.5	3.5	1.6	3.4	3.4
	T	2.3	5.5	4.4	2.0	3.3	2.4	0.4	1.9	2.5	2.1	3.8	3.8	1.7	3.4	3.5
20–64	M	3.2	5.0	4.0	0.8	1.0	0.9	0.1	0.7	1.0	2.6	3.8	3.9	2.0	3.3	3.3
	F	3.9	9.3	7.6	4.7	7.5	5.9	1.3	2.7	2.8	2.2	3.6	3.6	1.9	3.5	3.4
	T	3.6	7.1	5.8	2.7	4.2	3.4	0.7	1.7	1.9	2.4	3.7	3.8	1.9	3.4	3.4
55–64	M	13.4	17.6	17.5	3.8	3.8	3.8	0.2	2.6	4.4	10.1	15.4	16.1	8.2	13.0	13.6
	F	13.7	31.7	31.5	20.1	24.8	23.8	5.4	12.6	13.1	8.4	14.2	14.9	7.3	13.6	14.3
	T	13.5	24.4	24.4	12.3	14.4	13.8	2.9	7.6	8.7	9.2	14.8	15.5	7.8	13.3	14.0
20–74	M	2.1	4.1	3.1	0.6	0.8	0.5	0.0	0.8	1.7	2.5	4.3	4.5	1.9	3.7	3.8
	F	2.8	7.8	6.4	3.6	6.2	4.6	0.9	3.4	3.7	2.0	3.7	3.8	1.7	3.7	3.7
	T	2.4	5.9	4.7	2.1	3.5	2.6	0.5	2.1	2.7	2.3	4.0	4.1	1.8	3.7	3.7

Source: Commission services, EPC

Table 2.7 shows the estimated impact of pension reforms on participation rates. In most of the 22 EU Member States that have recently legislated pension reforms, they are projected to have a sizeable impact on the labour market participation of older workers (55–64), depending on their magnitude and phasing in.

Overall, in the EU-27, the participation rate of older people (55–64) is estimated to be higher by about 7.7 percentage points in 2020, 13.2 percentage points in 2040, and 13.8 percentage points in 2060 due to the projected impact of pension reforms. In the euro area, the impact is estimated to be even larger: 9.1 percentage points, 14.7 percentage points, and 15.4 percentage points, respectively, in 2020, 2040 and 2060. In Germany, France, Italy, Hungary, Slovenia and Slovakia the impact is estimated to be above 10 percentage points by 2020, while in the Czech Republic, Denmark, Greece, Spain, Lithuania, Malta, Austria and Poland, the impact is estimated to be above 10 percentage points by 2040.

It should be recalled that total participation rates (15–64 and 20–64) are mainly driven

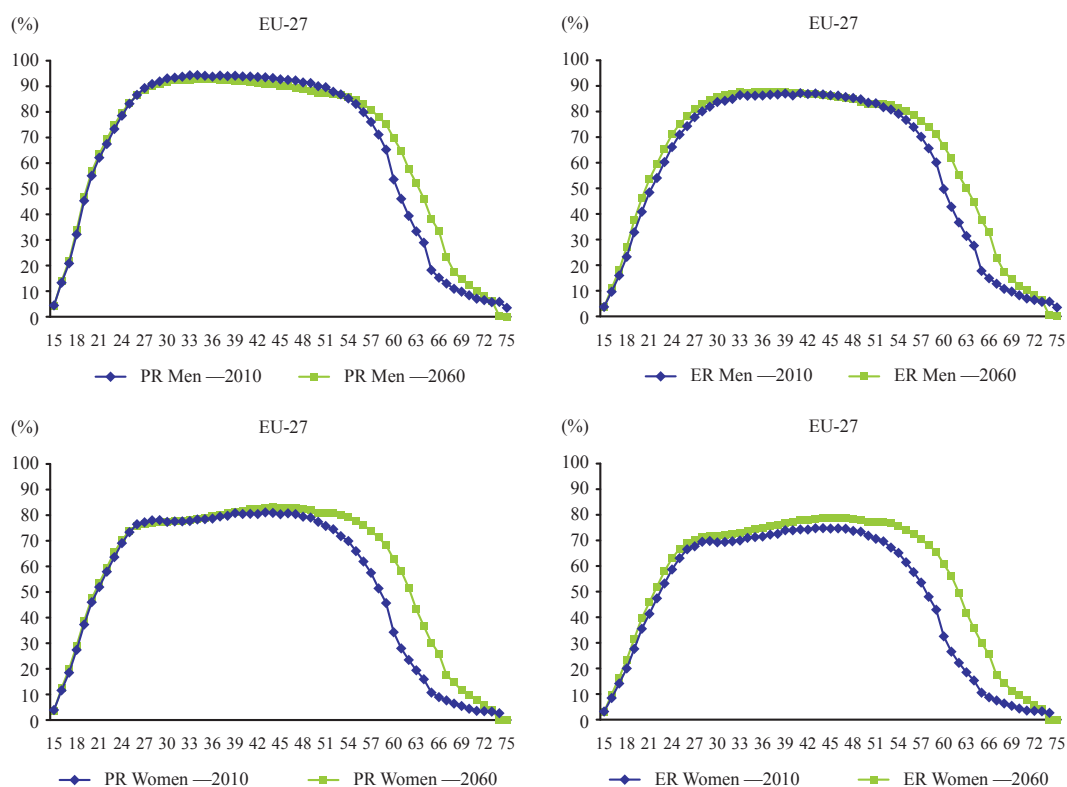
by changes in the participation rate of prime-age workers (25–55), as this group accounts for about 60 % of the total labour force (15–64). Therefore, even these significant projected rises in participation rates for older workers will only have a rather limited impact on the total participation rate. For example, the 13.8 percentage points increase in the participation rate of workers aged 55–64 in the EU will lead to an increase in the total participation rate (15–64) of only about 3 percentage points by 2060.

## 2.6. MAIN RESULTS OF THE PROJECTION OF LABOUR MARKET PARTICIPATION RATES

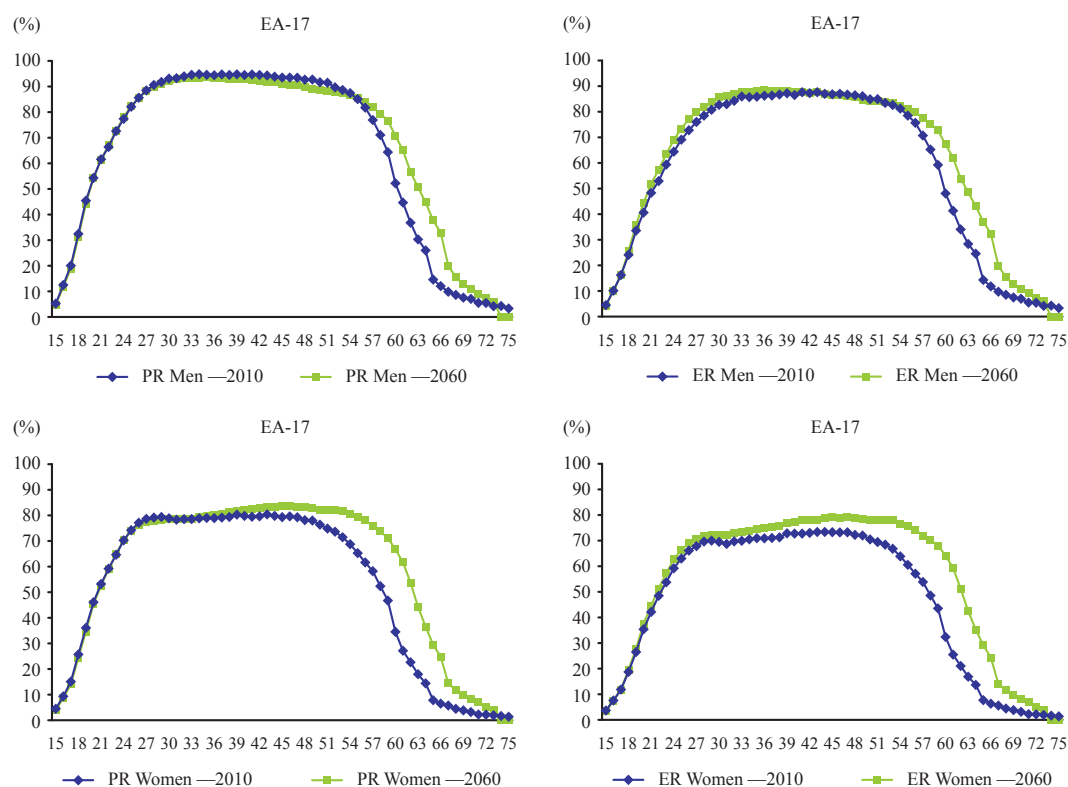
### 2.6.1. PROJECTION OF PARTICIPATION RATES

The methodology used leads to a projected rightward shift in the age profiles of participation rates, meaning that older individuals (aged 50 and over) tend to stay longer in the labour market, particularly women (Graphs 2.2 and 2.3).

**Graph 2.2:** Age profiles of participation and employment rates by gender in 2010 and 2060 (EU-27)



Source: Commission services, EPC

**Graph 2.3:** Age profiles of participation and employment rates by gender in 2010 and 2060 (EA-17)

Source: Commission services, EPC

Table 2.8 presents participation rate projections. The total participation rate (for the age group 20–64) in the EU-27 is projected to increase by 3.1 percentage points (from 75.6 % in 2010 to 78.7 % in 2060). For the euro area, a slightly higher increase of 3.3 percentage points is projected (from 75.9 % in 2010 to 79.2 % in 2060). For the age group 15–64, the projected increases in participation rates are smaller, with 80 % of the total improvement occurring in the period up to 2020.

The population of working age is projected to decline substantially in the coming decades, as large cohorts of people retire and are replaced by smaller cohorts of younger workers. Other things being equal and given the age profile of participation rates, the increasing share of older workers in the labour force puts downward pressure on the total participation rate.

Tables 2.9 to 2.11 provide an overview of major developments in participation rates

between 2010 and 2060 broken down by age group and gender. By some way, the biggest increase in participation rates is projected for older workers (around 20 percentage points for women and 10 percentage points for men) in the EU-27. Consequently, the gender gap in terms of participation rates is projected to narrow substantially in the period up to 2060.

Although the participation rate of total prime-age workers (25–54) in the EU-27 is projected to remain almost unchanged between 2010 and 2060, at about 85 %, this results from opposite trends by gender. In fact, women's participation rate is projected to rise by 1.9 percentage points, reaching 80 % in 2060, while men's participation rate is projected to decline by 1.7 percentage points, attaining 90 % in 2060.

In the framework of the CSM, participation rate dynamics are determined, inter alia, by labour market conditions affecting younger



**Table 2.8:**  
Projected changes in participation rates

	Age group 15–64					Age group 20–64					
	Level	Level	Change in participation rates			Level	Level	Change in participation rates			
	2010	2060	2060–10	2020–10	2060–20	2010	2060	2060–10	2020–10	2060–20	
AT	75.0	77.6	2.5	0.9	1.7	78.0	80.6	2.5	0.4	2.1	AT
BE	67.7	68.5	0.8	1.7	–0.9	73.5	74.8	1.3	1.5	–0.2	BE
BG	67.1	69.4	2.4	1.7	0.7	72.1	75.7	3.6	1.6	2.0	BG
CY	73.2	78.0	4.8	4.7	0.1	79.9	84.2	4.3	3.3	1.0	CY
CZ	70.3	73.1	2.8	2.6	0.2	75.9	79.7	3.7	2.0	1.7	CZ
DE	76.7	78.9	2.2	1.7	0.5	80.6	83.2	2.6	1.5	1.1	DE
DK	79.5	80.6	1.1	0.4	0.7	81.6	82.7	1.1	0.3	0.8	DK
EE	74.1	75.6	1.5	1.9	–0.4	80.2	82.7	2.5	1.5	1.0	EE
EL	68.4	72.6	4.2	2.9	1.3	73.2	78.8	5.6	3.1	2.5	EL
ES	73.4	77.5	4.0	3.0	1.1	77.7	83.0	5.3	3.7	1.7	ES
FI	74.6	76.2	1.7	1.8	–0.2	79.1	81.1	2.0	1.6	0.3	FI
FR	70.4	74.7	4.2	2.6	1.6	76.1	81.1	5.0	3.1	1.9	FR
HU	62.4	67.1	4.7	5.4	–0.7	68.0	72.6	4.6	5.0	–0.4	HU
IE	69.6	67.3	–2.3	–0.4	–1.9	74.8	73.2	–1.6	0.5	–2.1	IE
IT	62.2	65.3	3.1	2.0	1.1	66.5	70.3	3.8	2.2	1.6	IT
LT	71.0	73.0	2.0	2.9	–1.0	78.5	79.9	1.4	0.6	0.7	LT
LU	67.9	67.5	–0.4	0.5	–0.9	73.5	73.0	–0.5	0.1	–0.6	LU
LV	73.7	76.9	3.2	3.5	–0.4	79.9	83.1	3.3	2.5	0.7	LV
MT	60.7	70.3	9.6	5.7	4.0	64.3	74.3	10.0	5.4	4.6	MT
NL	78.2	79.9	1.7	1.4	0.3	80.0	81.7	1.7	1.3	0.3	NL
NO	78.2	78.0	–0.2	0.1	–0.4	82.2	81.9	–0.3	–0.2	–0.1	NO
PL	65.8	67.2	1.4	2.6	–1.2	71.5	72.6	1.1	1.4	–0.3	PL
PT	74.1	76.7	2.6	1.6	1.0	79.4	82.1	2.8	2.0	0.8	PT
RO	63.8	60.9	–2.9	0.7	–3.6	68.4	65.2	–3.2	0.4	–3.6	RO
SE	79.1	81.9	2.8	2.4	0.3	84.5	87.4	3.0	1.9	1.0	SE
SI	71.7	74.7	3.0	3.0	0.0	76.0	80.6	4.5	2.9	1.6	SI
SK	68.9	67.8	–1.1	2.1	–3.2	75.1	73.4	–1.8	0.7	–2.4	SK
UK	75.4	76.7	1.3	1.1	0.2	79.0	80.7	1.7	0.9	0.8	UK
EU-12	66.4	67.7	1.3	2.4	–1.1	71.9	73.2	1.3	1.6	–0.3	EU-12
EU-15	72.4	74.9	2.5	1.9	0.6	76.6	79.8	3.1	2.0	1.1	EU-15
EU-27	71.1	73.7	2.6	2.1	0.6	75.6	78.7	3.1	2.0	1.1	EU-27
EA-17	71.4	74.0	2.6	2.0	0.5	75.9	79.2	3.3	2.2	1.1	EA-17

Source: Commission services, EPC

generations, cohort effects <sup>(42)</sup> and demographic composition effects. The severe economic recession of 2008–09 disproportionately affected young (male) workers, having a detrimental impact on their entry rates to the labour force. Given that, in the CSM, participation rates are calculated as cumulative entry minus exit rates, it is not surprising that today's decline in entry (and participation) rates for younger cohorts (15–24) has significant knock-on effects on tomorrow's participation

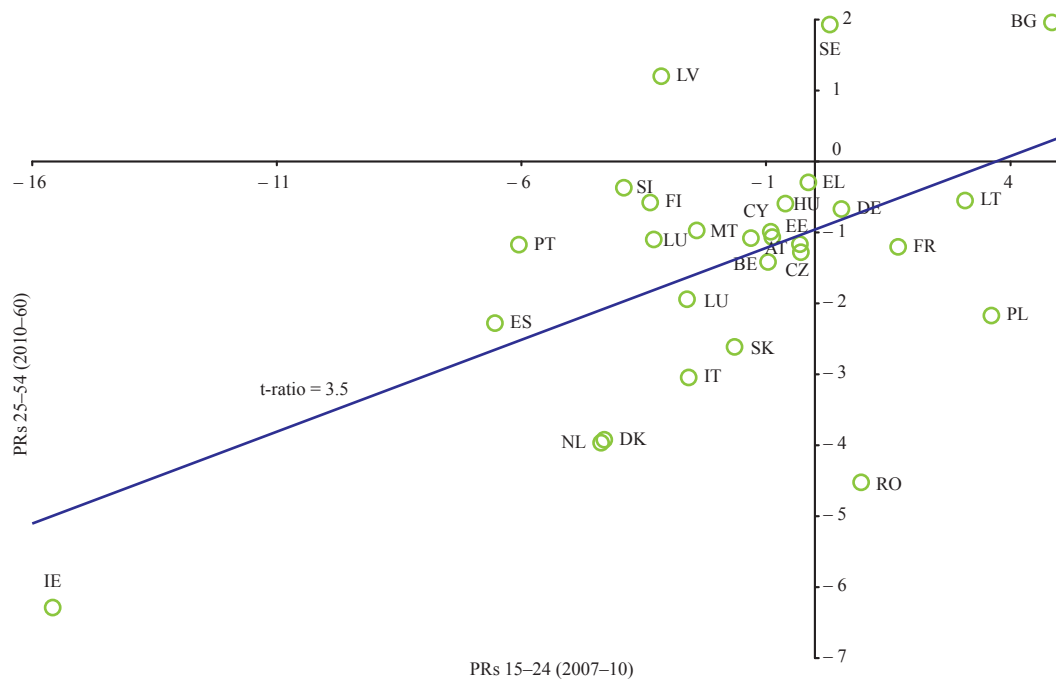
rates of prime-age workers (25–54) <sup>(43)</sup>. In fact, despite the various determinants of participation rates, Graph 2.4 strongly suggests that the decline in the prime-age (25–54) participation rate of men in 2060 partly reflects the negative impact of the 2008–09 economic recession on young (15–24) men workers' participation rate.

<sup>(42)</sup> That is how the age profile of participation rates shifts across generations.

<sup>(43)</sup> Despite the correction mechanism described in the third bullet of Section 2.3 — this effect is not present for women because of a strong counteracting cohort effect, and a less dramatic impact of the 2008–09 economic recession on younger women's participation rates.



**Graph 2.4:** Knock-on effects of the 2008–09 economic recession on men's prime-age participation rate



Source: Commission services, EPC

Participation rate differences: 15–24 age group 2010–07 v 25–54 age group 2010–60

**Table 2.9:**  
Participation rates by age groups — Total, 2010–60

	Total 15–64		Young 15–24		Prime age 25–54		Older 55–64		Change 2010–60			
	2010	2060	2010	2060	2010	2060	2010	2060	Total 15–64	Young 15–24	Prime age 25–54	Older 55–64
AT	75.0	77.6	59.5	61.3	87.7	89.5	43.1	56.1	2.5	1.8	1.9	12.9
BE	67.7	68.5	32.7	33.3	86.3	85.6	39.1	48.7	0.8	0.6	– 0.7	9.6
BG	67.1	69.4	32.0	29.9	82.7	84.0	49.3	59.8	2.4	– 2.0	1.3	10.5
CY	73.2	78.0	42.0	41.9	87.3	91.0	59.6	68.8	4.8	– 0.1	3.7	9.2
CZ	70.3	73.1	31.1	29.7	87.9	85.7	50.1	72.6	2.8	– 1.4	– 2.1	22.5
DE	76.7	78.9	51.6	50.6	87.3	88.2	62.5	74.8	2.2	– 1.0	0.9	12.3
DK	79.5	80.6	67.8	69.3	89.0	86.6	61.1	73.2	1.1	1.5	– 2.4	12.1
EE	74.1	75.6	39.6	35.7	88.3	88.2	64.4	73.6	1.5	– 4.0	– 0.1	9.2
EL	68.4	72.6	31.4	30.6	83.5	85.9	45.5	69.6	4.2	– 0.8	2.4	24.1
ES	73.4	77.5	43.0	41.8	85.5	87.9	50.8	76.4	4.0	– 1.2	2.4	25.6
FI	74.6	76.2	50.0	50.8	87.5	87.4	60.5	65.8	1.7	0.8	– 0.1	5.3
FR	70.4	74.7	39.8	39.6	88.9	89.7	42.5	63.3	4.2	– 0.2	0.7	20.8
HU	62.4	67.1	25.7	25.3	81.0	81.0	37.1	59.1	4.7	– 0.4	0.0	22.0
IE	69.6	67.3	42.3	42.0	80.4	76.9	54.7	63.9	– 2.3	– 0.4	– 3.5	9.3
IT	62.2	65.3	28.7	29.2	76.9	76.1	37.8	62.6	3.1	0.5	– 0.8	24.8
LT	71.0	73.0	31.3	29.4	88.5	87.6	56.5	66.1	2.0	– 2.0	– 0.8	9.7
LU	67.9	67.5	25.3	28.4	85.7	86.9	40.1	41.6	– 0.4	3.2	1.2	1.5
LV	73.7	76.9	42.2	38.5	88.5	91.3	57.1	64.7	3.2	– 3.7	2.8	7.5
MT	60.7	70.3	51.9	51.5	73.2	79.5	32.6	58.5	9.6	– 0.3	6.3	26.0
NL	78.2	79.9	69.1	71.0	87.9	88.6	56.0	62.4	1.7	2.0	0.7	6.5
NO	78.2	78.0	57.1	57.7	87.3	87.4	69.8	68.2	– 0.2	0.6	0.1	– 1.7
PL	65.8	67.2	35.5	33.4	84.2	82.8	36.8	47.4	1.4	– 2.1	– 1.4	10.5
PT	74.1	76.7	37.3	37.7	88.7	90.0	54.2	69.4	2.6	0.3	1.3	15.2
RO	63.8	60.9	31.9	29.2	79.5	74.8	42.3	46.3	– 2.9	– 2.7	– 4.7	4.0
SE	79.1	81.9	51.9	52.9	90.0	92.2	73.9	77.9	2.8	1.0	2.1	3.9
SI	71.7	74.7	39.6	38.2	90.2	89.6	36.3	61.6	3.0	– 1.4	– 0.6	25.3
SK	68.9	67.8	31.8	30.1	86.9	83.7	45.1	50.7	– 1.1	– 1.7	– 3.2	5.5
UK	75.4	76.7	59.4	58.4	85.0	84.5	59.9	70.1	1.3	– 0.9	– 0.5	10.2
EU-12	66.4	67.7	33.3	31.2	83.7	82.2	42.2	53.9	1.3	– 2.0	– 1.5	11.7
EU-15	72.4	74.9	46.6	46.1	85.3	85.7	51.8	68.1	2.5	– 0.5	0.4	16.3
EU-27	71.1	73.7	43.5	43.8	85.0	85.2	49.7	65.7	2.6	0.3	0.2	16.0
EA-17	71.4	74.0	42.9	41.8	85.2	85.8	49.3	67.0	2.6	– 1.1	0.6	17.7

Source: Commission services, EPC

**Table 2.10:**  
Participation rates by age groups — Men, 2010–60

	Total 15–64		Young 15–24		Prime age 25–54		Older 55–64		Change 2010–60			
	2010	2060	2010	2060	2010	2060	2010	2060	Total 15–64	Young 15–24	Prime age 25–54	Older 55–64
AT	80.8	79.7	64.1	65.5	92.5	91.5	52.9	56.9	– 1.0	1.5	– 1.0	4.0
BE	73.4	72.8	35.2	35.8	92.2	90.7	47.5	52.0	– 0.7	0.6	– 1.4	4.5
BG	71.6	74.5	36.6	34.5	86.1	88.0	56.8	68.9	2.9	– 2.0	2.0	12.1
CY	79.8	80.1	42.6	43.2	93.5	92.4	75.1	74.4	0.3	0.6	– 1.1	– 0.7
CZ	78.7	80.1	36.4	34.9	95.5	94.3	62.8	76.6	1.4	– 1.6	– 1.3	13.8
DE	82.4	82.4	54.3	53.4	93.1	92.4	70.8	76.9	– 0.0	– 0.9	– 0.7	6.1
DK	82.8	82.1	68.0	69.3	92.4	88.5	67.4	75.0	– 0.7	1.3	– 3.9	7.5
EE	77.1	77.9	43.9	39.9	91.8	90.6	64.3	73.9	0.9	– 4.0	– 1.2	9.6
EL	78.8	79.4	34.5	33.6	94.2	94.0	60.4	77.3	0.6	– 0.9	– 0.3	16.9
ES	80.8	79.1	45.6	44.5	92.5	90.2	63.9	74.9	– 1.7	– 1.0	– 2.3	11.0
FI	76.3	77.6	49.9	50.4	90.5	89.9	60.2	65.0	1.2	0.6	– 0.6	4.8
FR	74.8	77.5	43.5	43.4	94.2	93.0	45.1	63.9	2.7	– 0.1	– 1.2	18.8
HU	68.4	71.5	28.7	28.4	87.4	86.8	43.0	60.8	3.1	– 0.4	– 0.6	17.7
IE	77.2	71.3	43.2	43.3	89.3	83.0	65.0	64.3	– 5.9	0.1	– 6.3	– 0.7
IT	73.3	74.3	33.6	34.3	89.4	86.4	49.5	70.8	0.9	0.7	– 3.0	21.4
LT	73.0	74.3	34.9	32.6	89.2	88.6	62.6	67.2	1.4	– 2.2	– 0.5	4.6
LU	75.6	71.6	27.4	28.6	94.8	93.7	48.5	41.1	– 4.0	1.2	– 1.1	– 7.4
LV	76.6	78.9	45.7	42.2	91.3	92.5	59.0	67.6	2.3	– 3.6	1.2	8.6
MT	77.7	82.4	54.7	54.5	94.4	93.4	51.2	72.5	4.7	– 0.2	– 1.0	21.3
NL	83.7	82.5	68.7	71.5	93.3	91.0	67.4	67.4	– 1.3	2.8	– 2.4	0.0
NO	80.6	79.2	56.7	57.1	90.2	89.1	73.8	69.9	– 1.4	0.5	– 1.1	– 3.9
PL	72.6	73.8	40.1	38.1	89.8	87.6	49.1	60.3	1.2	– 2.1	– 2.2	11.1
PT	78.3	78.1	39.2	39.5	92.6	91.4	62.0	70.7	– 0.2	0.3	– 1.2	8.7
RO	71.7	68.9	36.8	33.7	87.5	83.0	52.6	56.4	– 2.8	– 3.1	– 4.5	3.8
SE	81.6	84.3	52.1	52.9	92.8	94.7	78.0	82.8	2.7	0.8	1.9	4.7
SI	75.7	76.6	43.7	41.0	91.8	91.5	47.0	62.5	0.9	– 2.8	– 0.4	15.5
SK	76.4	73.4	37.2	35.4	93.0	90.4	59.8	53.5	– 3.0	– 1.9	– 2.6	– 6.3
UK	81.5	80.7	61.9	61.0	91.4	89.5	69.2	72.5	– 0.8	– 1.0	– 1.9	3.3
EU-12	73.1	73.8	37.8	35.7	89.7	88.0	52.7	62.2	0.7	– 2.2	– 1.7	9.5
EU-15	78.9	78.8	49.5	49.0	92.3	90.5	60.4	70.8	– 0.1	– 0.4	– 1.8	10.3
EU-27	77.7	78.0	46.8	46.9	91.7	90.1	58.8	69.3	0.3	0.2	– 1.7	10.5
EA-17	78.2	78.0	46.0	45.0	92.4	90.6	58.1	69.7	– 0.2	– 1.0	– 1.8	11.6

Source: Commission services, EPC

**Table 2.11:**  
Participation rates by age groups — Women, 2010–60

	Total 15–64		Young 15–24		Prime age 25–54		Older 55–64		Change 2010–60			
	2010	2060	2010	2060	2010	2060	2010	2060	Total 15–64	Young 15–24	Prime age 25–54	Older 55–64
AT	69.3	75.3	54.7	56.8	82.8	87.4	33.9	55.3	6.0	2.1	4.7	21.4
BE	61.9	64.0	30.3	30.7	80.4	80.2	30.9	45.5	2.1	0.5	– 0.1	14.5
BG	62.6	64.3	27.1	25.1	79.4	80.0	42.7	50.6	1.7	– 2.0	0.6	7.9
CY	66.6	75.9	41.3	40.6	81.0	89.5	44.8	63.1	9.3	– 0.8	8.6	18.3
CZ	61.7	65.8	25.6	24.3	79.8	76.9	38.3	68.6	4.2	– 1.2	– 2.9	30.3
DE	70.8	75.3	48.8	47.7	81.3	83.9	54.5	72.7	4.5	– 1.2	2.5	18.2
DK	76.1	79.0	67.6	69.4	85.6	84.6	54.9	71.4	2.9	1.8	– 1.0	16.5
EE	71.4	73.2	35.2	31.4	84.9	85.7	64.4	73.4	1.9	– 3.8	0.8	8.9
EL	57.7	65.8	28.0	27.5	72.3	78.0	31.4	61.9	8.1	– 0.5	5.7	30.5
ES	65.9	75.8	40.2	38.9	78.3	85.5	38.5	78.0	9.9	– 1.3	7.2	39.5
FI	72.8	74.9	50.1	51.2	84.4	84.8	60.9	66.7	2.1	1.1	0.4	5.8
FR	66.2	71.7	36.1	35.6	83.8	86.2	40.1	62.8	5.5	– 0.5	2.4	22.7
HU	56.5	62.6	22.6	22.2	74.6	75.1	32.2	57.5	6.0	– 0.4	0.5	25.3
IE	62.0	63.1	41.5	40.6	71.6	70.6	44.3	63.6	1.1	– 0.9	– 1.0	19.3
IT	51.1	55.8	23.5	23.7	64.4	65.1	26.8	54.1	4.7	0.2	0.7	27.3
LT	69.1	71.5	27.7	25.9	87.8	86.6	51.9	65.1	2.4	– 1.7	– 1.2	13.3
LU	60.0	63.3	23.1	28.3	76.4	80.1	31.4	42.0	3.3	5.2	3.6	10.7
LV	70.9	74.8	38.5	34.6	85.8	90.0	55.7	61.7	3.8	– 3.8	4.2	6.0
MT	43.0	57.2	48.8	48.2	51.1	64.2	14.3	44.0	14.2	– 0.6	13.1	29.6
NL	72.6	77.2	69.5	70.6	82.4	86.1	44.5	57.4	4.6	1.1	3.8	12.9
NO	75.7	76.7	57.6	58.4	84.3	85.7	65.8	66.4	1.0	0.7	1.4	0.7
PL	59.1	60.3	30.6	28.5	78.6	77.7	26.1	34.6	1.2	– 2.1	– 0.9	8.5
PT	70.0	75.2	35.4	35.8	84.9	88.6	47.3	68.1	5.2	0.4	3.7	20.9
RO	55.9	52.6	26.7	24.4	71.4	66.2	33.3	36.2	– 3.3	– 2.3	– 5.1	2.9
SE	76.5	79.3	51.8	53.0	87.1	89.4	69.8	72.9	2.7	1.2	2.3	3.1
SI	67.5	72.9	35.2	35.5	88.3	87.7	25.6	60.7	5.4	0.2	– 0.6	35.1
SK	61.4	62.0	26.1	24.6	80.8	76.9	32.2	47.9	0.6	– 1.6	– 3.9	15.7
UK	69.3	72.6	56.7	55.8	78.6	79.4	51.1	67.7	3.2	– 0.9	0.8	16.6
EU-12	59.7	61.3	28.5	26.6	77.7	76.2	32.9	45.6	1.6	– 1.9	– 1.4	12.7
EU-15	65.8	70.7	43.7	43.0	78.3	80.8	43.5	65.3	5.0	– 0.6	2.5	21.8
EU-27	64.5	69.2	40.1	40.5	78.1	80.0	41.1	62.0	4.7	0.3	1.9	20.9
EA-17	64.6	69.7	39.7	38.4	78.0	80.8	40.9	64.2	5.2	– 1.3	2.8	23.3

Source: Commission services, EPC

## 2.6.2. PROJECTION OF LABOUR SUPPLY

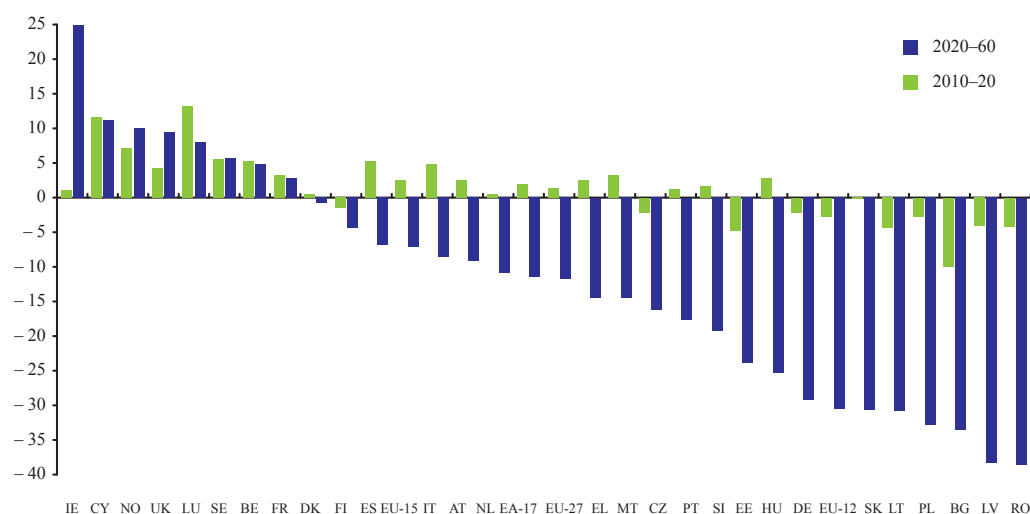
Labour supply projections are calculated by single age and gender (by multiplying participation rates by population values). The total labour supply in the EU-27 is projected to increase by 1.4 % from 2010 to 2020 (age group 20–64). In terms of persons, this represents an increase in the labour force of roughly 3.3 million. In the euro area, the labour force is projected to increase by 2.0 % in the same period. The increase in labour supply over the period 2010–20 is mainly due to the increase of women in the labour supply, as the male labour force is projected to remain substantially unchanged (Table 2.12).

The positive trend in labour supply up to 2020 is expected to be reversed during

the period 2020–60 when the total labour force is projected to contract by 11.8 %, equivalent to 27.7 million people (24.5 million compared with the 2010 level). In the euro area, the projected fall in labour supply 2020–60 is 11.5 %, which represents 17.9 million people (14.9 million compared with the 2010 level).

Graphs 2.5 and 2.6 highlight the wide diversity across Member States of labour supply projections, ranging from an increase of 25.0 % in Ireland to a decrease of 38.5 % in Romania (2020–60). The initially positive trend across most countries over 2010–20 is projected to be reversed after 2020, when a large majority of countries is expected to record a decline (20 EU Member States in total).

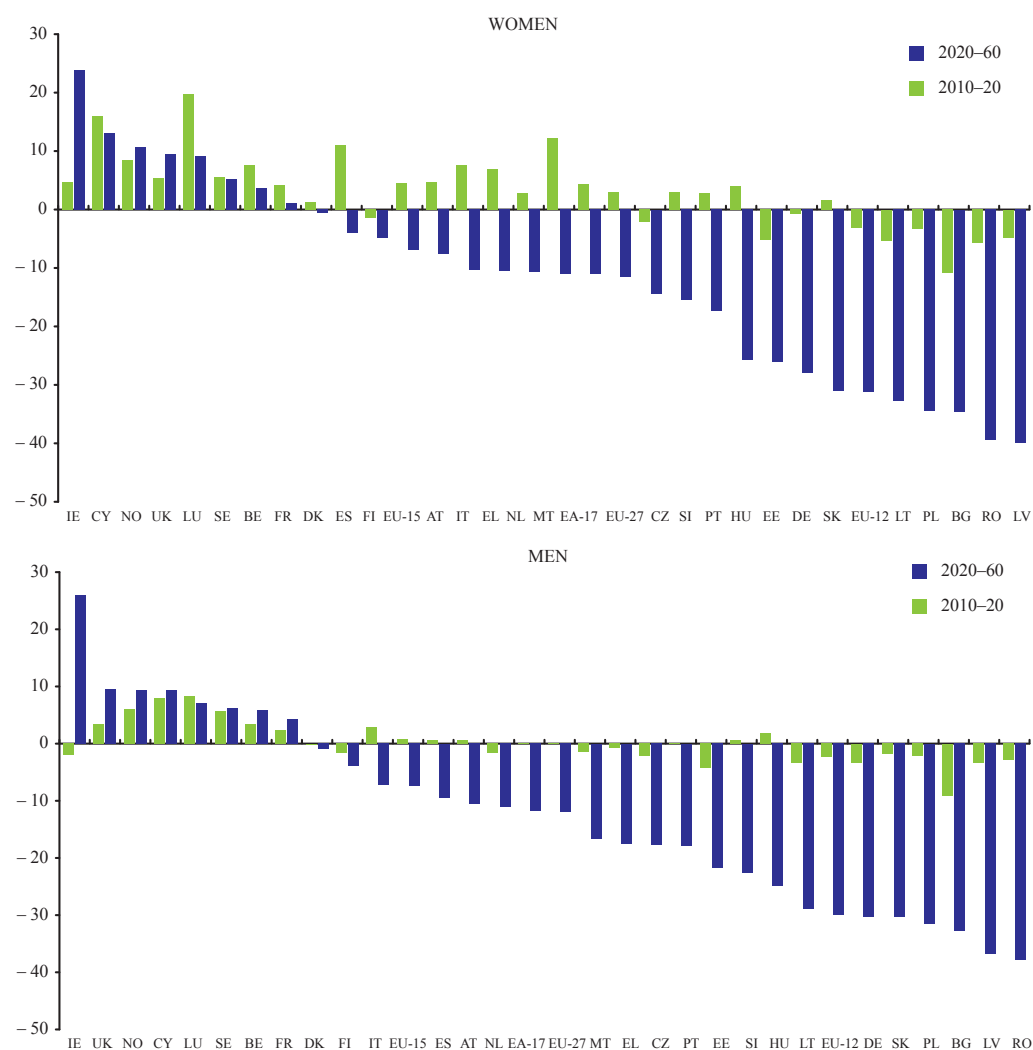
**Graph 2.5: Percentage change in total labour supply of the population aged 20–64 (2010–60)**



Source: Commission services, EPC

Note: Countries are ranked in descending order of change over the period 2020–60.

**Graph 2.6: Percentage change in labour supply by gender of the population aged 20–64 (2020–60)**



Source: Commission services, EPC

Note: Countries are ranked in descending order of change over the period 2020–60.

**Table 2.12:**  
Labour supply — age group 20–64 ('000)

Country	Total			Men			Women			Average annual growth rate (%)		
	2010	2020	2060	2010	2020	2060	2010	2020	2060	2010–10	2020–10	2060–20
	Average annual growth rate (%)			Average annual growth rate (%)			Average annual growth rate (%)			Average annual growth rate (%)		
AT	4 034	4 136	3 759	2 163	2 176	1 947	1 871	1 960	1 812	0.1	0.1	–0.2
BE	4 794	5 049	5 295	2 611	2 700	2 859	2 184	2 350	2 436	0.3	0.1	0.1
BG	3 448	3 105	2 062	1 830	1 663	1 118	1 618	1 442	944	–0.9	–0.8	–1.1
CY	406	453	503	220	238	260	185	215	243	0.8	0.2	0.3
CZ	5 164	5 053	4 231	2 924	2 862	2 354	2 240	2 191	1 877	–0.2	–0.4	–0.4
DE	40 032	39 170	27 715	21 735	21 017	14 635	18 297	18 152	13 080	–0.3	–0.8	–0.7
DK	2 674	2 687	2 665	1 410	1 408	1 394	1 264	1 279	1 271	–0.0	–0.0	–0.0
EE	665	633	482	333	319	249	332	314	233	–0.6	–0.5	–0.7
EL	5 102	5 228	4 474	2 974	2 952	2 436	2 128	2 276	2 038	0.2	–0.1	–0.3
ES	22 624	23 801	22 174	12 567	12 640	11 451	10 057	11 161	10 723	0.5	0.1	–0.1
FI	2 545	2 507	2 398	1 322	1 301	1 249	1 223	1 206	1 148	–0.1	–0.2	–0.1
FR	28 977	29 916	30 752	15 156	15 508	16 183	13 821	14 407	14 569	0.1	0.1	0.0
HU	4 264	4 385	3 275	2 305	2 347	1 761	1 959	2 038	1 513	0.3	0.2	–0.6
IE	2 040	2 060	2 575	1 130	1 107	1 394	910	953	1 181	0.6	0.6	0.6
IT	24 453	25 651	23 446	14 376	14 799	13 719	10 077	10 853	9 727	0.3	0.3	–0.3
LT	1 613	1 542	1 066	802	774	550	811	768	516	–0.4	–0.3	–0.8
LU	232	263	284	131	142	152	101	121	133	0.2	0.2	0.2
LV	1 124	1 078	665	566	547	346	557	531	319	–0.4	–0.3	–1.0
MT	167	172	147	109	108	90	57	64	57	0.3	–0.1	–0.3
NL	8 109	8 144	7 254	4 396	4 324	3 842	3 713	3 820	3 411	0.0	–0.2	–0.3
NO	2 394	2 565	2 823	1 264	1 341	1 467	1 129	1 224	1 355	0.7	0.6	0.3
PL	17 720	17 237	11 581	9 698	9 483	6 497	8 022	7 754	5 084	–0.3	–0.2	–0.9
PT	5 199	5 266	4 340	2 717	2 715	2 232	2 481	2 551	2 108	0.1	–0.0	–0.4
RO	9 417	9 024	5 546	5 274	5 120	3 180	4 143	3 903	2 366	–0.4	–0.3	–1.0
SE	4 630	4 891	5 172	2 439	2 579	2 739	2 191	2 312	2 433	0.6	0.2	0.1
SI	1 005	1 022	825	546	550	426	458	472	399	0.2	0.1	–0.4
SK	2 685	2 679	1 858	1 487	1 461	1 017	1 198	1 218	840	–0.0	–0.2	–0.8
UK	29 358	30 616	33 515	15 903	16 433	17 994	13 456	14 183	15 521	0.4	0.3	0.2
NO	2 394	2 565	2 823	1 264	1 341	1 467	1 129	1 224	1 355	0.7	0.6	0.3
EU-12	47 677	46 383	32 242	26 095	25 472	17 850	21 581	20 912	14 392	–0.3	–0.7	–0.8
EU-15	184 804	189 386	175 818	101 029	101 800	94 227	83 774	87 585	81 591	0.2	0.1	–0.2
EU-27	232 480	235 769	208 060	127 125	127 272	112 076	105 356	108 497	95 983	0.1	0.0	–0.3
EA-17	153 068	156 151	138 281	83 974	84 056	74 142	69 095	72 095	64 138	0.2	0.0	–0.3

Source: Commission services, EPC

In the eight largest (in terms of labour force) EU Member States, representing about 78 % of the total EU labour force in 2020, their prospective evolution in the period 2020–60 is strikingly dissimilar (Table 2.13). Expected differences in the annual growth rate of the total labour force are very significant, because they are ‘compounded’ over 40 years. Germany, Poland and Romania are projected to register average annual declines of close to 1 % or in excess during a period of 40 years, while Spain, Italy and the Netherlands are projected to register declines of 0.2–0.3 %, equivalent to the EU average <sup>(44)</sup>. Conversely, France and the United Kingdom are expected to register small increases in the total labour force. Consequently, country rankings (in terms of share of labour force) are expected to change significantly during the period 2020–60.

Obviously, and all else being equal, such dissimilar prospects for labour supply growth will result in marked differences in the growth potential of the economy. In fact, the growth rate of potential output is the sum of (trend) total factor productivity plus a weighted average of the growth rate of labour and capital inputs, weighted by their respective income shares (Chapter 3):

$$\Delta \log Y_p = \Delta \log TFP + \beta * \Delta \log LF_a + (1 - \beta) * \Delta \log K$$

where:

$$LF_a = LF * (1 - \text{Nairu}) * \text{Hours}$$

where:

$\Delta$  represents first differences (i.e.  $\Delta y_t = y_t - y_{t-1}$ );

$Y_p$  is potential GDP;

$TFP$  is trend total factor productivity;

$LF_a$  is total labour input;

$K$  is capital services input; and

$b$  is the labour income share <sup>(45)</sup>.

As an example, and all else being equal, the contraction (expansion) in the labour force in Germany (the United Kingdom) (compared to the EU-27 average) brings about an annual 0.4 % reduction (increase) in potential output growth relative to the EU-27 average (see last column of Table 2.13).

These huge differences in potential growth rates basically reflect the partial equilibrium nature of the projection methodology, namely the fact that demographic, labour force participation, migration and productivity assumptions are effectively independent, i.e. do not interact <sup>(46)</sup>.

The projected negative labour force growth over the period 2020–60 in the EU-27 is mainly due to negative demographic developments, given that participation rates over the period 2020–60 — especially for older workers — are projected to continue to increase, although at a slower pace than during the period 2010–20 (Graph 2.7).

<sup>(44)</sup> In the case of Germany, this is due to Eurostat’s population projection, which assumes a relatively low level of net migration (Table 1.7 and Graph 1.4). Over the entire projection period, net migration flows are projected to be concentrated in a few destination countries, particularly Spain, Italy and the United Kingdom.

<sup>(45)</sup> The labour income share is assumed to be 0.65.

<sup>(46)</sup> In particular, there is no interaction between migration flows and productivity.

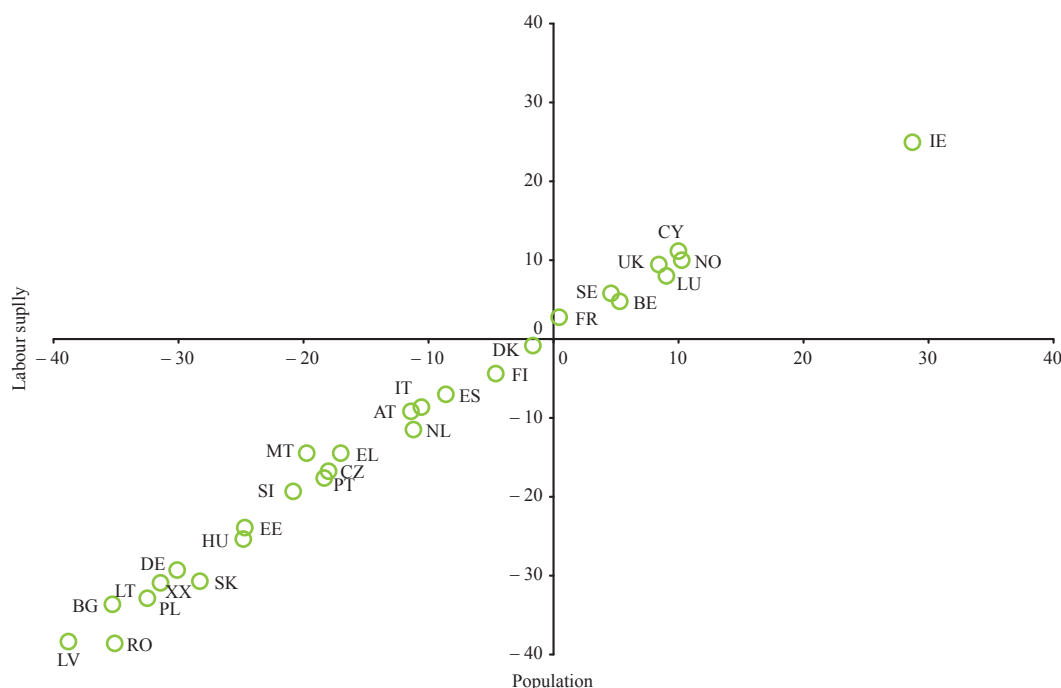
**Table 2.13:**  
Labour supply projection in the ‘largest’ eight EU Member States

Country	Total LF (20–64) ('000)		Average annual growth rate of the LF (%)	Impact on potential output growth (%) <sup>(a)</sup>
	2020	2060	2060–20	
DE	39 170	27 715	– 0.9	– 0.4
UK	30 616	33 515	0.2	0.4
FR	29 916	30 752	0.1	0.2
IT	25 651	23 446	– 0.2	0.1
ES	23 801	22 174	– 0.2	0.1
PL	17 237	11 581	– 1.0	– 0.4
RO	9 024	5 546	– 1.2	– 0.6
NL	8 054	7 132	– 0.3	0.0
EU-27	235 679	207 938	– 0.3	0.0
EA-17	156 061	138 159	– 0.3	0.0

<sup>(a)</sup> Impact of LF growth differentials relative to the EU average:  $\Delta \log Y_p^i - \Delta \log Y_p^{EU} = \beta * \Delta (\log LF_a^i - \log LF_a^{EU})$

Source: Commission services, EPC

**Graph 2.7:** Population and labour supply 2020–60 (% change in the age group 20–64)



Source: Commission services, EPC

### 2.6.3. BREAKING DOWN CHANGES IN PARTICIPATION RATES AND LABOUR FORCE

Tables 2.14 and 2.15 apply a shift-share analysis to changes in the total participation rate and the labour force over the period 2010–60, focusing on both age and gender dimensions. The overall participation rate is algebraically broken down into three components: (i) a participation rate effect; (ii) a population/demographic effect; and (iii) an interaction/residual effect <sup>(47)</sup>.

The participation rate effect, reflecting changes in the participation rate of specific age/gender groups, tends to be positive. Specifically, rises

in the participation rate of older workers and women have a significant positive impact on the total participation rate.

The demographic effect (i.e. the effect of the structure of the working-age population) is negative in many Member States, being mainly driven by projected developments in the prime-age population (25–54), women and net migration. Women are associated with both positive participation and negative demographic effects. The former reflects the upward displacement of the participation rate age profile of younger cohorts embedded in the CSM, and the latter reflects the ageing of the population which has a stronger impact on women than on men, largely due to their (still) relatively lower average exit ages from the labour force.

<sup>(47)</sup> Carone (2005), p. 54.



**Table 2.14:**  
Contribution to the overall change in participation rates, 2010–60 (% change)

	Participation rates in 2060	Total change in participation rates (%)	Contribution of group-specific changes in participation rates to change in overall participation rate																Demographic effect				Interaction effect				
			Total		Young		Prime age		Older		Male		Female		Total		Young		Prime age		Older			Male		Female	
			Young	Older	Young	Older	Young	Older	Young	Older	Young	Older	Young	Older	Young	Older	Young	Older	Young	Older	Young	Older		Young	Older	Young	Older
BE	68.5	0.8	1.4	0.1	-0.5	1.8	0.0	0.1	-0.4	0.4	1.4	0.0	-0.0	1.4	-0.7	0.4	-1.1	0.1	0.5	-0.4	0.0						
BG	69.4	2.4	2.4	-0.4	0.8	2.1	1.6	-0.2	0.6	1.1	0.9	-0.2	0.2	0.8	-0.1	0.2	0.0	-0.3	0.6	-0.5	-0.1						
CZ	73.1	2.8	3.0	-0.3	-1.3	4.5	0.8	-0.1	-0.4	1.3	2.2	-0.1	-0.9	3.2	0.1	0.2	0.6	-0.6	0.2	-0.1	-0.3						
DK	80.6	1.1	1.2	0.3	-1.5	2.4	-0.3	0.1	-1.2	0.7	1.5	0.2	-0.3	1.6	-0.2	0.1	-0.5	0.3	0.7	-0.6	0.1						
DE	78.9	2.2	2.7	-0.2	0.6	2.3	0.3	-0.1	-0.2	0.6	2.4	-0.1	0.8	1.7	-0.9	-0.1	-3.3	2.6	0.1	-0.1	0.5						
EE	75.6	1.5	0.8	-0.8	-0.1	1.6	-0.0	-0.4	-0.4	0.7	0.8	-0.4	0.3	0.9	0.6	-0.5	1.2	-0.0	1.5	-1.4	0.0						
IE	67.3	-2.3	-1.1	-0.1	-2.3	1.4	-2.1	0.0	-2.1	-0.1	1.0	-0.1	-0.3	1.5	-1.8	1.2	-4.4	1.4	0.9	-0.8	0.4						
EL	72.6	4.2	6.0	-0.1	1.6	4.4	1.3	-0.1	-0.1	1.5	4.7	-0.0	1.9	2.8	-2.2	0.7	-4.0	1.2	-0.6	0.5	0.5						
ES	77.5	4.0	5.6	-0.2	1.6	4.1	-0.0	-0.1	-0.8	0.9	5.6	-0.1	2.4	3.3	-2.6	0.9	-6.0	2.5	0.2	-0.1	1.1						
FR	74.7	4.2	4.4	-0.0	0.5	4.0	1.4	-0.0	-0.4	1.8	3.0	-0.0	0.8	2.3	-0.3	0.2	-0.5	0.0	1.1	-1.0	0.0						
IT	65.3	3.1	3.9	0.1	-0.5	4.7	1.0	0.1	-1.0	1.9	2.9	0.0	0.2	2.6	-1.9	0.4	-3.5	1.2	1.2	-0.8	0.9						
CY	78.0	4.8	3.8	-0.0	2.3	1.5	-0.3	0.1	-0.3	-0.1	4.1	-0.1	2.7	1.5	0.7	-1.5	0.1	2.0	0.5	-0.4	0.3						
LV	76.9	3.2	2.1	-0.8	1.7	1.3	0.6	-0.4	0.4	0.6	1.5	-0.4	1.3	0.6	0.6	-1.5	0.2	1.9	1.6	-1.5	0.4						
LT	73.0	2.0	0.5	-0.4	-0.5	1.5	-0.1	-0.3	-0.2	0.3	0.6	-0.2	-0.4	1.2	1.0	-1.2	0.1	2.0	1.6	-1.5	0.4						
LU	67.5	-0.4	1.6	0.6	0.8	0.2	-0.9	0.1	-0.4	-0.6	2.5	0.4	1.2	0.8	-2.0	0.1	-3.8	1.6	-0.2	0.2	0.0						
HU	67.1	4.7	4.2	-0.1	0.0	4.3	1.4	-0.0	-0.2	1.6	2.8	-0.0	0.2	2.7	-0.1	-0.4	-0.5	0.9	0.8	-0.6	0.5						
MT	70.3	9.6	8.6	-0.1	3.7	5.3	1.8	-0.0	-0.3	2.1	6.8	-0.1	3.8	3.0	0.3	-1.6	1.7	0.2	0.8	-0.5	0.3						
NL	79.9	1.7	2.0	0.4	0.4	1.3	-0.5	0.3	-0.7	0.0	2.5	0.1	1.2	1.3	-0.5	0.4	-1.5	0.6	0.7	-0.6	0.1						
AT	77.6	2.5	3.7	0.3	1.2	2.2	0.1	0.1	-0.3	0.3	3.6	0.2	1.5	1.9	-1.7	-0.5	-3.1	1.8	0.5	-0.5	0.5						
PL	67.2	1.4	0.4	-0.4	-0.9	2.0	0.1	-0.2	-0.7	1.0	0.4	-0.2	-0.3	0.8	0.5	-1.0	0.7	0.8	1.1	-0.9	0.3						
PT	76.7	2.6	3.6	0.1	0.8	2.7	0.4	0.0	-0.4	0.7	3.2	0.0	1.2	2.0	-1.7	-0.0	-4.5	2.8	0.8	-0.7	0.7						
RO	60.9	-2.9	-3.0	-0.5	-3.0	0.7	-1.4	-0.3	-1.4	0.3	-1.6	-0.2	-1.6	0.3	-0.4	-1.0	-1.6	2.2	0.6	-0.4	0.4						
SI	74.7	3.0	4.2	-0.2	-0.4	4.8	1.1	-0.2	-0.1	1.5	3.1	0.0	-0.2	3.3	-1.3	0.7	-2.3	0.3	-0.8	0.7	0.2						
SK	67.8	-1.1	-1.5	-0.3	-2.0	1.0	-1.5	-0.2	-0.8	-0.5	0.1	-0.2	-1.2	1.4	-0.0	-0.9	-0.8	1.7	0.5	-0.4	0.3						
FI	76.2	1.7	1.3	0.1	-0.0	1.2	0.4	0.1	-0.2	0.5	0.9	0.1	0.1	0.7	0.5	0.3	1.9	-1.7	0.4	-0.3	-0.1						
SE	81.9	2.8	2.2	0.2	1.3	0.8	1.1	0.1	0.6	0.5	1.1	0.1	0.7	0.3	0.5	-0.4	2.0	-1.2	0.3	-0.3	-0.0						
UK	76.7	1.3	1.3	-0.2	-0.3	1.8	-0.4	-0.1	-0.6	0.3	1.7	-0.1	0.2	1.5	-0.0	0.0	-0.1	0.1	0.8	-0.6	0.0						
NO	78.0	-0.2	-0.1	0.1	0.1	-0.3	-0.7	0.0	-0.3	-0.4	0.5	0.1	0.4	0.1	-0.1	0.0	-0.6	0.5	-0.0	0.0	-0.0						
EU-27	73.7	2.6	3.0	0.0	0.1	2.9	0.4	0.0	-0.5	0.9	2.6	0.0	0.6	2.0	-0.8	0.1	-1.9	1.0	0.7	-0.6	0.3						
EA	74.0	2.6	3.4	-0.2	0.4	3.2	0.4	-0.1	-0.6	1.0	3.0	-0.1	0.9	2.2	-1.3	0.3	-3.0	1.3	0.6	-0.5	0.4						
EU-15	74.9	2.5	3.1	-0.1	0.3	3.0	0.3	-0.0	-0.6	0.9	2.8	-0.1	0.8	2.0	-1.0	0.4	-2.4	1.0	0.6	-0.5	0.3						
EU-12	67.7	1.3	0.7	-0.4	-0.9	2.2	0.1	-0.2	-0.5	0.8	0.6	-0.2	-0.4	1.2	0.1	-0.7	-0.1	1.0	0.8	-0.6	0.3						

Source: Commission services, EPC

**Table 2.15:**  
Contribution to the overall change in the labour force, 2010-60 (% change)

	Labour force in 2060 ('000)	Total change in labour force (%)	Contribution of group-specific changes in participation rates to change in overall labour supply												Demographic effect					Interaction effect	
			Total		Young		Prime age		Older		Female		Young		Prime age		Older		Male		Female
			Young	Older	Male	Female	Young	Prime age	Older	Female	Young	Prime age	Older	Female	Young	Prime age	Older				
BE	5 362.2	10.5	2.0	0.2	-0.7	2.6	0.0	0.1	-0.7	0.6	2.0	0.1	-0.1	2.0	8.1	1.4	5.6	1.2	5.8	3.6	0.3
BG	2 079.4	-40.2	3.6	-0.5	1.2	3.1	2.3	-0.3	0.9	1.7	1.3	-0.3	0.3	1.3	-42.3	-3.4	-32.4	-6.5	-21.9	-20.2	-1.7
CZ	4 264.3	-18.1	4.2	-0.4	-1.9	6.5	1.1	-0.2	-0.6	1.9	3.1	-0.1	-1.2	4.5	-21.1	-1.4	-15.9	-3.8	-11.8	-9.3	-1.2
DK	2 862.5	-0.8	1.5	0.4	-1.9	3.0	-0.4	0.2	-1.5	0.9	1.9	0.2	-0.4	2.1	-2.3	-0.2	-2.1	0.0	-0.3	-1.8	0.1
DE	28 572.5	-30.8	3.5	-0.2	0.8	3.0	0.3	-0.1	-0.3	0.7	3.1	-0.1	1.1	2.2	-33.6	-3.9	-27.0	-2.7	-17.7	-15.0	-0.7
EE	487.4	-27.5	1.0	-1.1	-0.1	2.2	-0.0	-0.6	-0.5	1.0	1.1	-0.5	0.3	1.2	-28.3	-3.6	-20.2	-4.5	-13.0	-15.8	-0.3
IE	2 650.1	26.9	-1.6	-0.1	-3.3	2.0	-3.1	0.0	-3.0	-0.1	1.5	-0.1	-0.5	2.1	28.0	5.8	15.8	6.4	19.1	12.6	0.3
EL	4 520.8	-12.2	8.8	-0.2	2.3	6.4	1.9	-0.1	-0.1	2.2	6.8	-0.1	2.7	4.2	-19.9	-0.4	-18.8	-0.7	-10.8	-6.7	-0.9
ES	22 598.9	-1.8	7.6	-0.3	2.2	5.6	-0.0	-0.1	-1.1	1.2	7.6	-0.1	3.3	4.5	-10.2	0.5	-13.2	2.5	-3.7	-3.2	0.9
FR	31 412.8	6.1	6.2	-0.1	0.7	5.7	2.0	-0.0	-0.5	2.5	4.2	-0.1	1.1	3.2	-0.3	0.3	-0.6	0.1	1.6	-1.3	0.0
IT	23 704.4	-4.1	6.2	0.1	-0.8	7.5	1.6	0.1	-1.6	3.1	4.6	0.0	0.4	4.2	-11.5	-0.1	-12.3	0.8	-3.4	-4.8	0.7
CY	510.6	23.6	5.2	-0.0	3.2	2.0	-0.5	0.1	-0.5	-0.1	5.6	-0.1	3.7	2.1	17.0	-0.4	12.2	5.3	9.4	6.7	1.3
LV	671.9	-41.0	2.9	-1.0	2.3	1.7	0.8	-0.5	0.5	0.8	2.1	-0.5	1.8	0.8	-43.0	-6.2	-32.5	-4.2	-20.7	-22.7	-1.0
LT	1 072.0	-34.0	0.7	-0.6	-0.7	2.1	-0.2	-0.4	-0.2	0.4	0.9	-0.3	-0.5	1.7	-34.9	-4.5	-27.8	-2.6	-16.3	-19.4	0.1
LU	287.6	22.4	2.4	0.8	1.2	0.4	-1.3	0.2	-0.5	-0.9	3.7	0.7	1.8	1.2	19.4	1.6	12.6	5.1	12.7	10.4	0.6
HU	3 288.4	-23.3	6.7	-0.1	0.0	6.9	2.2	-0.1	-0.3	2.5	4.6	-0.1	0.3	4.3	-28.7	-2.6	-23.8	-2.4	-14.6	-13.9	-1.4
MT	151.7	-12.7	14.2	-0.1	6.2	8.7	3.0	-0.0	-0.5	3.5	11.2	-0.1	6.3	5.0	-24.2	-6.1	-15.7	-2.4	-15.0	-9.1	-3.2
NL	7 806.1	-10.4	2.6	0.5	0.6	1.6	-0.6	0.3	-1.0	0.0	3.2	0.1	1.5	1.6	-12.8	-1.5	-10.3	-1.0	-5.9	-6.3	-0.2
AT	3 941.6	-7.3	4.9	0.4	1.6	2.9	0.2	0.2	-0.4	0.4	4.7	0.2	2.0	2.5	-12.4	-2.0	-11.5	1.2	-4.9	-5.3	0.1
PL	11 693.8	-34.8	0.7	-0.6	-1.3	3.0	0.1	-0.3	-1.0	1.5	0.5	-0.3	-0.4	1.3	-35.7	-4.9	-27.8	-3.0	-18.8	-17.2	-0.1
PT	4 396.7	-16.6	4.8	0.1	1.1	3.7	0.5	0.0	-0.5	1.0	4.3	0.0	1.6	2.7	-21.3	-1.7	-20.2	0.5	-9.3	-10.0	-0.2
RO	5 631.9	-41.1	-4.7	-0.8	-4.7	1.1	-2.3	-0.5	-2.3	0.5	-2.5	-0.4	-2.5	0.4	-38.7	-4.7	-31.8	-2.3	-20.9	-17.3	2.1
SI	842.1	-17.6	5.9	-0.3	-0.5	6.6	1.5	-0.3	-0.2	2.0	4.3	0.0	-0.3	4.6	-22.4	-1.1	-19.6	-1.7	-12.3	-8.8	-1.0
SK	1 872.3	-30.9	-2.1	-0.5	-2.9	1.4	-2.2	-0.3	-1.2	-0.7	0.1	-0.2	-1.8	2.1	-29.8	-3.6	-24.6	-1.6	-16.0	-13.7	0.9
FI	2 493.5	-5.8	1.7	0.2	-0.1	1.6	0.5	0.1	-0.2	0.7	1.2	0.1	0.2	0.9	-7.2	-0.6	-3.1	-3.5	-3.6	-4.2	-0.3
SE	5 375.1	11.2	2.8	0.3	1.6	1.0	1.4	0.1	0.7	0.6	1.4	0.2	0.9	0.4	8.2	0.5	7.9	-0.2	4.3	3.2	0.2
UK	35 359.1	14.1	1.7	-0.3	-0.4	2.4	-0.5	-0.1	-0.8	0.4	2.2	-0.1	0.3	2.0	12.2	1.9	8.4	1.8	7.7	4.7	0.2
NO	2 979.8	17.8	-0.1	0.1	0.1	-0.4	-0.8	0.1	-0.4	-0.5	0.7	0.1	0.5	0.1	18.0	2.6	11.7	3.7	9.5	8.6	-0.0
EU-27	213 909.5	-10.4	4.3	0.1	0.2	4.1	0.6	0.0	-0.8	1.3	3.7	0.0	0.8	2.8	-14.6	-1.4	-12.7	-0.5	-6.6	-6.8	-0.2
EA	141 611.1	-9.7	4.7	-0.3	0.5	4.5	0.5	-0.1	-0.8	1.5	4.2	-0.2	1.3	3.1	-14.4	-0.9	-13.5	-0.0	-6.3	-6.4	-0.1
EU-15	181 343.6	-4.8	4.3	-0.1	0.4	4.1	0.4	-0.1	-0.8	1.3	3.9	-0.1	1.1	2.8	-9.3	-0.4	-9.1	0.3	-3.6	-4.3	0.0
EU-12	32 565.8	-32.4	1.0	-0.6	-1.4	3.3	0.1	-0.3	-0.8	1.2	0.9	-0.3	-0.7	1.9	-33.6	-4.0	-26.7	-3.0	-17.7	-15.9	-0.1

Source: Commission services, EPC

## 2.7. ASSUMPTIONS ON STRUCTURAL UNEMPLOYMENT

As in previous rounds of the long-term budgetary exercise, the Directorate-General for Economic and Financial Affairs's structural unemployment rate estimates (NAWRU) are used as a proxy for the structural unemployment rate under a 'no policy change' scenario. However, the outlook on structural unemployment rates has worsened compared to the previous round of projections, because of the 2008–09 economic recession.

As a general rule, actual unemployment rates are assumed to converge to NAWRU rates by 2015(7) <sup>(48)</sup>, and thereafter gradually decline towards country-specific historical minima. The latter are capped at 7.3 %, which corresponds to the EU-27 NAWRU average (based on the spring 2011 the Directorate-General for Economic and Financial Affairs's Economic forecasts): that is, if the historical unemployment rate minimum for a country is higher than the EU-27 NAWRU average, actual unemployment rates will converge to the latter. Capping is done in order to avoid extrapolating too high unemployment rate values into the future <sup>(49)</sup>. It should be noted that this cap on unemployment rates is a crucial assumption for some countries which currently still have much higher unemployment rates. Higher long-term unemployment than assumed here would, through weaker employment growth, lead to lower potential output growth.

In order to avoid changes in total/average unemployment rates as a result of the interaction between cohort-specific structural unemployment rates ( $u_{ag}$ ) and the structure of the labour force, the age-specific unemployment

rates (by gender) for each projection year are calculated as follows:

$$u_{a,g}^t = \frac{u_{total}^t}{\sum_{a,g} \{ u_{a,g}^{2010} * l_{a,g}^t \}} * u_{a,g}^{2010}$$

where:

$$l_{a,g}^t = \frac{LF_{a,g}^t}{LF_{total}^t}$$

where:

$u_{a,g}^t$  is the unemployment rate in age group  $a$ , gender  $g$ , and period  $t$ ;

$u_{total}^t$  is the total unemployment rate in period  $t$ ; and

$l_{a,g}^t$  is the fraction of the total labour force.

This means that the unemployment rate structure (by age and gender) observed in the base year (2010) is kept unchanged throughout the projection period, thereby age/gender values are adjusted proportionally in order to satisfy a given total unemployment rate target.

Table 2.16 presents the unemployment rate assumptions. In the EU-27, the unemployment rate is assumed to decline by 3.2 percentage points (from 9.7 % in 2010 to 6.5 % in 2060). In the euro area, the unemployment rate is expected to fall from 10.1 % in 2010 to 6.7 % in 2060.

<sup>(48)</sup> Convergence by 2015 corresponds to a general rule for closing the output gap. Convergence by 2017 represents a two-year extension for those countries with initial (2012) large output gaps (more than double the EU average, applied to Greece).

<sup>(49)</sup> NAWRU rates (calculated using the production function methodology endorsed by the Output Gap Working Group of the EPC) can be seen as short-term structural unemployment rates, while historical minima (or their capped values) can be seen as long-term structural unemployment rates. The economic theory distinguishes a short-term NAWRU, which is influenced by the presence of nominal rigidities limiting the adjustment in actual unemployment, from a long-term NAWRU, which is only affected by real rigidities and institutional settings, refer Directorate-General for Economic and Financial Affairs, *Impact of the current economic and financial crisis on potential output*, European Economy, Occasional Papers 49, June 2009).

**Table 2.16:**  
Unemployment rate assumptions (15–64)

Unemployment rate assumptions (15–64) (%)											
	2010	2020	2025	2030	2035	2040	2045	2050	2055	2060	
AT	4.5	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	AT
BE	8.4	7.6	7.4	7.4	7.3	7.3	7.3	7.3	7.3	7.3	BE
BG	10.5	8.2	7.7	7.5	7.4	7.3	7.3	7.3	7.3	7.3	BG
CY	6.8	5.3	4.9	4.7	4.6	4.6	4.5	4.5	4.5	4.5	CY
CZ	7.3	6.4	6.3	6.2	6.1	6.1	6.1	6.1	6.1	6.1	CZ
DE	7.2	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	DE
DK	7.5	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	DK
EE	17.2	14.0	10.9	8.2	7.7	7.5	7.4	7.3	7.3	7.3	EE
ES	20.2	17.2	12.6	8.9	8.1	7.7	7.5	7.4	7.3	7.3	ES
FI	8.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6	FI
FR	9.4	8.0	7.7	7.5	7.4	7.3	7.3	7.3	7.3	7.3	FR
EL	12.8	10.6	8.9	8.1	7.7	7.5	7.4	7.3	7.3	7.3	EL
HU	11.3	11.4	9.5	7.8	7.6	7.4	7.4	7.3	7.3	7.3	HU
IE	13.7	13.4	10.0	7.1	6.5	6.3	6.1	6.1	6.0	6.0	IE
IT	8.5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	IT
LT	18.1	16.7	12.4	8.6	7.9	7.6	7.4	7.4	7.3	7.3	LT
LU	4.4	4.5	4.3	4.3	4.2	4.2	4.2	4.2	4.2	4.2	LU
LV	19.0	18.3	13.3	8.8	8.0	7.7	7.5	7.4	7.3	7.3	LV
MT	6.9	6.8	6.7	6.7	6.7	6.7	6.6	6.6	6.6	6.6	MT
NL	4.5	3.5	3.5	3.5	3.5	3.4	3.4	3.4	3.4	3.4	NL
PL	9.8	7.6	7.5	7.4	7.3	7.3	7.3	7.3	7.3	7.3	PL
PT	11.4	11.6	9.6	8.0	7.6	7.5	7.4	7.3	7.3	7.3	PT
RO	7.6	7.4	7.2	7.1	7.1	7.2	7.2	7.2	7.1	7.0	RO
SE	8.5	6.6	6.6	6.5	6.5	6.5	6.5	6.5	6.5	6.5	SE
SI	7.4	8.3	7.1	6.0	5.9	5.8	5.7	5.7	5.7	5.7	SI
SK	14.4	13.1	10.4	8.1	7.7	7.5	7.4	7.3	7.3	7.3	SK
UK	8.0	6.9	6.3	5.9	5.8	5.7	5.7	5.7	5.6	5.6	UK
NO	3.6	3.4	3.4	3.3	3.3	3.3	3.3	3.3	3.3	3.3	NO
EU-12	10.0	8.8	8.0	7.3	7.2	7.1	7.1	7.1	7.0	7.0	EU-12
EU-15	9.7	8.3	7.5	6.8	6.6	6.5	6.5	6.5	6.5	6.5	EU-15
EU-27	9.7	8.4	7.5	6.9	6.7	6.6	6.6	6.6	6.5	6.5	EU-27
EA-17	10.1	8.8	7.8	7.0	6.9	6.8	6.7	6.7	6.7	6.7	EA-17

Source: Commission services, EPC

## 2.8. EMPLOYMENT PROJECTIONS

The methodology used projects employment as a residual variable. Employment is determined using Eurostat's population projections, future participation rates derived using the CSM, and finally the unemployment rate assumptions that are applied to labour force values. The total employment rate (for individuals aged 20–64) in the EU-27 is projected to increase from 68.6 % in 2010 to 71.3 % in 2020 and to 73.8 % in 2060. In the euro area, a similar development is projected, with the employment rate attaining 74.0 % in 2060.

The 2008–09 economic recession has complicated the task of producing comparable employment rate projections (both across countries and between exercises). Firstly, the methodology used in general, and in particular the capping of unemployment rates, tends to generate stronger declines (rises) in unemployment (employment) rates in those Member States that undergone the more severe increases in unemployment rates during the crisis. Secondly, in some Member States, employment rate projections are also negatively affected by the downward revision in participation rates, namely for prime-age male workers (Graph 2.4).

The employment rate of women is projected to rise from 62.1 % in 2010 to 65.9 % in 2020 and to 69.4 % in 2060. The employment rate for older workers is expected to increase by even more, from 46.3 % in 2010 to 56.1 % in 2020 and to 62.7 % in 2060, reflecting the expected impact of recent pension reforms in many Member States aiming at increasing the retirement age. For the euro area, the increase in the employment rate of older workers (55–64) is higher than in the EU-27, rising by 18.1 percentage points compared to 16.4 percentage points in the EU-27.

The number of persons employed (using the LFS definition) is projected to record

an annual growth rate of only 0.3 % over the period 2010 to 2020 (compared to 0.9 % over the period 2000–09), which is expected to reverse to a negative annual growth rate of a similar magnitude over the period 2020 to 2060 (Table 2.18). The outcome of these opposite trends is an overall significant decline of about 15.8 million workers over the period 2010–60. The negative prospects for population developments, including the rapid ageing of the population, will only be partly offset by the increase in (older workers') participation rates and migration inflows, leading to an overall sharp reduction in employment levels over the period 2020–60.

**Table 2.17:**  
Employment rate projections

	Total (20–64)			Women (20–64)			Older workers (55–64)			
	2010	2020	2060	2010	2020	2060	2010	2020	2060	
AT	74.8	75.4	77.5	69.5	71.7	75.9	42.2	50.2	55.1	AT
BE	67.6	69.5	69.6	61.7	64.9	65.0	37.3	47.1	46.8	BE
BG	64.8	67.8	70.3	60.8	63.4	65.4	44.7	46.4	56.0	BG
CY	74.8	79.0	80.5	67.9	75.0	78.4	56.8	61.7	66.5	CY
CZ	70.5	73.1	75.0	61.0	63.7	66.9	46.8	52.0	69.1	CZ
DE	74.9	77.2	78.2	69.6	72.7	75.1	57.7	67.3	70.0	DE
DK	76.0	78.3	79.1	73.0	75.5	77.8	57.6	64.9	70.7	DK
EE	66.8	70.5	76.8	65.8	69.8	75.2	54.0	58.2	68.7	EE
EL	64.1	68.4	73.2	51.8	58.5	65.1	42.6	52.5	67.1	EL
ES	62.6	67.9	77.2	55.8	64.5	75.8	43.6	58.2	72.5	ES
FI	73.1	76.0	76.3	71.6	74.4	75.1	56.6	63.2	62.6	FI
FR	69.3	73.1	75.5	64.9	69.5	72.5	39.7	52.3	60.2	FR
HU	60.4	64.8	67.4	54.9	60.2	63.0	34.2	49.1	56.6	HU
IE	64.9	65.7	69.0	60.4	63.2	65.9	49.9	59.1	61.7	IE
IT	61.1	63.9	65.4	49.5	53.8	55.5	36.4	50.6	60.7	IT
LT	64.6	66.1	74.2	65.2	66.4	73.8	48.3	54.1	62.7	LT
LU	70.4	70.4	70.1	61.7	64.9	65.3	39.2	41.2	40.7	LU
LV	65.1	67.6	77.2	64.8	67.7	76.2	48.2	52.7	60.7	LV
MT	60.4	65.4	69.9	42.2	49.9	56.5	31.1	39.4	56.4	MT
NL	76.8	78.8	79.2	70.8	74.6	76.4	53.7	59.7	60.6	NL
NO	79.6	79.5	79.5	77.1	77.6	78.3	68.9	68.2	67.3	NO
PL	64.7	67.5	67.5	57.7	60.3	60.4	34.2	39.3	44.8	PL
PT	70.5	72.1	76.3	65.7	68.9	74.6	49.4	57.4	65.5	PT
RO	63.4	64.2	61.1	56.0	55.9	53.1	40.9	42.7	45.0	RO
SE	78.3	81.4	82.5	75.6	78.4	79.7	70.0	72.5	74.7	SE
SI	70.5	72.5	76.1	66.6	69.3	74.5	34.9	49.3	59.9	SI
SK	64.7	66.1	68.2	57.4	60.0	62.3	40.6	46.6	48.3	SK
UK	73.5	75.1	76.8	67.8	70.3	72.9	57.1	63.3	67.8	UK
EU-12	64.8	67.3	68.2	58.3	60.6	61.9	39.1	44.5	51.4	EU-12
EU-15	69.6	72.4	74.9	63.2	67.3	70.9	48.3	58.8	65.0	EU-15
EU-27	68.6	71.3	73.8	62.1	65.9	69.4	46.3	56.1	62.7	EU-27
EA-17	68.4	71.4	74.1	61.7	66.2	69.9	45.7	57.1	63.6	EA-17

Source: Commission services, EPC

**Table 2.18:**  
Employment projections (20–64)

	Persons ('000)			Change ('000)			Change (%)			Annual growth rate		
	2010	2020	2060	2010–20	2020–60	2010–60	2010–20	2020–60	2010–60	2010–20	2020–60	2010–60
<b>BE</b>	4 409	4 679	4 925	269	247	516	6.1	5.3	11.7	0.6	0.1	0.2
<b>BG</b>	3 097	2 858	1 917	–239	–941	–1 181	–7.7	–32.9	–38.1	–0.8	–1.0	–1.0
<b>CZ</b>	4 797	4 738	3 982	–59	–756	–815	–1.2	–16.0	–17.0	–0.1	–0.4	–0.4
<b>DK</b>	2 490	2 568	2 549	78	–19	59	3.1	–0.7	2.4	0.3	–0.0	0.0
<b>DE</b>	37 205	36 799	26 041	–407	–10 758	–11 165	–1.1	–29.2	–30.0	–0.1	–0.9	–0.7
<b>EE</b>	554	547	448	–7	–99	–106	–1.3	–18.0	–19.1	–0.1	–0.5	–0.4
<b>IE</b>	1 770	1 797	2 427	27	630	657	1.5	35.1	37.1	0.2	0.8	0.6
<b>EL</b>	4 462	4 686	4 156	224	–530	–306	5.0	–11.3	–6.9	0.5	–0.3	–0.1
<b>ES</b>	18 219	19 867	20 626	1 648	759	2 407	9.0	3.8	13.2	0.9	0.1	0.2
<b>FR</b>	26 376	27 620	28 615	1 245	994	2 239	4.7	3.6	8.5	0.5	0.1	0.2
<b>IT</b>	22 468	23 877	21 828	1 408	–2 049	–640	6.3	–8.6	–2.8	0.6	–0.2	–0.1
<b>CY</b>	380	430	482	50	52	102	13.2	12.1	26.8	1.2	0.3	0.5
<b>LV</b>	917	884	618	–32	–267	–299	–3.5	–30.1	–32.6	–0.4	–0.9	–0.8
<b>LT</b>	1 326	1 288	990	–38	–298	–336	–2.9	–23.1	–25.4	–0.3	–0.7	–0.6
<b>LU</b>	222	252	273	29	21	50	13.2	8.3	22.6	1.2	0.2	0.4
<b>HU</b>	3 791	3 892	3 040	101	–852	–751	2.7	–21.9	–19.8	0.3	–0.6	–0.4
<b>MT</b>	157	162	138	5	–23	–18	3.2	–14.3	–11.6	0.3	–0.4	–0.2
<b>NL</b>	7 784	7 889	7 031	105	–858	–752	1.4	–10.9	–9.7	0.1	–0.3	–0.2
<b>AT</b>	3 866	3 976	3 614	111	–362	–251	2.9	–9.1	–6.5	0.3	–0.2	–0.1
<b>PL</b>	16 025	15 947	10 757	–77	–5 191	–5 268	–0.5	–32.5	–32.9	–0.0	–1.0	–0.8
<b>PT</b>	4 620	4 671	4 033	50	–638	–588	1.1	–13.7	–12.7	0.1	–0.4	–0.3
<b>RO</b>	8 733	8 428	5 194	–305	–3 235	–3 540	–3.5	–38.4	–40.5	–0.4	–1.2	–1.0
<b>SI</b>	932	939	779	7	–160	–153	0.7	–17.0	–16.4	0.1	–0.5	–0.4
<b>SK</b>	2 311	2 335	1 726	24	–609	–585	1.0	–26.1	–25.3	0.1	–0.8	–0.6
<b>FI</b>	2 350	2 358	2 257	8	–101	–94	0.3	–4.3	–4.0	0.0	–0.1	–0.1
<b>SE</b>	4 290	4 606	4 878	315	272	588	7.3	5.9	13.7	0.7	0.1	0.3
<b>UK</b>	27 336	28 778	31 899	1 442	3 121	4 563	5.3	10.8	16.7	0.5	0.3	0.3
<b>NO</b>	2 319	2 488	2 742	169	253	423	7.3	10.2	18.2	0.7	0.2	0.3
<b>EU-27</b>	210 887	216 870	195 221	5 983	–21 648	–15 666	2.8	–10.0	–7.4	0.280	–0.3	–0.2
<b>EA</b>	138 085	142 882	129 399	4 797	–13 483	–8 686	3.5	–9.4	–6.3	0.3	–0.2	–0.1
<b>EA-12</b>	167 868	174 421	165 151	6 553	–9 270	–2 717	3.9	–5.3	–1.6	0.4	–0.1	–0.0
<b>EU-15</b>	43 019	42 448	30 070	–570	–12 378	–12 949	–1.3	–29.2	–30.1	–0.1	–0.9	–0.7

Source: Commission services, EPC

**Table 2.19:**  
Employment rate projections by age group, Total

	Total 15–64		Total 20–64		Young 15–24		Prime age 25–54		Older 55–64		15–64	20–64	15–24	25–54	55–64
	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060	Change 2010–60				
AT	71.7	74.4	74.8	77.5	54.2	56.2	84.2	86.1	42.2	55.1	2.7	2.7	2.0	1.9	12.9
BE	62.0	63.5	67.6	69.6	25.4	26.9	80.0	80.1	37.3	46.8	1.5	2.0	1.5	0.1	9.5
BG	60.0	64.4	64.8	70.3	24.8	25.2	75.0	78.5	44.7	56.0	4.4	5.6	0.3	3.6	11.3
CY	68.3	74.5	74.8	80.5	34.6	36.6	82.5	87.6	56.8	66.5	6.2	5.8	2.0	5.0	9.7
CZ	65.1	68.6	70.5	75.0	25.5	25.0	82.2	81.1	46.8	69.1	3.5	4.4	–0.5	–1.1	22.3
DE	71.2	74.0	74.9	78.2	46.5	46.4	81.5	83.2	57.7	70.0	2.9	3.3	–0.1	1.7	12.3
DK	73.5	76.8	76.0	79.1	58.5	63.4	83.2	82.9	57.6	70.7	3.3	3.1	4.9	–0.3	13.1
EE	61.3	70.1	66.8	76.8	26.6	30.6	74.9	82.4	54.0	68.7	8.7	10.1	3.9	7.5	14.7
EL	59.6	67.3	64.1	73.2	21.1	24.6	73.4	79.9	42.6	67.1	7.7	9.2	3.5	6.4	24.5
ES	58.6	71.8	62.6	77.2	25.2	35.2	69.6	81.9	43.6	72.5	13.2	14.7	10.1	12.3	28.9
FI	68.2	71.2	73.1	76.3	39.2	42.5	81.6	82.9	56.6	62.6	3.0	3.2	3.3	1.3	6.0
FR	63.8	69.2	69.3	75.5	30.9	32.6	81.8	84.0	39.7	60.2	5.4	6.2	1.7	2.2	20.4
HU	55.4	62.2	60.4	67.4	19.0	20.7	72.6	75.2	34.2	56.6	6.8	7.0	1.7	2.7	22.4
IE	60.0	63.2	64.9	69.0	30.7	36.8	70.3	72.8	49.9	61.7	3.2	4.1	6.1	2.5	11.7
IT	56.9	60.6	61.1	65.4	20.7	22.1	71.1	71.0	36.4	60.7	3.7	4.4	1.3	–0.1	24.2
LT	58.2	67.7	64.6	74.2	20.6	25.0	73.7	81.5	48.3	62.7	9.5	9.6	4.5	7.7	14.4
LU	64.9	64.6	70.4	70.1	21.6	24.7	82.4	83.7	39.2	40.7	–0.2	–0.3	3.0	1.4	1.5
LV	59.7	71.3	65.1	77.2	27.8	33.2	73.3	85.1	48.2	60.7	11.6	12.1	5.4	11.7	12.5
MT	56.5	65.6	60.4	69.9	45.2	44.8	68.9	74.5	31.1	56.4	9.2	9.5	–0.4	5.6	25.2
NL	74.7	77.1	76.8	79.2	63.1	66.4	84.7	86.1	53.7	60.6	2.4	2.4	3.3	1.4	6.8
NO	75.4	75.4	79.6	79.5	51.9	52.9	84.7	85.0	68.9	67.3	–0.0	–0.1	1.0	0.3	–1.6
PL	59.3	62.3	64.7	67.5	27.2	27.1	77.2	77.5	34.2	44.8	3.0	2.8	–0.1	0.3	10.6
PT	65.6	71.1	70.5	76.3	29.1	32.2	79.2	83.8	49.4	65.5	5.5	5.8	3.1	4.5	16.1
RO	58.9	56.8	63.4	61.1	24.9	23.0	74.4	70.3	40.9	45.0	–2.1	–2.4	–1.9	–4.1	4.1
SE	72.4	76.5	78.3	82.5	39.1	42.9	84.4	87.7	70.0	74.7	4.2	4.2	3.8	3.3	4.6
SI	66.4	70.5	70.5	76.1	33.9	33.7	83.9	84.7	34.9	59.9	4.1	5.6	–0.2	0.8	25.0
SK	59.0	62.8	64.7	68.2	21.3	24.6	75.8	78.1	40.6	48.3	3.8	3.5	3.4	2.3	7.8
UK	69.4	72.4	73.5	76.8	47.7	50.2	79.8	80.9	57.1	67.8	3.0	3.3	2.5	1.0	10.7
EU-12	59.7	63.0	64.8	68.2	25.4	25.7	76.4	77.1	39.1	51.4	3.3	3.4	0.3	0.7	12.3
EU-15	65.4	70.0	69.6	74.9	37.2	39.4	78.0	80.9	48.3	65.0	4.7	5.3	2.2	2.9	16.8
EU-27	64.1	68.9	68.6	73.8	34.5	37.3	77.6	80.2	46.3	62.7	4.7	5.2	2.8	2.6	16.5
EA-17	64.2	69.0	68.4	74.1	34.1	35.6	77.4	80.6	45.7	63.8	4.9	5.6	1.5	3.2	18.1

Source: Commission services, EPC

**Table 2.20:**  
Employment rate projections by age group, Men

	Total 15–64		Total 20–64		Young 15–24		Prime age 25–54		Older 55–64		15–64	20–64	15–24	25–54	55–64
	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060	Change 2010–60				
AT	77.0	76.2	80.1	79.0	58.3	60.0	88.7	87.8	51.5	55.6	–0.7	–1.1	1.7	–0.8	4.1
BE	67.4	67.5	73.5	74.0	27.3	28.9	85.5	85.0	45.5	50.1	0.1	0.5	1.6	–0.5	4.6
BG	63.6	68.8	68.8	75.1	28.0	28.8	77.5	81.9	51.3	64.3	5.1	6.4	0.7	4.4	13.1
CY	74.5	76.4	81.7	82.6	35.4	38.0	88.4	89.0	71.2	71.6	1.9	1.0	2.5	0.5	0.4
CZ	73.7	75.7	79.8	82.7	29.9	29.4	90.6	90.0	58.7	72.8	2.1	2.9	–0.5	–0.6	14.1
DE	76.1	77.0	80.1	81.2	48.4	48.5	86.5	86.8	65.1	71.7	0.9	1.1	0.1	0.3	6.6
DK	75.9	77.7	79.0	80.4	57.4	62.5	85.8	84.4	62.8	71.9	1.8	1.4	5.1	–1.5	9.1
EE	61.8	71.4	67.8	78.4	28.6	33.8	75.7	83.7	52.2	68.2	9.6	10.7	5.2	8.0	16.0
EL	70.7	74.7	76.1	81.4	25.3	28.2	85.4	88.8	56.7	74.5	4.0	5.4	2.9	3.4	17.9
ES	64.8	73.3	69.2	78.7	26.0	37.3	75.7	84.2	54.8	71.0	8.5	9.5	11.3	8.5	16.2
FI	69.2	72.0	74.5	77.5	37.8	41.2	83.9	84.9	55.7	61.3	2.8	3.0	3.3	1.0	5.6
FR	68.0	72.0	73.7	78.3	34.0	35.9	87.1	87.5	42.0	60.6	4.0	4.5	1.9	0.3	18.5
HU	60.4	66.1	66.2	71.6	20.9	23.0	78.1	80.4	39.5	58.0	5.7	5.5	2.1	2.4	18.6
IE	64.0	65.9	69.4	72.0	28.7	36.8	75.0	77.2	58.0	61.2	1.9	2.6	8.2	2.2	3.2
IT	67.7	69.2	72.8	74.7	24.6	26.2	83.6	81.2	47.5	68.5	1.5	1.9	1.6	–2.3	20.9
LT	57.3	67.9	63.9	74.5	21.8	27.4	71.4	81.2	52.0	63.0	10.7	10.6	5.6	9.8	11.0
LU	72.7	68.9	78.8	74.7	22.5	23.9	91.9	91.1	47.5	40.3	–3.7	–4.1	1.4	–0.9	–7.1
LV	59.9	72.3	65.5	78.3	29.9	36.3	73.0	85.1	47.6	62.7	12.4	12.8	6.4	12.1	15.1
MT	72.4	77.0	78.0	82.2	47.1	46.8	88.8	87.9	48.8	69.3	4.6	4.2	–0.2	–0.9	20.5
NL	80.0	79.6	82.8	81.9	62.6	66.7	90.0	88.4	64.5	65.2	–0.4	–0.8	4.1	–1.6	0.7
NO	77.3	76.1	82.1	80.8	50.4	51.4	87.1	86.3	72.5	68.7	–1.1	–1.4	1.0	–0.8	–3.7
PL	65.7	68.6	71.8	74.2	31.3	31.3	82.6	82.2	45.5	56.8	2.9	2.4	0.0	–0.4	11.4
PT	70.1	72.8	75.4	78.0	31.0	34.1	83.9	85.8	55.8	66.1	2.7	2.6	3.1	1.9	10.4
RO	65.9	64.0	71.0	68.8	28.7	26.6	81.5	77.7	50.2	54.3	–1.8	–2.2	–2.1	–3.8	4.1
SE	74.3	78.6	80.9	85.1	38.6	42.4	86.8	90.0	73.5	79.0	4.3	4.3	3.8	3.1	5.5
SI	69.9	72.0	74.2	77.7	37.1	35.9	85.3	86.3	45.0	60.6	2.1	3.5	–1.2	1.0	15.5
SK	65.6	68.1	72.0	73.9	24.5	28.7	81.4	84.5	54.1	51.0	2.5	1.9	4.3	3.0	–3.1
UK	74.3	75.6	79.2	80.6	48.6	51.5	85.3	85.3	65.1	69.4	1.4	1.3	3.0	–0.1	4.4
NO	77.3	76.1	82.1	80.8	50.4	51.4	87.1	86.3	72.5	68.7	–1.1	–1.4	1.0	–0.8	–3.7
EU-12	65.7	68.6	71.5	74.3	28.9	29.3	81.8	82.5	48.7	59.0	2.9	2.9	0.4	0.7	10.4
EU-15	71.3	73.7	76.0	78.9	39.1	41.6	84.5	85.4	56.1	67.4	2.4	2.8	2.5	0.9	11.4
EU-27	70.1	72.8	75.1	78.1	36.7	39.7	83.9	84.9	54.5	66.0	2.8	3.1	3.0	1.0	11.5
EA-17	70.4	72.9	75.2	78.2	36.4	38.3	84.2	85.3	53.7	66.4	2.5	3.0	1.9	1.1	12.7

Source: Commission services, EPC



**Table 2.21:**  
Employment rate projections by age group, Women

	Total 15–64		Total 20–64		Young 15–24		Prime age 25–54		Older 55–64		15–64	20–64	15–24	25–54	55–64
	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060	Change 2010–60				
AT	66.3	72.4	69.5	75.9	49.9	52.1	79.6	84.3	33.3	54.6	6.1	6.4	2.2	4.6	21.3
BE	56.6	59.3	61.7	65.0	23.5	24.9	74.4	75.0	29.3	43.5	2.7	3.4	1.3	0.7	14.2
BG	56.5	59.9	60.8	65.4	21.5	21.4	72.3	75.0	39.0	47.5	3.4	4.6	–0.1	2.7	8.6
CY	62.0	72.5	67.9	78.4	33.9	35.2	76.6	86.2	43.0	61.2	10.5	10.5	1.4	9.6	18.3
CZ	56.4	61.3	61.0	66.9	20.9	20.5	73.4	71.8	35.8	65.4	4.9	5.9	–0.4	–1.6	29.6
DE	66.1	71.0	69.6	75.1	44.5	44.1	76.3	79.5	50.5	68.3	4.9	5.5	–0.4	3.2	17.7
DK	71.1	75.8	73.0	77.8	59.7	64.3	80.6	81.4	52.4	69.5	4.7	4.8	4.6	0.8	17.1
EE	60.9	68.7	65.8	75.2	24.6	27.3	74.0	81.0	55.4	69.1	7.8	9.4	2.7	7.0	13.8
EL	48.2	59.9	51.8	65.1	16.6	20.8	61.1	71.1	29.3	59.7	11.7	13.3	4.2	10.0	30.3
ES	52.3	70.3	55.8	75.8	24.3	33.1	63.2	79.5	33.2	74.1	18.0	19.9	8.8	16.3	40.9
FI	67.2	70.4	71.6	75.1	40.7	43.9	79.2	80.8	57.5	63.9	3.2	3.5	3.2	1.6	6.4
FR	59.7	66.3	64.9	72.5	27.7	29.1	76.7	80.4	37.5	59.7	6.6	7.6	1.4	3.8	22.2
HU	50.4	58.2	54.9	63.0	17.0	18.4	67.1	69.9	29.8	55.1	7.8	8.2	1.4	2.8	25.3
IE	56.1	60.5	60.4	65.9	32.8	36.7	65.7	68.1	41.9	62.1	4.4	5.5	4.0	2.5	20.3
IT	46.1	51.4	49.5	55.5	16.6	17.6	58.7	60.1	26.0	52.6	5.3	6.1	0.9	1.4	26.6
LT	59.0	67.4	65.2	73.8	19.2	22.5	76.0	81.7	45.6	62.5	8.4	8.6	3.3	5.7	16.9
LU	56.9	60.3	61.7	65.3	20.7	25.5	72.5	76.3	30.7	41.0	3.4	3.6	4.8	3.7	10.4
LV	59.6	70.3	64.8	76.2	25.6	30.0	73.7	85.0	48.7	58.8	10.7	11.4	4.4	11.3	10.1
MT	40.0	53.3	42.2	56.5	43.1	42.5	48.1	59.9	13.9	42.9	13.3	14.3	–0.6	11.8	29.0
NL	69.3	74.6	70.8	76.4	63.5	66.0	79.3	83.7	42.8	55.7	5.3	5.5	2.5	4.4	12.9
NO	73.4	74.6	77.1	78.3	53.4	54.5	82.2	83.7	65.2	65.9	1.2	1.2	1.1	1.5	0.7
PL	53.0	55.7	57.7	60.4	22.9	22.7	71.7	72.5	24.4	32.9	2.7	2.7	–0.2	0.8	8.5
PT	61.2	69.4	65.7	74.6	27.1	30.3	74.6	81.7	43.7	64.9	8.2	8.9	3.2	7.1	21.2
RO	52.0	49.4	56.0	53.1	21.0	19.3	67.2	62.6	32.7	35.7	–2.6	–2.9	–1.7	–4.6	2.9
SE	70.3	74.3	75.6	79.7	39.6	43.4	81.9	85.2	66.6	70.3	4.0	4.1	3.8	3.3	3.7
SI	62.7	68.9	66.6	74.5	30.4	31.5	82.4	83.0	24.7	59.2	6.2	7.9	1.1	0.6	34.5
SK	52.5	57.5	57.4	62.3	17.9	20.4	70.0	71.5	28.7	45.7	5.0	4.9	2.4	1.5	17.0
UK	64.5	69.0	67.8	72.9	46.8	48.8	74.3	76.3	49.5	66.2	4.6	5.0	2.0	2.0	16.8
NO	73.4	74.6	77.1	78.3	53.4	54.5	82.2	83.7	65.2	65.9	1.2	1.2	1.1	1.5	0.7
EU-12	53.8	57.1	58.3	61.9	21.7	21.8	70.8	71.4	30.7	43.7	3.4	3.6	0.1	0.6	13.0
EU-15	59.4	66.4	63.2	71.0	35.3	37.1	71.4	76.1	40.9	63.4	7.0	7.9	1.8	4.7	22.5
EU-27	58.2	64.9	62.1	69.5	32.1	34.7	71.3	75.3	38.6	60.1	6.6	7.4	2.6	4.1	21.5
EA-17	57.9	65.2	61.7	70.1	31.8	32.9	70.5	75.7	38.1	62.2	7.3	8.4	1.1	5.2	24.1

Source: Commission services, EPC

Mainly as a result of the ageing process, the age structure of the working population is projected to undergo a number of significant changes. The share of older workers (55–64) in the labour force (20–64) is projected to rise by around 40 %, from 13.2 % in 2010 to 18.7 %

in 2060 in the EU-27 (Table 2.22). In the euro area, this share is projected to rise slightly more, reaching 19.5 % in 2060. The projected increases are particularly high in Greece, Spain, Italy, Hungary and Portugal.

**Table 2.22:**  
Share of older workers (55–64) as a percentage of the labour force (20–64)

	Total			Men			Women		
	2010	2020	2060	2010	2020	2060	2010	2020	2060
BE	10.9	15.0	13.6	12.1	15.4	13.5	9.6	14.6	13.8
DK	14.9	15.4	16.9	15.1	15.6	18.0	14.7	15.2	15.6
DE	14.5	14.2	18.9	15.4	14.8	17.9	13.2	13.4	20.1
EL	16.4	18.4	19.7	17.1	19.2	19.4	15.7	17.5	20.1
ES	15.5	23.1	22.0	15.9	23.3	21.5	15.0	22.9	22.5
FR	15.7	17.9	17.5	13.4	15.2	17.0	17.9	20.7	18.1
IE	12.2	17.0	17.3	13.1	16.7	16.1	11.0	17.3	18.7
IT	12.2	16.3	20.1	13.5	16.9	20.5	10.4	15.4	19.6
LU	11.3	17.6	21.2	12.4	17.3	20.2	9.9	18.0	22.3
NL	12.0	15.7	16.9	11.8	15.2	16.2	12.2	16.1	17.7
AT	11.6	17.8	21.4	12.5	18.1	21.0	10.2	17.4	22.0
PT	13.4	15.2	17.5	15.2	17.1	18.4	11.3	13.1	16.5
FI	13.2	17.0	17.1	11.7	15.9	17.0	14.7	18.2	17.1
SE	12.5	17.9	17.5	12.0	17.2	17.0	13.0	18.6	18.1
UK	9.6	11.9	12.5	10.4	11.7	11.6	8.4	12.1	13.6
CY	11.7	14.2	19.4	11.4	12.7	18.4	12.1	15.9	20.6
CZ	11.3	12.9	18.0	13.4	15.2	18.7	7.4	9.0	17.0
EE	15.0	18.0	17.3	16.7	19.4	17.9	13.0	16.4	16.7
HU	10.3	15.5	16.1	11.4	16.8	15.7	8.9	14.0	16.5
LT	10.5	12.1	14.7	12.0	13.7	16.6	8.8	10.2	12.3
LV	13.3	17.2	21.2	13.8	17.3	21.2	12.8	17.2	21.3
MT	11.6	12.0	17.3	12.0	13.0	18.4	11.1	10.8	15.9
PL	9.7	15.1	16.5	11.6	16.2	16.4	7.5	13.8	16.6
SK	11.3	13.8	15.8	12.7	13.4	15.2	9.6	14.3	16.6
SI	18.7	19.3	17.3	17.6	18.2	16.4	19.8	20.4	18.3
BG	19.1	18.4	17.8	19.1	18.6	18.0	19.0	18.2	17.5
RO	14.9	17.7	17.3	15.6	17.4	16.7	14.2	17.9	17.9
NO	17.2	17.3	17.5	17.4	17.5	17.3	17.0	17.1	17.6
EU-27	13.2	17.4	18.7	13.8	17.5	18.4	12.4	17.2	19.1
EA	13.0	18.4	19.5	13.6	18.5	19.0	12.2	18.3	20.0
EU-15	13.5	18.4	19.1	14.1	18.4	18.6	12.8	18.3	19.6
EU-12	11.8	13.3	16.7	12.6	14.0	17.3	10.9	12.5	15.8

Source: Commission services, EPC

## 2.9. RESULTING ECONOMIC DEPENDENCY RATIOS

The effective economic old-age dependency ratio is an important indicator to assess the impact of ageing on budgetary expenditure, particularly on its pension component. This indicator is calculated as the ratio

between the inactive elderly (65+) and total employment (either 20–64 or 20–74). The effective economic old-age dependency ratio is projected to rise significantly from around 40 % in 2010 to 74 % in 2060 in the EU-27 (employed aged 20–64). In the euro area, a similar deterioration is projected from 43 % in 2010 to 75 % in 2060.

**Table 2.23:**  
Effective economic old-age dependency ratio

	Inactive population aged 65 and over as % of employed (20–64)					Inactive population aged 65 and over as % of employed (20–74)					
	2010	2020	2060	Change 2010–20	Change 2020–60	2010	2020	2060	Change 2010–20	Change 2020–60	
BE	42	47	68	5	21	42	46	67	5	21	BE
DK	35	42	56	8	14	34	41	53	7	12	DK
DE	44	47	77	3	31	43	45	73	2	28	DE
EL	47	51	83	4	32	46	50	82	4	32	EL
ES	42	44	75	2	30	42	43	71	2	28	ES
FR	41	49	66	9	17	40	49	65	8	16	FR
IE	27	35	55	8	20	26	34	53	8	19	IE
IT	53	57	90	4	33	52	56	86	4	30	IT
LU	31	36	70	5	34	31	36	70	5	34	LU
NL	31	40	62	9	22	31	39	60	8	21	NL
AT	37	41	67	4	26	36	40	64	4	25	AT
PT	37	42	73	6	31	35	40	67	5	27	PT
FI	38	49	65	12	16	37	48	63	11	15	FI
SE	37	42	58	5	16	36	40	55	4	15	SE
UK	35	40	55	6	15	34	39	52	5	13	UK
CY	25	31	60	6	29	25	30	56	5	27	CY
CZ	32	43	74	10	31	32	41	70	10	28	CZ
EE	38	42	74	5	31	36	41	70	4	29	EE
HU	43	50	91	6	41	43	49	88	6	39	HU
LT	39	42	81	3	39	38	41	78	3	37	LT
LV	40	42	89	2	47	39	40	83	1	42	LV
MT	39	52	85	14	33	38	52	84	14	32	MT
PL	31	41	100	10	58	31	40	95	10	55	PL
SK	29	38	97	10	59	28	38	96	9	58	SK
SI	34	43	79	9	35	34	42	75	9	33	SI
BG	42	48	89	7	40	41	47	85	5	38	BG
RO	32	40	109	8	69	30	39	102	8	63	RO
NO	29	35	56	6	21	28	33	53	6	20	NO
EA	43	48	75	5	27	42	47	72	5	25	EA
EU-27	40	46	74	6	28	39	45	70	5	26	EU-27
EU-15	41	46	70	5	24	41	45	67	5	22	EU-15
EU-12	34	42	94	9	51	33	41	89	8	48	EU-12

Source: Commission services, EPC

**Table 2.24:**  
Total economic dependency ratio

	Total inactive population as % of employed (20–64)					Total inactive population as % of employed (20–74)					
	2010	2020	2060	Change 2010–20	Change 2020–60	2010	2020	2060	Change 2010–20	Change 2020–60	
BE	136	138	163	2	25	135	137	161	2	24	BE
DK	105	108	121	4	13	102	106	115	4	10	DK
DE	107	104	138	–3	34	105	101	131	–5	30	DE
EL	137	132	161	–4	29	134	131	158	–4	27	EL
ES	126	118	139	–8	21	125	116	133	–9	17	ES
FR	133	135	146	1	11	132	133	143	1	10	FR
IE	133	147	157	15	9	130	142	151	12	9	IE
IT	158	153	185	–5	31	156	150	177	–5	27	IT
LU	121	123	161	1	39	120	122	160	2	38	LU
NL	100	104	128	4	24	98	100	123	2	22	NL
AT	105	105	132	0	26	104	103	126	–1	23	AT
PT	112	110	137	–1	26	106	105	126	–2	21	PT
FI	114	123	140	9	17	112	119	135	7	16	FI
SE	103	106	122	3	16	101	102	116	2	14	SE
UK	111	117	131	5	15	108	113	124	5	11	UK
CY	101	97	124	–4	27	98	94	118	–5	24	CY
CZ	110	118	149	9	31	108	115	140	7	25	CZ
EE	117	121	147	4	26	113	116	139	2	23	EE
HU	150	140	180	–10	40	149	138	175	–10	36	HU
LT	126	124	158	–2	34	124	122	152	–2	30	LT
LV	118	114	153	–4	39	115	110	143	–6	33	LV
MT	151	146	168	–5	22	150	145	165	–5	20	MT
PL	125	129	189	4	60	124	126	180	2	54	PL
SK	117	123	185	5	63	117	121	182	4	61	SK
SI	109	116	151	7	36	106	113	145	6	32	SI
BG	130	135	174	5	39	129	130	166	2	36	BG
RO	131	137	217	5	80	125	132	203	7	72	RO
NO	99	105	128	6	23	96	101	122	5	21	NO
EA	125	124	150	–1	26	123	121	144	–3	23	EA
EU-27	123	123	150	0	27	121	120	144	–1	24	EU-27
EU-15	122	122	145	–0	23	120	119	139	–1	20	EU-15
EU-12	126	129	182	3	53	124	126	173	2	47	EU-12

Source: Commission services, EPC

Across EU Member States, the effective economic old-age dependency ratio is projected to range from a minimum of 55 % in Ireland to a maximum of 109 % in Romania in 2060. This ratio is projected to be above 85 % in eight EU Member States, namely Bulgaria, Italy, Latvia, Hungary, Malta, Poland, Romania and Slovakia by 2060.

The total economic dependency ratio is calculated as the ratio between the total inactive population and the employed population thus giving a measure of the average number of individuals that each employed person ‘supports’. This ratio is relevant when considering prospects for potential GDP per

capita growth; it is expected to stabilise in the period up to 2020 in the EU-27, while rising above 150 % by 2060. A similar evolution is projected in the euro area. The projected development of this indicator reflects the strong impact of the ageing process after 2020 in most EU Member States. However, there are large differences between countries. In Bulgaria, Luxembourg, Poland, Romania, Slovenia and Slovakia, it is projected to increase by 40 percentage points or more between 2010 and 2060, while in other countries (Denmark, Spain, France, Malta, Sweden and the United Kingdom) it is projected to rise by less than 20 percentage points.

## 2.10. PROJECTION OF TOTAL HOURS WORKED

Total hours worked are projected to increase by 3.3 % over the period 2010–20 in the EU-27 <sup>(50)</sup>. However, from 2020 onwards, this upward trend is projected to be reversed and total hours worked are expected to decline by 8.4 % between 2020 and 2060. Over the entire projection period (i.e. 2010–60), total hours worked are projected to fall by 5.3 % in the EU-27. For the euro area, the projected fall is less marked (– 3.8 % between 2010 and 2060). In terms of annual average growth rates, hours worked are projected to decline by 0.1 % over the period 2010–60 in both the EU-27 and the euro area (Table 2.25). These trends in hours worked largely reflect employment trends (Section 8). In addition, given the relatively

high take-up rates of part-time work by women, increasing female participation rates are expected — through composition effects — to slightly increase the share of the part-time hours of total hours worked from 10.1 % in 2010 to 10.5 % in 2060 in the EU-27 <sup>(51)</sup>.

There are major differences across Member States, reflecting different demographic outlooks. A reduction in total hours worked of 20 % or more between 2010 and 2060 is projected for Bulgaria, Germany, Latvia, Lithuania, Poland, Romania and Slovakia. In contrast, for some Member States, an increase of 10 % or more is projected over the same period, namely Belgium, Ireland, Spain, France, Cyprus, Luxembourg, Sweden and the United Kingdom.

---

<sup>(50)</sup> For the purpose of calculating potential GDP, estimated potential hours worked using the production function approach were used (Table 3.5, Chapter 3). Specifically, for the potential GDP projections until 2015, the growth rates of hours worked estimated using the production function approach are used; thereafter, the growth rates estimated with the CSM — as reported in Table 2.25 — are used.

---

<sup>(51)</sup> Part-time work varies considerably across the EU, accounting for less than 2 % of total hours worked in Bulgaria and Slovakia to over 30 % in the Netherlands.

**Table 2.25:**  
Projections for total weekly hours worked ('000), and break down by full and part-time, 2010–60 (15–74)

	Total			of which				of which				Total change (%)				Total average annual growth (%)			
	Full-time (%)			Part-time (%)		Total		Full-time (%)		Part-time (%)		2010		2020		2030		2040	
	2010	2020	2030	2010	2020	2030	2040	2010	2020	2030	2040	2010	2020	2030	2040	2010	2020	2030	2040
AT	150 938 253	86.7	13.3	154 780 917	86.5	13.5	143 366 299	86.2	13.8	15.2	6.3	2.5	–7.4	–5.0	0.4	–0.2	–0.1	0.3	0.3
BE	165 360 425	85.1	14.9	175 713 348	84.8	15.2	186 081 415	84.8	15.2	15.2	6.3	5.9	12.5	0.7	0.1	0.1	0.3	0.3	0.3
BG	127 237 221	98.9	1.1	120 287 118	98.8	1.2	81 666 138	98.8	1.2	81 666 138	98.8	1.2	–32.1	–35.8	–0.8	–1.0	–0.9	–0.9	–0.9
CY	15 426 552	96.0	4.0	17 499 638	95.9	4.1	19 983 887	95.8	4.2	13.4	14.2	29.5	1.5	0.3	0.6	0.6	0.6	0.6	0.6
CZ	198 180 036	97.3	2.7	197 992 826	97.3	2.7	172 140 930	97.2	2.8	2.8	–0.1	–13.1	–0.1	–0.3	–0.3	–0.3	–0.3	–0.3	–0.3
DE	1 390 538 239	87.0	13.0	1 395 700 956	86.8	13.2	1 008 797 194	86.6	13.4	13.4	0.4	–27.7	–27.5	0.1	–0.8	–0.6	–0.6	–0.6	–0.6
DK	93 782 286	85.1	14.9	96 651 788	85.1	14.9	98 232 801	85.0	15.0	15.0	3.1	1.6	4.7	0.1	0.0	0.1	0.1	0.1	0.1
EE	22 226 950	94.6	5.4	22 133 697	94.6	5.4	18 490 858	94.7	5.3	5.3	–0.4	–16.5	–16.8	–0.3	–0.4	–0.4	–0.4	–0.4	–0.4
ES	699 088 052	93.6	6.4	770 355 340	93.4	6.6	822 937 681	93.2	6.8	6.8	10.2	6.8	17.7	0.7	0.2	0.3	0.3	0.3	0.3
FI	89 353 713	92.3	7.7	90 989 990	92.2	7.8	87 644 787	92.2	7.8	7.8	1.8	–3.7	–1.9	0.2	–0.1	–0.0	–0.0	–0.0	–0.0
FR	990 488 233	89.3	10.7	1 039 617 753	89.2	10.8	1 090 049 835	89.3	10.7	10.7	5.0	4.9	10.1	0.7	0.1	0.2	0.2	0.2	0.2
EL	186 630 416	97.0	3.0	194 494 957	96.9	3.1	173 169 559	96.8	3.2	3.2	4.2	–11.0	–7.2	0.5	–0.3	–0.1	–0.1	–0.1	–0.1
HU	151 855 505	96.7	3.3	156 202 456	96.7	3.3	124 251 979	96.6	3.4	3.4	2.9	–20.5	–18.2	0.4	–0.5	–0.4	–0.4	–0.4	–0.4
IE	64 232 675	88.4	11.6	66 142 884	88.0	12.0	90 329 205	88.2	11.8	11.8	3.0	36.6	40.6	–0.1	0.8	0.6	0.6	0.6	0.6
IT	855 328 338	91.6	8.4	911 479 501	91.4	8.6	854 008 457	91.6	8.4	8.4	6.6	–6.3	–0.2	0.6	–0.1	–0.0	–0.0	–0.0	–0.0
LT	52 053 018	95.5	4.5	50 647 162	95.5	4.5	39 677 083	95.5	4.5	4.5	–2.7	–21.7	–23.8	–0.6	–0.6	–0.6	–0.6	–0.6	–0.6
LU	8 542 118	90.4	9.6	9 582 630	89.9	10.1	10 396 005	89.8	10.2	10.2	12.2	8.5	21.7	1.4	0.2	0.5	0.5	0.5	0.5
LV	36 288 338	94.8	5.2	35 536 714	94.8	5.2	25 701 967	94.8	5.2	5.2	–2.1	–27.7	–29.2	–0.5	–0.8	–0.7	–0.7	–0.7	–0.7
MT	6 244 781	93.6	6.4	6 347 403	93.3	6.7	5 466 218	93.1	6.9	6.9	1.6	–13.9	–12.5	0.2	–0.4	–0.2	–0.2	–0.2	–0.2
NL	265 163 017	68.2	31.8	272 908 669	67.8	32.2	244 248 406	67.7	32.3	32.3	2.9	–10.5	–7.9	0.1	–0.3	–0.2	–0.2	–0.2	–0.2
PL	649 688 633	95.9	4.1	652 619 362	95.9	4.1	451 760 179	95.8	4.2	4.2	0.5	–30.8	–30.5	0.4	–0.9	–0.6	–0.6	–0.6	–0.6
PT	188 440 060	95.8	4.2	191 137 665	95.7	4.3	169 700 644	95.6	4.4	4.4	1.4	–11.2	–9.9	–0.0	–0.3	–0.2	–0.2	–0.2	–0.2
RO	364 241 808	93.0	7.0	347 670 037	93.1	6.9	220 499 211	92.9	7.1	7.1	–4.5	–36.6	–39.5	–0.4	–1.1	–1.0	–1.0	–1.0	–1.0
SE	162 624 226	83.0	17.0	175 129 591	83.0	17.0	188 161 443	83.1	16.9	16.9	7.7	7.4	15.7	0.8	0.2	0.3	0.3	0.3	0.3
SI	37 536 499	95.0	5.0	37 809 535	94.9	5.1	32 092 851	94.8	5.2	5.2	0.7	–15.1	–14.5	–0.0	–0.4	–0.3	–0.3	–0.3	–0.3
SK	92 063 058	98.1	1.9	93 342 641	98.1	1.9	69 710 811	98.1	1.9	1.9	1.4	–25.3	–24.3	–0.0	–0.7	–0.6	–0.6	–0.6	–0.6
UK	1 030 591 140	86.5	13.5	1 081 077 607	86.4	13.6	1 234 395 910	86.3	13.7	13.7	4.9	14.2	19.8	0.6	0.3	0.4	0.4	0.4	0.4
NO	84 350 375	83.0	17.0	90 598 778	82.8	17.2	100 701 074	82.8	17.2	17.2	7.4	11.2	19.4	0.7	0.3	0.4	0.4	0.4	0.4
EA	5 227 601 378	89.1	10.9	5 450 037 525	89.0	11.0	5 026 474 112	89.2	10.8	10.8	4.3	–7.8	–3.8	0.4	–0.2	–0.1	–0.1	–0.1	–0.1
EU-27	8 094 143 589	89.9	10.1	8 363 852 185	89.8	10.2	7 662 961 751	89.5	10.5	10.5	3.3	–8.4	–5.3	0.3	–0.2	–0.1	–0.1	–0.1	–0.1

Source: Commission services, EPC

**2.11. COMPARING THE 2012 AND 2009  
LABOUR MARKET PROJECTIONS**

This section provides a summary comparison of the main labour market outcomes between the current 2012 projection exercise and the previous exercise of 2009. The impact of the 2008–09 economic recession is clearly visible in the downward revision for 2010 of the labour force, employment values and employment rates (Tables 2.26 to 2.28) <sup>(52)</sup>.

The economic recession of 2008–09 led to a considerable downward revision in employment levels for 2010 (i.e. between the 2009 and the 2012 exercises). In the EU-27, employment levels were revised downwards by 6.8 million persons for the age group 20–64.

In addition, given the assumed rise of 0.8 percentage point in the structural unemployment rate in the EU-27 by 2060 (Table 2.28), the employment rate in 2060 is also lower by 1.0 percentage point (15–64). In contrast, the participation rate of older workers (55–64) is increased by 3.1 percentage points in 2060, reflecting the positive effect of (further) legislated pension reforms in many Member States.

**Table 2.26:**  
Labour force projections: 2012 round v 2009 round, 2010–60  
(‘000)

	Labour Force (20–64)		Employment (20–64)	
	2010	2060	2010	2060
<b>AT</b>	– 9.2	– 45.4	– 19.7	– 40.8
<b>BE</b>	14.1	397.4	– 29.3	319.4
<b>BG</b>	– 54.2	43.1	– 245.0	– 10.1
<b>CY</b>	– 19.6	– 93.0	– 31.7	– 95.0
<b>CZ</b>	6.1	464.1	– 136.6	379.1
<b>DE</b>	– 511.5	– 2 275.0	– 155.1	– 2 118.2
<b>DK</b>	12.3	61.8	– 96.1	19.8
<b>EE</b>	2.4	23.6	– 87.5	4.5
<b>ES</b>	– 288.7	798.2	– 2 813.0	484.9
<b>FI</b>	3.1	90.5	– 62.3	67.4
<b>FR</b>	1 222.3	1 908.5	679.2	1 468.1
<b>EL</b>	13.8	294.6	– 226.8	228.1
<b>HU</b>	– 61.6	164.8	– 208.8	118.0
<b>IE</b>	– 209.8	– 293.8	– 375.0	– 309.2
<b>IT</b>	– 297.9	1 624.9	– 944.0	1 186.0
<b>LT</b>	28.4	158.1	– 204.2	113.0
<b>LU</b>	9.7	– 6.9	9.4	– 5.8
<b>LV</b>	– 2.2	12.9	– 157.3	– 4.1
<b>MT</b>	4.4	10.1	2.8	8.7
<b>NL</b>	17.5	106.6	– 95.6	72.4
<b>PL</b>	504.5	909.8	– 198.2	705.5
<b>PT</b>	– 98.5	– 407.2	– 284.4	– 431.0
<b>RO</b>	38.9	112.8	– 119.4	65.2
<b>SE</b>	– 15.6	260.2	– 126.2	212.1
<b>SI</b>	9.9	153.4	– 17.0	138.5
<b>SK</b>	– 44.5	172.8	– 128.4	142.8
<b>UK</b>	20.8	10.6	– 694.2	– 102.6
<b>NO</b>	35.9	247.4	40.7	253.8
<b>EU-12</b>	412.4	2 132.5	– 1 531.1	1 566.1
<b>EU-15</b>	– 117.5	2 525.0	– 5 233.0	1 050.7
<b>EU-27</b>	294.9	4 657.6	– 6 764.1	2 616.8
<b>EA-17</b>	– 182.5	2 459.4	– 4 578.1	1 121.0

Source: Commission services, EPC

<sup>(52)</sup> Also note the downward revision of the participation rates of young (male) cohorts in the age profile of participation rates (Graph 2.10).

**Table 2.27:**  
Labour force projections: 2012 round (2010–60)

	Employment rate 15–64		Employment rate 20–64		Employment rate 55–64		Participation rate 15–64		Participation rate 20–64		Participation rate 55–64		Unemployment rate 55–64	
	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060
AT	71.7	74.4	74.8	77.5	42.2	55.1	75.0	77.6	78.0	80.6	43.1	56.1	4.5	4.1
BE	62.0	63.5	67.6	69.6	37.3	46.8	67.7	68.5	73.5	74.8	39.1	48.7	8.4	7.3
BG	60.0	64.4	64.8	70.3	44.7	56.0	67.1	69.4	72.1	75.7	49.3	59.8	10.5	7.3
CY	68.3	74.5	74.8	80.5	56.8	66.5	73.2	78.0	79.9	84.2	59.6	68.8	6.8	4.5
CZ	65.1	68.6	70.5	75.0	46.8	69.1	70.3	73.1	75.9	79.7	50.1	72.6	7.3	6.1
DE	71.2	74.0	74.9	78.2	57.7	70.0	76.7	78.9	80.6	83.2	62.5	74.8	7.2	6.1
DK	73.5	76.8	76.0	79.1	57.6	70.7	79.5	80.6	81.6	82.7	61.1	73.2	7.5	4.8
EE	61.3	70.1	66.8	76.8	54.0	68.7	74.1	75.6	80.2	82.7	64.4	73.6	17.2	7.3
ES	58.6	71.8	62.6	77.2	43.6	72.5	73.4	77.5	77.7	83.0	50.8	76.4	20.2	7.3
FI	68.2	71.2	73.1	76.3	56.6	62.6	74.6	76.2	79.1	81.1	60.5	65.8	8.6	6.6
FR	63.8	69.2	69.3	75.5	39.7	60.2	70.4	74.7	76.1	81.1	42.5	63.3	9.4	7.3
EL	59.6	67.3	64.1	73.2	42.6	67.1	68.4	72.6	73.2	78.8	45.5	69.6	12.8	7.3
HU	55.4	62.2	60.4	67.4	34.2	56.6	62.4	67.1	68.0	72.6	37.1	59.1	11.3	7.3
IE	60.0	63.2	64.9	69.0	49.9	61.7	69.6	67.3	74.8	73.2	54.7	63.9	13.7	6.0
IT	56.9	60.6	61.1	65.4	36.4	60.7	62.2	65.3	66.5	70.3	37.8	62.6	8.5	7.3
LT	58.2	67.7	64.6	74.2	48.3	62.7	71.0	73.0	78.5	79.9	56.5	66.1	18.1	7.3
LU	64.9	64.6	70.4	70.1	39.2	40.7	67.9	67.5	73.5	73.0	40.1	41.6	4.4	4.2
LV	59.7	71.3	65.1	77.2	48.2	60.7	73.7	76.9	79.9	83.1	57.1	64.7	19.0	7.3
MT	56.5	65.6	60.4	69.9	31.1	56.4	60.7	70.3	64.3	74.3	32.6	58.5	6.9	6.6
NL	74.7	77.1	76.8	79.2	53.7	60.6	78.2	79.9	80.0	81.7	56.0	62.4	4.5	3.4
PL	59.3	62.3	64.7	67.5	34.2	44.8	65.8	67.2	71.5	72.6	36.8	47.4	9.8	7.3
PT	65.6	71.1	70.5	76.3	49.4	65.5	74.1	76.7	79.4	82.1	54.2	69.4	11.4	7.3
RO	58.9	56.8	63.4	61.0	40.9	45.0	63.8	60.9	68.4	65.2	42.3	46.3	7.6	6.7
SE	72.4	76.5	78.3	82.5	70.0	74.7	79.1	81.9	84.5	87.4	73.9	77.9	8.5	6.5
SI	66.4	70.5	70.5	76.1	34.9	59.9	71.7	74.7	76.0	80.6	36.3	61.6	7.4	5.7
SK	59.0	62.8	64.7	68.2	40.6	48.3	68.9	67.8	75.1	73.4	45.1	50.7	14.4	7.3
UK	69.4	72.4	73.5	76.8	57.1	67.8	75.4	76.7	79.0	80.7	59.9	70.1	8.0	5.6
NO	75.4	75.4	79.6	79.5	68.9	67.3	78.2	78.0	82.2	81.9	69.8	68.2	3.6	3.3
EU-12	59.7	63.0	64.8	68.2	39.1	51.4	66.4	67.7	71.9	73.2	42.2	53.9	10.0	6.9
EU-15	65.4	70.0	69.6	74.9	48.3	65.0	72.4	74.9	76.6	79.8	51.8	68.1	9.7	6.4
EU-27	64.1	68.9	68.6	73.8	46.3	62.7	71.1	73.7	75.6	78.7	49.7	65.7	9.7	6.5
EA-17	64.2	69.0	68.4	74.1	45.7	63.8	71.4	74.0	75.9	79.2	49.3	67.0	10.1	6.7

Source: Commission services, EPC



**Table 2.28:**  
Labour force projections: 2012 round v 2009 round (2010–60)

	Employment rate 15–64		Employment rate 20–64		Employment rate 55–64		Participation rate 15–64		Participation rate 20–64		Participation rate 55–64		Unemployment rate 55–64	
	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060	2010	2060
AT	-0.3	0.0	-0.1	0.1	2.7	1.1	-0.1	-0.1	0.2	0.1	2.6	0.6	0.2	-0.2
BE	-0.8	-1.9	-0.8	-1.7	-0.2	-0.6	-0.2	-1.3	-0.2	-1.0	-0.0	-0.4	0.9	1.1
BG	-4.7	-1.6	-4.9	-1.1	0.6	8.0	-0.9	0.2	-0.9	0.8	3.1	9.5	5.8	2.6
CY	-3.8	-0.8	-3.7	-0.7	-0.6	3.0	-1.4	0.0	-1.3	0.1	0.8	3.7	3.3	1.1
CZ	-2.8	-1.6	-2.9	-1.2	-3.9	3.8	-0.8	-0.5	-0.9	0.0	-2.6	4.9	2.9	1.6
DE	0.1	-0.8	0.2	-0.6	3.4	1.4	-0.6	-0.9	-0.4	-0.7	2.6	1.0	-0.8	-0.1
DK	-3.7	-1.5	-3.3	-1.2	-1.1	3.2	-0.3	-0.2	-0.0	0.1	0.7	3.8	4.3	1.5
EE	-10.6	-1.8	-10.8	-1.4	-7.3	6.3	-0.4	1.1	-0.0	1.8	1.4	9.4	13.8	3.8
ES	-8.3	-0.7	-8.2	-0.5	-4.4	2.0	0.1	0.1	0.6	0.5	-0.5	2.4	11.4	1.1
FI	-2.7	-3.4	-2.2	-3.1	1.9	-1.9	-0.7	-2.9	-0.2	-2.6	2.9	-2.0	2.8	0.8
FR	-0.5	2.1	-0.4	2.3	2.8	12.8	0.6	3.1	0.9	3.4	3.7	14.1	1.6	1.1
EL	-3.1	2.7	-3.1	3.4	-0.8	16.6	0.2	3.8	0.4	4.6	0.6	17.8	4.7	1.1
HU	-3.2	1.2	-3.4	1.2	-6.0	8.6	-1.0	2.1	-1.0	2.1	-4.9	9.6	3.5	1.1
IE	-10.2	-9.2	-9.8	-8.7	-5.6	-5.6	-4.3	-9.0	-3.5	-8.3	-2.4	-5.2	8.7	1.0
IT	-3.1	-3.2	-3.0	-3.2	-1.7	-0.9	-1.4	-2.3	-1.3	-2.2	-1.3	-0.5	2.8	1.5
LT	-8.6	1.9	-9.3	2.8	-8.5	10.1	1.8	4.8	2.0	6.0	-2.1	12.0	14.6	3.7
LU	1.1	0.9	0.9	0.6	3.6	0.2	1.0	0.7	0.9	0.4	3.7	0.3	-0.2	-0.4
LV	-11.1	0.7	-11.1	1.2	-8.7	4.3	-0.7	2.7	-0.1	3.4	-1.8	6.1	14.1	2.4
MT	0.8	5.2	1.4	6.1	4.4	8.3	1.3	5.8	2.0	6.9	4.9	8.2	0.7	0.4
NL	-1.6	-0.6	-1.3	-0.4	2.3	5.0	-0.5	-0.3	-0.2	-0.1	2.8	5.0	1.5	0.4
PL	-0.9	-0.1	-0.8	0.2	2.8	0.1	1.8	0.9	2.0	1.2	4.1	0.8	3.9	1.4
PT	-3.8	-0.5	-3.6	-0.4	-4.1	1.0	-1.1	0.4	-0.7	0.6	-2.7	1.6	3.8	1.1
RO	-1.2	-0.8	-1.2	-0.7	-2.7	0.4	-0.2	-0.4	-0.1	-0.2	-2.2	0.8	1.6	0.7
SE	-2.9	-1.1	-2.6	-0.9	-0.3	0.8	-0.9	-0.7	-0.6	-0.3	0.8	1.1	2.6	0.6
SI	-1.8	2.0	-1.9	2.5	-0.3	12.1	0.1	2.8	0.1	3.4	-0.0	12.4	2.7	1.0
SK	-3.6	-4.0	-3.8	-3.8	-2.5	-2.2	-1.5	-3.4	-1.5	-3.2	-1.6	-2.3	3.3	1.1
UK	-2.2	-2.0	-1.7	-1.6	0.4	-1.1	-0.3	-2.0	0.3	-1.4	1.4	-1.1	2.6	0.2
NO	0.3	0.6	0.4	0.8	2.6	2.7	-0.1	-0.0	0.2	0.4	2.5	2.5	-0.5	-0.8
EU-12	-2.4	-0.4	-2.5	-0.1	-1.0	2.6	0.3	0.6	0.5	0.9	0.5	3.4	4.1	1.4
EU-15	-2.5	-1.1	-2.2	-0.9	0.4	2.8	-0.4	-0.6	-0.1	-0.3	1.2	3.1	2.8	0.7
EU-27	-2.4	-1.0	-2.3	-0.8	0.1	2.7	-0.3	-0.5	-0.0	-0.1	1.1	3.1	3.1	0.8
EA-17	-2.5	-0.9	-2.4	-0.7	0.4	3.6	-0.5	-0.3	-0.2	-0.1	1.2	4.0	2.9	0.8

Source: Commission services, EPC

Table 2.29 provides a breakdown of the changes in employment projections (between the 2009 and 2012 rounds) <sup>(53)</sup>. Although the situation varies considerably across Member States, on average, in the EU-27, employment levels were revised upward for 2060 by 1.1 % (approximately two million more persons) between the 2009 and 2012 projection exercises. This revision results from an increase of 2.6 % in the population projections which is partly

offset by a reduction in participation rates (– 0.6 %) and an increase in the unemployment rate (+ 0.8 %) <sup>(54)</sup>.

This breakdown illustrates again the close link between the employment/labour force and population variables. In fact, there is a high cross-country correlation between the revisions in employment and population projections (Graph 2.8).

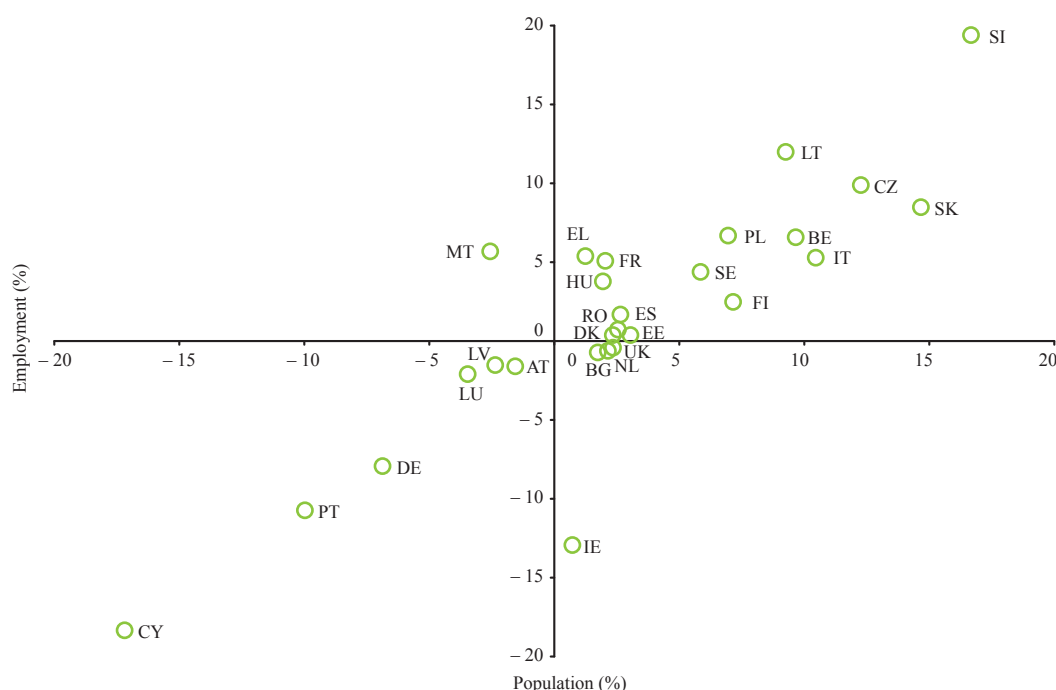
**Table 2.29:**  
Breakdown of revisions in employment projections (2012 round v 2009 round), 2060

	Employment (15–64) (%)	Population (15–64) (%)	Participation rate (15–64) (%)	Unemployment rate (15–64) (%)	Discrepancy (%)
	(1)+(2)+(3)–(4)	(2)	(3)	(4)	
AT	– 1.6	– 1.6	– 0.1	– 0.2	0.0
BE	6.6	9.6	– 1.8	1.1	– 0.1
BG	– 0.7	1.7	0.3	2.6	– 0.2
CY	– 18.3	– 17.2	0.0	1.1	– 0.0
CZ	9.9	12.2	– 0.6	1.6	– 0.1
DE	– 7.9	– 6.9	– 1.1	– 0.1	0.0
DK	0.4	2.3	– 0.3	1.5	– 0.1
EE	0.4	3.0	1.4	3.8	– 0.2
ES	1.7	2.6	0.2	1.1	– 0.1
FI	2.5	7.1	– 3.8	0.8	– 0.1
FR	5.1	2.0	4.2	1.1	– 0.1
EL	5.4	1.2	5.3	1.1	– 0.1
HU	3.8	1.9	3.1	1.1	– 0.1
IE	– 12.9	0.7	– 12.6	1.0	– 0.1
IT	5.3	10.4	– 3.5	1.5	– 0.1
LT	12.0	9.2	6.8	3.7	– 0.2
LU	– 2.1	– 3.5	1.0	– 0.4	0.0
LV	– 1.5	– 2.4	3.5	2.4	– 0.2
MT	5.7	– 2.6	8.7	0.4	– 0.0
NL	1.2	2.1	– 0.4	0.4	– 0.0
PL	6.7	6.9	1.4	1.4	– 0.1
PT	– 10.7	– 10.0	0.5	1.1	– 0.1
RO	1.1	2.5	– 0.6	0.7	– 0.0
SE	4.4	5.8	– 0.8	0.6	– 0.0
SI	19.4	16.6	3.9	1.0	– 0.1
SK	8.5	14.6	– 4.9	1.1	– 0.1
UK	– 0.4	2.3	– 2.5	0.2	– 0.0
NO	9.8	9.0	– 0.0	– 0.8	0.0
EU-12	5.2	5.9	0.9	1.4	– 0.1
EU-15	0.4	1.9	– 0.8	0.7	– 0.0
EU-27	1.1	2.6	– 0.6	0.8	– 0.1
EA-17	0.5	1.9	– 0.4	0.8	– 0.1

Source: Commission services, EPC

<sup>(53)</sup> The employment identity:  $L \equiv E + U$  can be written as:  
 $E \equiv P * PR * [1 - UR]$   
 where  $L$  is the labour force;  $E$  is employment;  $U$  is unemployment;  $P$  is population;  $PR$  is the participation rate; and  $UR$  the unemployment rate. Taking the logarithm of the above expression, revisions in employment level projections can be approximately broken down as:  
 $\log\left(\frac{E_1}{E_0}\right) \approx \log\left(\frac{P_1}{P_0}\right) + \log\left(\frac{PR_1}{PR_0}\right) - (UR_1 - UR_0)$   
 where indices 0 and 1 refer to two distinct projection exercises.

<sup>(54)</sup> Although based on an approximation, the results of this breakdown can be used because of the small errors involved.

**Graph 2.8:** Revisions of population and employment projections, 2012 round v 2009 round, 2060 (% change)

Source: Commission services, EPC

Given the important role played by participation rate projections, Table 2.30 and Graph 2.9 focus on the extent of their revision by age group between the 2009 and 2012 exercises. Using the year 2060 for comparison, in the EU-27, participation rates are revised downwards for young (15–24) and prime-age (25–54) workers, while being revised upwards for older workers (55–64). The downward revision of the participation rate for young workers can largely be attributed to base-year effects (i.e. the 2008–09 economic recession) <sup>(55)</sup>. As already mentioned in Section 2.6 (Graph 2.4), in the framework of the CSM, a present reduction in young workers' participation rate is likely to cause future reductions in the participation

rate of prime-age workers. Likewise, Graph 2.9 suggests that a downward revision in participation rate projections for young workers today is likely to be associated with a downward revision in future participation rate projections for prime-age workers.

Since the 2009 Ageing Report, many EU Member States have legislated additional pension reforms (Box 2.1), which are projected to increase further the participation rate of older workers. Graph 2.10 clearly shows this projected upward revision for age 55 and over. In addition, the upward revision of participation rates for women is more pronounced than for men, indicating the continuation of a convergence process (e.g. the convergence of women's lower statutory retirement age to that of men's).

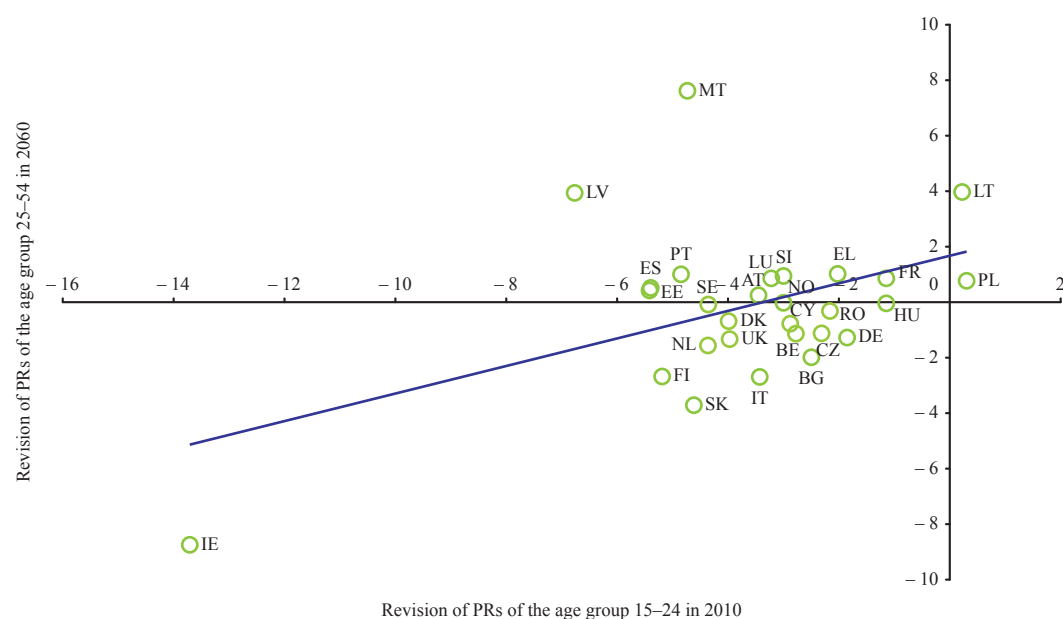
<sup>(55)</sup> And, possibly, further increases in the time spent in school.

**Table 2.30:**  
Revision of participation rate projections, 2012 round v 2009 round, 2060

	15–64	20–64	15–24	25–54	55–64	
AT	– 0.1	0.1	– 2.0	0.2	0.6	AT
BE	– 1.3	– 1.0	– 2.3	– 1.1	– 0.4	BE
BG	0.2	0.8	– 1.8	– 2.0	9.5	BG
CY	0.0	0.1	– 1.5	– 0.8	3.7	CY
CZ	– 0.5	0.0	– 2.3	– 1.1	4.9	CZ
DE	– 0.9	– 0.7	– 1.6	– 1.3	1.0	DE
DK	– 0.2	0.1	– 3.2	– 0.7	3.8	DK
EE	1.1	1.8	– 4.4	0.4	9.4	EE
ES	0.1	0.5	– 4.9	0.5	2.4	ES
FI	– 2.9	– 2.6	– 4.7	– 2.7	– 2.0	FI
FR	3.1	3.4	– 0.6	0.8	14.1	FR
EL	3.8	4.6	– 2.1	1.0	17.8	EL
HU	2.1	2.1	– 0.9	– 0.0	9.6	HU
IE	– 9.0	– 8.3	– 12.0	– 8.7	– 5.2	IE
IT	– 2.3	– 2.2	– 3.1	– 2.7	– 0.5	IT
LT	4.8	6.0	0.3	4.0	12.0	LT
LU	0.7	0.4	– 1.1	0.9	0.3	LU
LV	2.7	3.4	– 5.7	3.9	6.1	LV
MT	5.8	6.9	– 4.5	7.6	8.2	MT
NL	– 0.3	– 0.1	– 2.8	– 1.6	5.0	NL
PL	0.9	1.2	0.4	0.8	0.8	PL
PT	0.4	0.6	– 3.9	1.0	1.6	PT
RO	– 0.4	– 0.2	– 2.1	– 0.3	0.8	RO
SE	– 0.7	– 0.3	– 3.5	– 0.1	1.1	SE
SI	2.8	3.4	– 1.9	0.9	12.4	SI
SK	– 3.4	– 3.2	– 4.4	– 3.7	– 2.3	SK
UK	– 2.0	– 1.4	– 3.9	– 1.3	– 1.1	UK
NO	– 0.0	0.4	– 2.8	– 0.0	2.5	NO
EU-12	0.6	0.9	– 1.2	0.1	3.4	EU-12
EU-15	– 0.6	– 0.3	– 3.0	– 1.0	3.1	EU-15
EU-27	– 0.5	– 0.1	– 2.8	– 0.9	3.1	EU-27
EA-17	– 0.3	– 0.1	– 3.0	– 1.0	4.0	EA-17

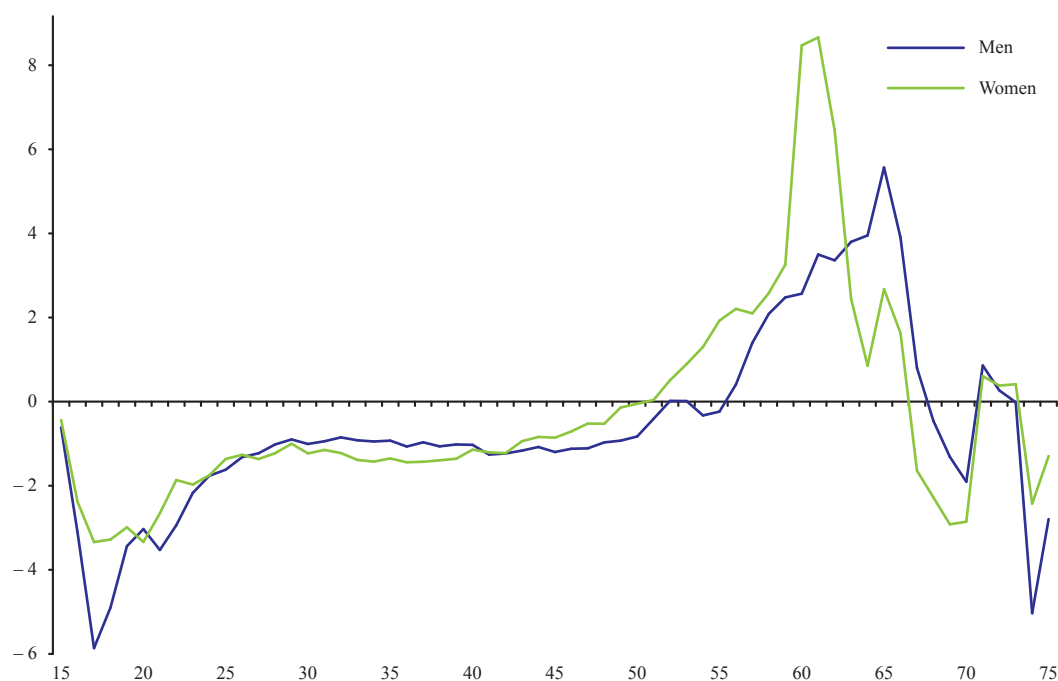
Source: Commission services, EPC

**Graph 2.9:** Revision of participation rates of age group 25–54 in 2060 against the revision of participation rates of age group 15–24 in 2010 (2012 round v 2009 round)



Source: Commission services, EPC

**Graph 2.10:** Revision of participation rates age profiles by gender, 2012 round v 2009 round, 2060 (percentage point change)



Source: Commission services, EPC

## ANNEX 2.1. PROJECTING LABOUR FORCE DEVELOPMENTS USING THE COHORT SIMULATION MODEL (CSM)

### OVERALL APPROACH OF THE CSM

The CSM calculates entry and exit rates in the labour market by gender and cohort. The methodology was initially developed at the OECD <sup>(56)</sup>, but its implementation in the Ageing Report follows Carone (2005), namely the use of single ages instead of the average of five-year age groups.

The dynamic cohort approach is based on the estimates of exit and entry rates in the labour market of a ‘synthetic’ generation/cohort. The cohort is ‘synthetic’ because, due to lack of individual longitudinal data on labour market transitions, the same individual cannot be followed over time. Instead, it is assumed that those individuals aged  $x+1$  at year  $t+1$  are representative of the same generation observed in the previous year (aged  $x$  at time  $t$ ). Due to the lack of specific information on each individual’s behaviour, this assumption neglects inflows and outflows from the labour market that cancel out <sup>(57)</sup>.

Participation rate projections are produced by applying the average entry and exit rates observed over the period 2001–10 by gender and single age to the period 2011–60. Specifically, average entry rates for the period 2001–10 are kept constant over the entire projection period. For example, average entry rates for persons aged  $x$ , calculated for the period 2001–10 (with  $x$  varying between 15 and 74 years), are applied to persons aged  $x$  over the projection horizon of 2011 to 2060 in order to calculate future participation rates. In this way, the CSM captures ‘cohort effects’, namely, those resulting from the stronger attachment of younger women of the latest cohorts to the labour market.

The CSM is also able to incorporate a broad typology of pension reforms, inter alia, increases in the statutory retirement age, the convergence of women’s lower statutory retirement age to that of men’s, the linking of the statutory retirement age to changes in life expectancy, the tightening of conditions for early retirement, and changes in (financial) incentives affecting the retirement decision. The likely impact of pension reforms is incorporated in the labour force projections by appropriately changing the average labour market exit probabilities calculated for the period 2001–10.

### THE CALCULATION OF ENTRY RATES

Entry rates into the labour market from inactivity are calculated as follows.

The calculation of the number of persons that enter the labour market (from inactivity) takes into account the size of each gender/age group. It can be expressed as:

$$NLF_x^{t+1} = (Popmax_{wa} - LF_x^t) - (Popmax_{wa} - LF_{x+1}^{t+1})$$

where  $LF_x^t + NLF_{x+1}^{t+1} \leq Popmax_{wa}$

where:

$NLF$  is the number of people expected to become active between ages  $x$  and  $x+1$ ;

$Popmax_{wa}$  is the maximum population of working age that can potentially enter the labour force (which is usually slightly lower than the overall civilian population of working age due, for example, to illness/inability); and

$LF$  is the number of active persons (in the labour force) aged  $x$  in year  $t$  and aged  $x+1$  in year  $t+1$ .

By multiplying and dividing for the population aged  $x$  at time  $t$  (which is supposed to remain the same as the population aged  $x+1$  at time  $t+1$ ), the following equation is obtained:

$$NLF_x^{t+1} = \left[ (Pr_{max} - Pr_x^t) - (Pr_{max} - Pr_{x+1}^{t+1}) \right] * Pop_x^t$$

<sup>(56)</sup> Burniaux et al. (2003) and Sherer (2002), who developed a dynamic version of Latulippe’s (1996) methodology.

<sup>(57)</sup> For example, this means that if in year  $t$  there are 100 persons aged  $x$  in the labour force and next year (when aged  $x+1$ ) these same individuals leave the labour force (for whatever reason, e.g. disillusionment, death or emigration), but they are replaced by other 100 individuals aged  $x+1$ , previously out of the labour force, we do not observe any change in the size of our ‘synthetic’ cohort. As a consequence, our calculated net rates of exit and entry are zero, while the actual (gross) value is 100 %.

where  $Pr_{max}$  is the upper limit to the participation rate (assumed 0.99 for both male and female <sup>(58)</sup>).

Thus, we can calculate the rate of entry,  $Ren$  by dividing the number of people expected to become active by the number of people inactive at time  $t$ , that is:

$$Ren = \frac{NLF_{x+1}^{t+1}}{Pop_{max_{x+1}} - LF_x^t} = \left[ (Pr_{max} - Pr_x^t) - (Pr_{max} - Pr_{x+1}^{t+1}) \right] * \frac{Pop_x^t}{Pop_{max_{x+1}} - LF_x^t}$$

which, taking into account that  $PR_x^t = \frac{Pop_x^t}{LF_x^t}$  and

$Pr_{max} = \frac{Pop_{max_{x+1}}^t}{Pop_x^t}$  can be reformulated as:

$$Ren_{x+1} = \left[ (Pr_{max} - Pr_x^t) - (Pr_{max} - Pr_{x+1}^{t+1}) \right] * \frac{1}{(Pr_{max} - Pr_x^t)}$$

$$\text{or } Ren_{x+1} = \left[ 1 - \frac{(Pr_{max} - Pr_{x+1}^{t+1})}{(Pr_{max} - Pr_x^t)} \right] \geq 0$$

$$\text{or } Ren_{x+1} = \frac{(Pr_{x+1}^{t+1} - Pr_x^t)}{(1 - Pr_x^t)} \geq 0 \text{ when } Pr_{max} = 1$$

and rearranging, we obtain the analytical formula used for projecting participation rates.

Thus, projections of participation rates based on these entry rates are:

$$PR_{x+1}^{t+1} = Ren_{x+1} * (PR_{max} - PR_x^t) + PR_x^t$$

Thus, projections of participation rates for each single-year cohort ( $x+1$ ) can be calculated by applying the entry rates observed in a given year or period over the period of projections ( $t = 2011-60$ ). In practical terms, the entry rates for each age has been calculated on the basis of the average of the participation rates observed over the period 2001-10.

## THE CALCULATION OF EXIT RATES

In the same way, when participation rates for two adjacent single-year age groups are falling, we calculate an *exit rate* (i.e. the net reduction in the labour force relative to the number of people who were initially in the labour force in the same cohort the year before) as follows.

The number of persons that leave the labour market at time  $t+1$  is equivalent to:

$$OP_x^{t+1} = LF_x^t - LF_{x+1}^{t+1}$$

where:

OP is the number of individuals expected to become inactive between age  $x$  and  $x+1$ ; and

LF is the number of active persons (in the labour force) aged  $x$  in year  $t$  and aged  $x+1$  in year  $t+1$ .

By multiplying and dividing for the population aged  $x$  at time  $t$ , which is supposed to remain the same as the population aged  $x+1$  at time  $t+1$ , we get:

$$OP_x^{t+1} = (PR_x^t - PR_{x+1}^{t+1}) * Pop_x^t$$

where  $PR$  is the appropriate participation rate.

Thus, we can calculate the (conditional) rate of exit,  $Rex$  by dividing the number of people that become inactive at time  $t+1$  by the number of people active at time  $t$ , that is,

$$Rex = \frac{OP_x^{t+1}}{LF_x^t} = (PR_x^t - PR_{x+1}^{t+1}) * \frac{Pop_x^t}{LF_x^t},$$

which can be rearranged as:

$$Rex = \frac{OP_x^{t+1}}{LF_x^t} = 1 - \frac{PR_{x+1}^{t+1}}{PR_x^t}$$

Thus, we can use this  $Rex$  to project participation rates of older workers as:

$$PR_{x+1}^{t+1} = (1 - Rex_{x+1}) * PR_x^t \text{ and}$$

$$PR_{x+n}^{t+n} = (1 - Rex_{x+1})(1 - Rex_{x+2})(1 - Rex_{x+3}) \dots * (1 - Rex_{x+n-1}) * PR_x^t$$

<sup>(58)</sup> Burniaux et al. (2003) used 0.99 (for men) and 0.95 (for women) as the maximum value for the participation rate ( $Pr_{max}$ ).

## ANNEX 2.2. ESTIMATION OF THE AVERAGE EXIT AGE FROM THE LABOUR MARKET

### AVERAGE EXIT AGE FROM THE LABOUR FORCE <sup>(59)</sup>

In order to estimate the ‘average exit age’ (or the effective retirement age) from the labour force, the CSM is used, which is basically a probabilistic model using gender/single-year participation rates. The ‘average exit age’ is included in the list of the structural indicators to monitor progress towards the Lisbon and Barcelona targets (in particular, ‘the progressive increase of about five years in the effective average age at which people stop working in the European Union by 2010’) and originally applied to a five-year age cohort. The methodology is based on the comparison of labour force participation rates over time.

The conditional probability for each person staying in the labour force at age  $a$  in year  $t$ , (conditional upon staying in the labour force in year  $t-1$ ), can be calculated using the observed activity rates (Pr) as follows:

$$\text{Probability of staying} = cProb_{a,t}^{stay} = \frac{Pr_a^t}{Pr_{a-1}^{t-1}}$$

where  $0 \leq cProb_{a,t}^{stay} \leq 1$

Thus, at time  $t$ , the conditional probability for each person exiting at age  $a$  ( $cProb_{a,t}^{ex}$ ) is simply equal to:

$$\text{Probability of exiting} = cProb_{a,t}^{ex} = 1 - \frac{Pr_a^t}{Pr_{a-1}^{t-1}} = 1 - cProb_{a,t}^{stay}$$

where  $0 \leq cProb_{a,t}^{ex} \leq 1$

Assuming that nobody retires before the minimum age  $m$  (e.g. before  $m = 60$ ), the (unconditional) probability that any person will still be in the labour force (i.e. the probability of not retiring before a given age  $a$ ) can be calculated as the product of all the conditional probabilities to stay in the labour force from age  $m$  to age  $a-1$ :

$$\begin{aligned} \text{Probability of not retiring before} \\ = Prob_{a,t}^{notret} = \prod_{i=m}^{a-1} cProb_i^{stay} \end{aligned}$$

Thus, the probability of retiring at age  $a$  can be calculated as the product of the unconditional probability of not retiring from age  $m$  to  $a$  and the (conditional) probability of exit, that is:

$$\text{Probability of retiring} = Prob_{a,t}^{ret} = Prob_{a,t}^{notret} \cdot cProb_{a,t}^{ex}$$

By assuming that everybody will be retired at a given age  $M$  (e.g.  $M = 74$ ), the sum of the probability of retiring between the minimum age  $m$  and the maximum age  $M$  is equal to 1:

$$\sum_{a=m}^M Prob_a^{ret} = 1$$

The ‘average exit age’ or effective age of retirement from the labour market is then calculated as the weighted sum of the retirement ages (between the minimum and the maximum age of retirement, say 60–74), where the weights are the probability of retiring at each age  $a$ , as follows:

$$\text{Average exit age} = Aea = \sum_{a=m}^M Prob_a^{ret} * a$$

<sup>(59)</sup> Carone (2005).



### 3. LABOUR PRODUCTIVITY AND POTENTIAL GDP

#### 3.1. BACKGROUND AND GENERAL APPROACH

##### 3.1.1. A PRODUCTION FUNCTION APPROACH FOR THE LONG-TERM PROJECTION EXERCISE

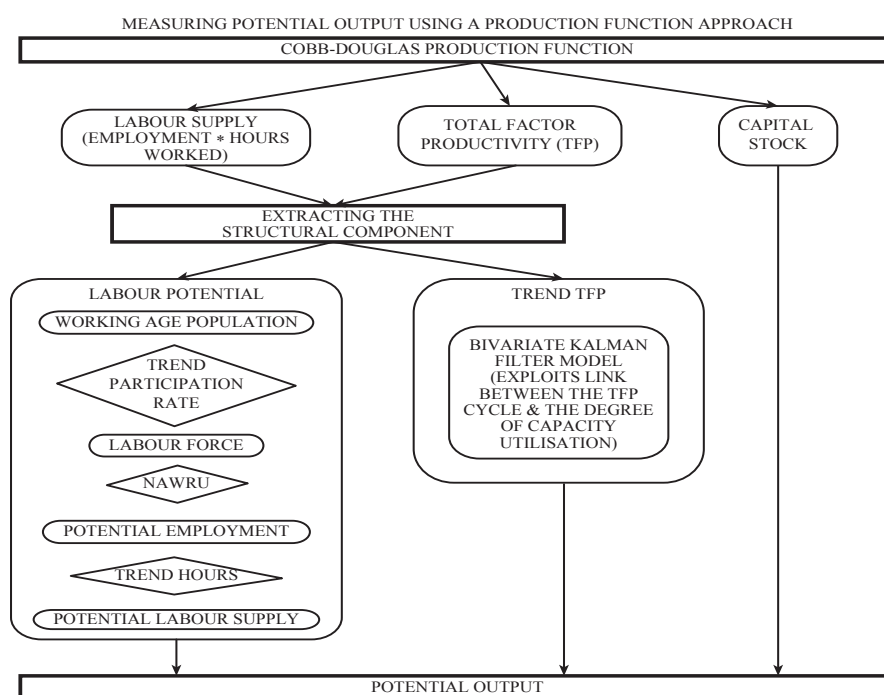
A production function framework is used in the long-term projection exercise to project long-term GDP growth, as in the 2009 Ageing Report. In this framework, demographic projections are crucial for the projection exercise of economic and budgetary developments over the long term. Indeed, the assumptions used for the population projections have a profound impact on projections for the labour force and, thus, for economic growth. In addition to the assumptions on population projections, it is necessary to make some specific statistical assumptions regarding long-term developments in each of the growth components. This framework enables an assessment of the drivers of labour productivity growth (namely total factor productivity and the capital stock per worker) while being fully consistent with the methodology developed by the EPCs Output Gap Working Group

(OGWG) and used in the work by other Council committees, notably to assess structural budgetary developments within the framework of the Stability and Growth Pact (SGP) <sup>(60)</sup>. A key assumption for the long-term projection is that of the productivity growth rate: the EPC agreed that all countries should converge to the same total factor productivity growth rate (1 %) at the end of the projection period (in 2060).

As in the previous 2009 projection exercise, total hours worked are used as labour input (as opposed to the number of persons employed used in the 2006 Ageing Report), in line with the incorporation of this variable in the production function used by the EPC's Output Gap Working Group (OGWG). In this way, the approaches by the EPC's working groups, the OGWG and the AWG, are fully aligned. Graph 3.1 illustrates the building blocks of the production function used in the projection: the methodology follows.

<sup>(60)</sup> See European Commission, Directorate-General for Economic and Financial Affairs (2010), 'Public finances in the EMU' for a discussion on the Stability and Growth Pact.

Graph 3.1: Overview of the production function approach



Source: D'Auria et al. (2010)

### 3.2. METHODOLOGY USED TO PROJECT POTENTIAL OUTPUT

#### 3.2.1. DESCRIPTION OF THE PRODUCTION FUNCTION FRAMEWORK

By using a standard specification of the Cobb-Douglas production with constant returns to scale, potential GDP can be expressed formally as total output represented by a combination of factor inputs multiplied with total factor productivity (TFP), which embeds the technological level <sup>(61)</sup>:

$$Y = TFP * L^{\beta} * K^{1-\beta} = \left( TFP^{\frac{1}{\beta}} * L \right)^{\beta} * K^{1-\beta} = (E * L)^{\beta} * K^{1-\beta}$$

where:

$Y$  is total output (GDP);

$L$  is the supply of labour (total hours worked);

$K$  is the stock of capital;

$E$  is the labour-augmenting technical progress (i.e. Harrod-neutral technical progress);

$E.L$  is then interpretable as total labour in efficiency units.  $TFP$  and the labour-augmenting technical progress are linked with a simple relationship:  $TFP = (E)^{\beta}$

$\beta$  is the labour share, i.e. the share of labour costs in total value-added, and is set at 0.65 <sup>(62)</sup>.

As a result, potential labour productivity growth comes down to the following expression (where  $Y$ ,  $L$ ,  $E$  and  $TFP$  denote potential output, potential labour, trend labour-augmenting technical progress and trend TFP):

$$\left( \frac{\dot{Y}}{Y} \right) = TFP * (1 - \beta) \left( \frac{\dot{K}}{K} \right) = \beta \dot{E} + (1 - \beta) \left( \frac{\dot{K}}{L} \right)$$

Thus, the projection of TFP growth and the growth in capital per hour worked, so-called capital deepening, are the key drivers of projected labour productivity over the medium term.

In the long term, according to the neoclassical growth model (Solow model), the economy should reach its equilibrium, also called steady-state or balanced growth path, when the ratio of capital stock to labour expressed in efficiency unit,  $K/(L.E)$ , remains constant over time. As a result, the capital stock per hour worked grows at the same pace as labour augmenting technical progress  $E$ . Therefore, labour productivity growth (i.e. output per hour worked growth) coincides with TFP growth divided by the labour share:

$$\left( \frac{\dot{Y}}{L} \right) = \left( \frac{\dot{K}}{L} \right) = \dot{E} = \frac{\dot{TFP}}{\beta}$$

It should also be noted that, in the steady state, the contribution of capital deepening to output growth is a simple function of TFP <sup>(63)</sup>, which becomes the single driver of labour productivity <sup>(64)</sup>:

$$contrib \left( \frac{\dot{K}}{L} \right) = (1 - \beta) \left( \frac{\dot{K}}{L} \right) = \frac{(1 - \beta)}{\beta} \dot{TFP}$$

As all these variables can be influenced by the business cycle in the short term, it is safer to project the potential output (i.e. the output adjusted for cyclical movements in the economy). This requires estimating the trend components for the individual production factors, except for the capital stock, which can only be adjusted in the long term.

Estimating potential output, therefore, amounts to removing the cyclical component from both TFP and labour. Trend TFP is obtained using a de-trending technique. Potential labour input is

<sup>(61)</sup> D'Auria, F., Denis, C., Havik, K., McMorrow, K., Planas, C., Raciborski, R., Röger, W., Rossi, A., *The production function methodology for calculating potential growth rates and output gaps*, European Economy, Economic Papers 420, July 2010.

<sup>(62)</sup> Although there is some debate about the recent and observed decline in the labour share, most economists assume that it will remain broadly constant in the long-term perspective. The AWG agreed to assume that real wages will grow in line with labour productivity and, thus, the wage share will be constant over the projection period. However, a variation in the short term up to 2012 was introduced, specifically allowing for a variation in the wage share up to 2012. This simple rule is uniformly applied to all Member States in order to allow for consistent cross-country comparisons of the results. The assumption is also well-founded in economic theory. If the real wage is equal to the marginal productivity of labour, it follows that under the standard features of the production function, real wage growth is equal to labour productivity growth and real unit labour costs remain constant.

<sup>(63)</sup> With the assumption of a long-term TFP growth rate equivalent to 1 % per annum (Section 1.5), this implies a long-term contribution of capital deepening to labour productivity growth equal to 0.5 % and, hence, a labour productivity growth rate of 1.5 %.

<sup>(64)</sup> This, in turn, implies that, in the long term, the growth rate of the capital stock is set equal to the sum of the growth rate of labour and labour-augmenting technological progress, the so-called Capital rule.

the total labour obtained when the unemployment rate equals the structural unemployment rate (NAWRU). It equals  $LF \cdot (1 - \text{NAWRU}) \cdot \text{Hours}$ , where  $LF$  stands for total labour force and  $\text{Hours}$  for the average hours worked per worker. The potential output denoted by  $Y_p$  can be expressed logarithmically as the sum (logarithmically) of *trend TFP*, potential labour input weighted by the labour share in total value-added and the total capital stock multiplied by one minus the labour share. More formally, we get:

$$\text{Log}(Y_p) = \text{Log}(\text{trendTFP}) + \beta \text{Log}(LF \cdot (1 - \text{Nawru}) \cdot \text{Hours}) + (1 - \beta) \text{logK}$$

### 3.3. SPECIFIC ASSUMPTIONS ON THE COMPONENTS OF THE PRODUCTION FUNCTION IN THE SHORT TERM (2011–15)

The production function approach is applied to historical (starting in the mid 1960s) and forecast data. The series have been taken from the Directorate-General for Economic and Financial Affairs's AMECO (annual macroeconomic) database: for 2011–12, Commission services' spring 2011 forecast was used; for 2013–15, the medium-term extension was used <sup>(65)</sup>.

<sup>(65)</sup> The EPC decided that the long-term projections for the 2012 Ageing Report should take the Commission's spring 2011 forecast to 2012 as a starting point for the potential growth projections, and also to use the extrapolation for the following three years (to 2015) under the agreed OGWG methodology. The potential growth estimates using the OGWG methodology includes a medium-term extension (for the years  $t+3$  to  $t+5$ ) on the basis of a number of assumptions, including transparent autoregressive integrated moving average (ARIMA) procedures, specifically: (i) the TFP trend is estimated from the Solow residual by using a bivariate Kalman filter method that exploits the link between the TFP cycle and capacity utilisation; (ii) the trend for the NAWRU is estimated according to the following rule:  $\text{NAWRU}_{t+1} = \text{NAWRU}_t + 0.5 \cdot (\text{NAWRU}_t - \text{NAWRU}_{t-1})$ ; (iii) the population of working age follows Eurostat's latest demographic projection; (iv) the average hours worked series is extended using an ARIMA process; (v) the investment to potential GDP series is used as an exogenous variable, while investment itself is made endogenous, using an autoregressive (AR) process that allows for a constant and a time trend. For a constant investment to GDP ratio, investment responds to potential output with an elasticity equal to one. As regards the NAWRU estimation, it has been shown to exhibit a considerable degree of persistence. Given the recent financial crisis-induced increase of the NAWRU in various countries, this rule implies a further increase of the NAWRU in the medium term.

### 3.4. SPECIFIC ASSUMPTIONS ON THE COMPONENTS OF THE PRODUCTION FUNCTION IN THE LONGER TERM (2016–60)

Three principles were adhered to when carrying out the long-term projections.

- Firstly, the need to ensure consistency between the medium-term projection based on country-specific trends and the long-term projection based on convergence rules toward the same value of labour productivity at the end of the projection horizon. There is also an overriding constraint to ensure comparability across the EU through the use of a common methodology for all Member States.
- Secondly, as the cross-country comparability of results entails similar assumptions of productivity at the end of the projection, a key issue is whether this convergence should be achieved in growth rates or levels. While economic theory shows that real convergence is conditional on crucial parameters such as the savings rate and demographic developments, the empirical literature does not support the idea of absolute convergence in levels between countries <sup>(66)</sup>. Thus, the AWG decided to continue assuming that there should be convergence in *growth rates* over the long-term projection exercise. However, the GDP level matters as well, through its influence on the convergence speed (Table 3.2).
- Thirdly, there were large differences of opinion regarding the need for strict convergence to the same growth rate of labour productivity in the long-term across countries. On the one hand, it could be argued that a convergence rule is important to ensure comparability of the age-related pension expenditure calculations. On the other hand, it could be reasonable to assume persistent differences also in the very long term, with these differences reflecting the different starting levels and growth rates of respective countries,

<sup>(66)</sup> Some exercises were run in the AWG that showed some convergence in levels in past periods but the growth rate needed to allow for this convergence in the projections would not be plausible in the short and medium term.

different assumptions on convergence in growth rates and, finally, the huge diversity in the EU. As a compromise, the EPC-AWG decided that the TFP projections should converge to the same growth rate in the long term. At the same time, account should be taken of the catch-up potential in Member States with relatively low income levels by allowing for a certain period of 'fast' convergence.

### 3.5. THE KEY ASSUMPTION ON TOTAL FACTOR PRODUCTIVITY DEVELOPMENTS

In the long term, the growth in labour productivity (output per hour worked) broadly coincides with the total factor productivity (TFP) growth divided by the labour share (set at 0.65). Hence, a prudent assumption for TFP would be that country-specific TFP growth rates would converge to the long-term historical average TFP growth rate recorded in the EU of 1 %, which represents a slight downward revision of 0.1 percentage point relative to the assumption made in the previous round. As a result of this assumption, the growth rate in labour productivity is projected to be 1.5 % in the long term.

The Ageing Working Group held a series of discussions in 2010–11 on the crucial assumptions on productivity growth and, specifically, the relative merits of whether there should be a convergence in productivity growth rate or productivity levels were discussed at great length. In particular, should one assume that a convergence would actually materialise, and if so, should that convergence be in terms of levels or in the growth rate?

As a result of the discussion, it was decided that the speed of convergence to this long-term TFP growth rate is to be determined by the relative income position in the different Member States. Specifically, it was assumed that the lower the GDP per capita at present, the greater the real catch-up potential.

**Table 3.1:**  
Potential GDP per capita (2010)

Country	GDP	
	per capita (PPS)	% of EU-27
LU	56.4	257
NL	28.8	131
SE	28.8	131
IE	28.6	130
AT	28.4	130
FI	27.2	124
DK	26.9	123
BE	26.6	121
UK	26.0	119
DE	25.3	115
FR	24.1	110
EA-17	23.6	108
IT	22.2	101
<b>EU-27</b>	<b>21.9</b>	<b>100</b>
ES	21.0	96
EL	20.6	94
SI	20.4	93
CY	19.6	89
MT	18.1	82
CZ	17.8	81
PT	16.0	73
SK	15.4	70
EE	13.9	63
PL	13.6	62
HU	13.6	62
LT	13.1	60
LV	11.7	53
BG	9.2	42
RO	8.1	37

Source: Commission services, EPC

Note: This is the potential GDP per capita expressed in 2000 PPS, estimated on the basis of the Commission's spring 2011 forecast.

As regards the transition to this long-term rate, Member States with per capita GDP higher than the EU average would converge to this long-term growth rate by 2025. Simultaneously, to allow for the catch-up potential (the real convergence process) for countries with below average per capita GDP, real convergence would be allowed at a pace that depends inversely on the gap to the 'leaders', but not involving an excessive amount of 'leapfrogging' (Table 3.2).

The assumptions agreed by the EPC in spring 2011 were as follows:

- the ‘leaders’ are the group of countries that have a GDP per capita above the EU-27 average in 2010; for these countries, TFP growth is assumed to converge to a 1 % growth rate by 2025;
- the ‘followers’ are the group of countries are those with GDP per capita below the EU-27 average in 2010; for this group of countries, a differentiation is made depending on the distance to the EU-27 average in 2010, as shown in Table 3.1.

For the sake of simplicity, the assumptions on TFP growth do not take into account specific effects of the ageing population, as TFP is supposed to be exogenous. In particular, while rising participation, which is likely to benefit less skilled workers or those without work experience, may depress TFP, the projected rise in educational attainment can be expected to enhance TFP growth. Likewise, the change in the age structure of the working population may weigh down on TFP, given the observed

age profile of productivity. Nonetheless, available studies suggest that older workers are not systematically less productive than younger ones, the main factor being the level of education <sup>(69)</sup>. Some also argue that older workers may be less flexible and more reluctant to accept innovation and technological changes. Given that a great deal of uncertainty is attached to this, this dimension has not been included in productivity projections.

### 3.6. CAPITAL FORMATION

Up to 2015, the so-called Investment rule is applied: capital stocks are derived from the ratio of investment to GDP ratio until 2015, duly taking depreciation into account. This scenario may also work very well for the EU-15 Member States in the medium and long term, but would lead to excessively optimistic investment performances in a number of new EU Member States, since it would imply extrapolating very high investment rates which are associated with the structural transition process. Moreover, this rule is fine provided that the user’s cost of capital remains stable, which should not be the case with a declining economic growth rate

**Table 3.2:**  
Assumptions on speed of convergence and criteria for selection

	Countries	Years (from/to)	Values	Years (from/to)	Values	Years (from/to)	Values
<b>‘Leaders’ (per capita GDP higher than the EU average)<sup>(67)</sup></b>							
Above 100 %	AT, BE, DE, DK, FI, FR, IE, IT, LU, NL, NO, SE, UK	2016 (t+6) to 2025	From value in 2015 (t+5) to 1 %, by linear interpolation	2026 to 2040	1 %	2041 to 2060	1 %
<b>‘Followers’ (per capita GDP relative to the EU average)</b>							
Between 50 and 100 %	CY, CZ, EE, ES, EL, HU, LT, LV, MT, PL, PT, SI, SK	2016 (t+6) to 2030	From value in 2015 (t+5) to $2\% - \frac{GDP_{i,t+5}}{GDP_{eu,t+5}}$ , by linear interpolation <sup>(68)</sup>	2031 to 2040	$2\% - \frac{GDP_{i,t+5}}{GDP_{eu,t+5}}$	2041 to 2060	From $2\% - \frac{GDP_{i,t+5}}{GDP_{eu,t+5}}$ to 1 %, by linear interpolation
Below 50 %	BG, RO	2016 (t+6) to 2030	From value in 2015 (t+5) to 1.5 %, by linear interpolation	2031 to 2040	1.5 %	2041 to 2060	From 1.5 to 1 %, by linear interpolation

<sup>(67)</sup> Potential real per capita GDP expressed in PPS (Directorate-General for Economic and Financial Affairs’s Economic forecast, spring 2011).

<sup>(68)</sup> Between 1 and 1.5 %: where  $GDP_{i,t}$  is per capita GDP in country i and year t; and  $GDP_{eu,t}$  is the average per capita output in the EU in year t. Originally, this formula was

$$\text{presented as } 1.5\% * \left(1 - \frac{GDP_{i,t+5}}{GDP_{eu,t+5}}\right) + 1\% * \left(\frac{GDP_{i,t+5}}{GDP_{eu,t+5}} - 0.5\right), \text{ which}$$

$$\text{can be simplified to } 2\% - \frac{GDP_{i,t+5}}{GDP_{eu,t+5}}$$

Source: Commission services, EPC

<sup>(69)</sup> For a survey of the literature and some estimates of the potential impact of ageing on productivity, see Carone, G., Denis, C., McMorrow, K., Moure, G., Röger, W. (2006) and European Commission (2005).



associated with ageing. Lastly, this rule may lead to fluctuating capital deepening at the end of the projection horizon, while neoclassical growth models predict that the capital stock per worker should broadly follow the labour-augmenting technical progress in the long term.

Therefore, it is assumed in the projections that in the long term, the capital stocks adjust to the steady state path according to the Capital rule: the growth rate of the capital stock is set equal to the sum of growth rate of labour and labour augmenting technical progress. As seen in Section 3.2, this fulfils the steady state property, as the ratio of capital stock to labour expressed in efficiency unit remains constant over time. Consequently, the labour productivity growth coincides with that of labour-augmenting technical progress.

Nonetheless, this would lead to very sharp shifts in investment rates for a large number of countries in the year in which the rule is introduced. For example, the introduction of the rule in 2016 would result in pessimistic productivity projections for a large number of the catching-up Member States whilst making little difference for those countries which are already close to their long-term TFP growth rate.

Therefore, a transition between the Investment rule and the Capital rule is applied to smooth the profile of investment. The following pattern for capital formation has been used:

- the capital stock dynamics is derived from the investment/GDP ratio until 2015 (Investment rule);
- the transition to the constant capital/labour (in efficiency units) ratio assumption is introduced gradually over the period 2016–20 in a linear manner (Transition rule);
- the capital/labour (in efficiency units) ratio is constant from 2021 onwards (Capital rule).

### 3.7. TAKING ACCOUNT OF THE CYCLICAL POSITION OF THE ECONOMY IN LONG-TERM PROJECTIONS

Over a short to medium-term horizon, there is a need to take account of the cyclical position of the economy, so as to bridge the current

situation and the longer-term prospects. This is of particular importance at the current juncture, where nearly all Member States have large output gaps. In terms of the preparation of the long-term projection exercise, the issue of the cyclical position was highlighted in the work programme for the 2012 long-term budgetary projection exercise <sup>(70)</sup>. Specifically, ‘linking the starting point (base year) with the assumed longer-term potential GDP growth may be considered by, for example, assuming that a (possible) output gap should be closed over a number of years, country by country’.

A procedure for closing the output gap so as to take better account of the cyclical position of the EU economies in the short term has been agreed by the AWG and endorsed by the EPC.

In relation to the need to produce actual, as opposed to potential, growth rate projections, the following operational rules will be applied by the AWG for closing the output gap. Firstly, the default rule is that the output gap is closed at the end of the medium term (i.e. 2015, based on the spring 2011 Commission forecast). Secondly, in circumstances where the output gap is small at the end of the short-term forecasts (2012), the gap could be closed by 0.5 percentage point a year. Finally, when the output gap is particularly large (i.e. more than double the EU average), a longer period of closure would be allowed, up to a maximum of two additional years. Specifically, on the basis of the spring 2011 forecast, all Member States are assumed to close the output gap in 2015 except Greece, where it is assumed to be closed in 2017.

### 3.8. MAIN RESULTS OF BASELINE GDP PROJECTIONS

Tables 3.3 to 3.8 present the outcome of the projections for potential growth rates up to 2060 as well as its determinants. In the EU as a whole, the annual average potential GDP growth rate is projected to remain quite stable over the long term (Table 3.3). After an average potential growth of 1.5 % up to 2020, a slight increase to 1.6 % is projected over the period 2021–30 and over the remainder of the

<sup>(70)</sup> Work programme for the 2012 long-term budgetary projection exercise, ECFIN/EPC/2010//46671-REV, 5.3.2010, adopted by the EPC 4 March 2010.

**Table 3.3:**  
Projected potential growth rates (annual average growth rates)

Potential GDP growth rate — Period average						
Country	2010–20	2021–30	2031–40	2041–50	2051–60	2010–60
BE	1.5	1.5	1.7	1.7	1.7	1.6
BG	1.9	1.3	1.4	0.9	0.9	1.3
CZ	2.0	1.7	1.6	1.3	1.1	1.5
DK	1.0	1.5	1.5	1.7	1.6	1.4
DE	1.2	0.7	0.6	0.8	0.8	0.8
EE	1.4	2.2	1.8	1.1	0.9	1.5
IE	1.2	3.2	2.2	1.7	2.2	2.1
EL	0.2	1.2	1.2	1.1	1.3	1.0
ES	1.3	2.6	1.5	1.1	1.4	1.6
FR	1.7	1.8	1.6	1.6	1.6	1.7
IT	0.8	1.4	1.2	1.3	1.4	1.2
CY	1.6	2.0	2.3	1.8	1.5	1.8
LV	0.8	2.3	1.5	0.7	0.5	1.1
LT	1.1	1.8	1.7	1.2	0.7	1.3
LU	2.6	1.8	1.8	1.7	1.7	1.9
HU	0.8	1.8	1.4	1.0	0.9	1.2
MT	1.8	1.9	1.7	1.1	0.8	1.4
NL	1.4	1.1	1.2	1.4	1.3	1.3
AT	1.6	1.3	1.4	1.4	1.3	1.4
PL	3.1	1.7	1.4	0.8	0.6	1.5
PT	0.4	1.9	1.5	1.2	1.1	1.2
RO	1.7	1.3	1.2	0.7	0.5	1.1
SI	1.8	1.5	1.2	0.9	1.1	1.3
SK	3.1	2.3	1.2	0.7	0.8	1.6
FI	1.7	1.4	1.6	1.5	1.4	1.5
SE	1.9	1.8	1.8	1.7	1.6	1.8
UK	1.8	1.9	1.9	1.9	1.7	1.9
NO	2.4	1.9	1.8	1.8	1.7	1.9
EA	1.3	1.5	1.2	1.2	1.3	1.3
EU-27	1.5	1.6	1.4	1.3	1.3	1.4

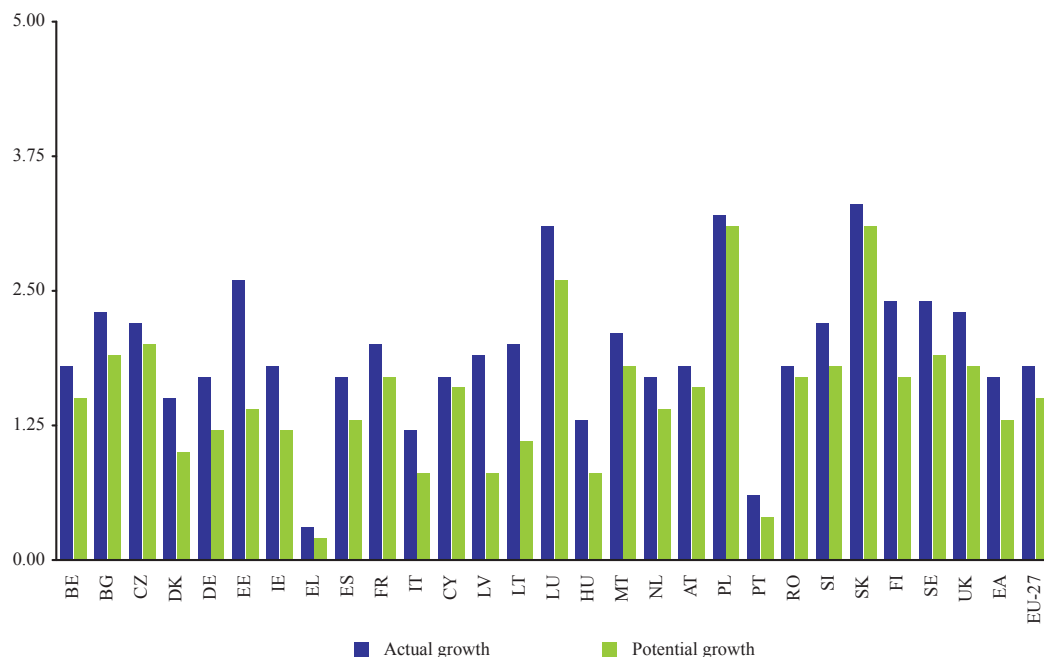
Source: Commission services, EPC

Note: For Ireland, Greece and Portugal, the potential GDP projections do not incorporate the impact of the measures that are envisaged to be implemented under the economic adjustment programmes agreed with the EU, IMF and ECB.

projection period up to 2060, a slow down to 1.3 % emerges. Over the whole period 2010–60, output growth rates in the euro area are very close to those in the EU-27 (though consistently lower by about 0.1 percentage point), as the former represents more than two thirds of the EU-27 total output. Notwithstanding this, the potential growth rate in the euro area is projected to be slightly lower than for the EU-27 throughout the projection period.

Taking account of the negative output gaps prevailing in the EU Member States, GDP growth is assumed to be higher than the potential growth rates until the output gap is closed (in 2015, Section 3.7). For the EU as a whole and the euro area, GDP growth is assumed to be 0.4 percentage point higher than the potential growth rates over the period 2010–20. There are, however, significant differences across Member States (Graph 3.2).

Graph 3.2: Actual and potential GDP growth (2010–20)



Source: Commission services, EPC

For the EU-27, labour productivity growth is projected to increase up to the 2020s and remain fairly stable at around 1.5 % thereafter throughout the projection period (Table 3.4). The small increase in the period up to the 2040s is due to the assumed higher productivity growth in the Member States assumed to have catch-up potential. Eventually, in 2060, all Member States are assumed to reach the same productivity growth of 1.5 %. Since the starting point of productivity growth in the euro area is below the assumed long-term EU average of 1.5 % annual growth, this leads to a higher assumed increase in productivity growth up to the 2030s.

**Table 3.4:**  
Determinants of potential growth: labour productivity per hour (annual average growth rates)

Labour productivity per hour growth rate — Period average						
Country	2010–20	2021–30	2031–40	2041–50	2051–60	2010–60
BE	1.0	1.5	1.5	1.5	1.5	1.4
BG	2.9	2.3	2.3	2.1	1.7	2.3
CZ	2.2	1.9	1.8	1.8	1.6	1.9
DK	1.1	1.5	1.5	1.5	1.5	1.4
DE	1.2	1.5	1.5	1.5	1.5	1.5
EE	2.5	2.1	2.1	2.0	1.7	2.1
IE	1.9	1.6	1.5	1.5	1.5	1.6
EL	–0.2	1.2	1.6	1.6	1.6	1.1

**Labour productivity per hour growth rate — Period average**

Country	2010–20	2021–30	2031–40	2041–50	2051–60	2010–60
ES	1.0	1.2	1.6	1.6	1.6	1.4
FR	1.3	1.5	1.5	1.5	1.5	1.5
IT	0.4	1.4	1.5	1.5	1.5	1.3
CY	0.8	1.3	1.7	1.7	1.6	1.4
LV	2.5	2.1	2.3	2.1	1.7	2.1
LT	2.0	1.9	2.2	2.0	1.7	1.9
LU	1.4	1.5	1.5	1.5	1.5	1.5
HU	1.1	1.6	2.1	2.0	1.7	1.7
MT	1.5	1.7	1.8	1.7	1.6	1.7
NL	1.3	1.5	1.5	1.5	1.5	1.5
AT	1.4	1.5	1.5	1.5	1.5	1.5
PL	2.8	2.2	2.1	2.0	1.7	2.2
PT	0.3	1.5	2.0	1.8	1.6	1.4
RO	2.3	2.1	2.3	2.1	1.7	2.1
SI	1.8	1.5	1.7	1.6	1.6	1.6
SK	3.3	2.3	2.0	1.9	1.6	2.3
FI	2.0	1.6	1.5	1.5	1.5	1.7
SE	1.4	1.5	1.5	1.5	1.5	1.5
UK	1.7	1.6	1.5	1.5	1.5	1.6
NO	1.8	1.6	1.5	1.5	1.5	1.6
EA	1.1	1.4	1.6	1.6	1.5	1.4
EU-27	1.3	1.6	1.6	1.6	1.6	1.5

Source: Commission services, EPC

Labour input — total hours worked — in the EU and in the euro area is projected to be positive



up to the late 2020s. Thereafter, the projected demographic changes, with a reduction in the size of the labour force stemming from the decline in the working-age population, are projected to lead to negative labour growth for the remainder of the projection period up to 2060. Hence, labour will act as a drag on growth in both the EU and the euro area, and most Member States, from 2030 onwards. The only exceptions are Belgium, Ireland, Spain, France, Cyprus, Luxembourg (due to cross-border workers), Sweden, and the United Kingdom.

**Table 3.5:**  
Determinants of potential growth: total hours worked  
(annual average growth rates)

Total hours worked growth rate — Period average						
Country	2010–20	2021–30	2031–40	2041–50	2051–60	2010–60
BE	0.5	0.0	0.2	0.2	0.2	0.2
BG	–0.9	–1.0	–0.9	–1.2	–0.8	–1.0
CZ	–0.2	–0.2	–0.3	–0.5	–0.5	–0.3
DK	–0.1	0.0	–0.1	0.2	0.0	0.0
DE	0.0	–0.8	–0.9	–0.7	–0.8	–0.6
EE	–1.0	0.1	–0.3	–0.8	–0.7	–0.6
IE	–0.6	1.6	0.6	0.2	0.7	0.5
EL	0.4	0.0	–0.4	–0.5	–0.2	–0.1
ES	0.3	1.4	–0.1	–0.5	–0.1	0.2
FR	0.3	0.3	0.1	0.0	0.1	0.2
IT	0.3	0.0	–0.3	–0.2	–0.1	–0.1
CY	0.8	0.7	0.6	0.1	–0.1	0.4
LV	–1.6	0.2	–0.8	–1.4	–1.2	–1.0
LT	–0.8	–0.1	–0.5	–0.8	–1.0	–0.7
LU	1.2	0.3	0.2	0.2	0.1	0.4
HU	–0.4	0.2	–0.7	–1.0	–0.8	–0.5
MT	0.2	0.2	–0.2	–0.7	–0.8	–0.2
NL	0.0	–0.4	–0.3	–0.1	–0.2	–0.2
AT	0.1	–0.2	–0.1	–0.2	–0.3	–0.1
PL	0.4	–0.6	–0.8	–1.2	–1.1	–0.6
PT	0.0	0.4	–0.4	–0.6	–0.5	–0.2
RO	–0.5	–0.8	–1.1	–1.4	–1.2	–1.0
SI	–0.0	–0.0	–0.4	–0.7	–0.5	–0.3
SK	–0.2	0.0	–0.8	–1.2	–0.9	–0.6
FI	–0.3	–0.2	0.0	–0.1	–0.1	–0.1
SE	0.5	0.2	0.3	0.2	0.0	0.2
UK	0.1	0.3	0.4	0.4	0.2	0.3
NO	0.8	0.3	0.3	0.3	0.2	0.4
EA	0.2	0.1	–0.3	–0.3	–0.2	–0.1
EU-27	0.1	0.0	–0.3	–0.3	–0.3	–0.2

Source: Commission services, EPC

Tables 3.6 and 3.7 show the contribution of the main determinants of labour productivity (per hour worked) (i.e. TFP growth and

capital deepening). Trends in TFP growth explains most of productivity growth per hour worked. The increase in TFP growth in the EU as a whole follows from the assumption that countries with catch-up potential are assumed to experience a period of higher TFP growth during the projection period, primarily between 2030 to 2040 (Section 3.5). This follows from the fact that, in the long term, the capital deepening contribution follows TFP growth (times the labour share). By assumption, TFP growth converges toward the rate of 1 % by 2060 for all Member States. Given the use of the Capital rule, this implies a labour productivity growth rate of 1.5 % for all Member States in 2060.

For the countries with a relatively low GDP per capita (Section 3.6), the capital deepening contribution is very high in the first part of the projection period, reflecting the assumed catching-up process of converging economies. Then, the contribution gradually declines to the steady state value of 0.5 percentage point, as the growth in the capital stock adjusts to growth in hours worked.

**Table 3.6:**  
Determinants of labour productivity: total factor  
productivity (annual average growth rates)

TFP growth rate — Period average						
Country	2010–20	2021–30	2031–40	2041–50	2051–60	2010–60
BE	0.7	1.0	1.0	1.0	1.0	0.9
BG	1.3	1.5	1.5	1.4	1.1	1.4
CZ	1.3	1.2	1.2	1.1	1.0	1.2
DK	0.6	1.0	1.0	1.0	1.0	0.9
DE	0.7	1.0	1.0	1.0	1.0	0.9
EE	1.1	1.4	1.4	1.3	1.1	1.2
IE	1.1	1.0	1.0	1.0	1.0	1.0
EL	0.1	0.8	1.1	1.0	1.0	0.8
ES	0.2	0.8	1.0	1.0	1.0	0.8
FR	0.8	1.0	1.0	1.0	1.0	0.9
IT	0.2	0.9	1.0	1.0	1.0	0.8
CY	0.2	0.8	1.1	1.1	1.0	0.8
LV	1.0	1.4	1.5	1.3	1.1	1.2
LT	0.7	1.2	1.4	1.3	1.1	1.1
LU	0.7	1.0	1.0	1.0	1.0	0.9
HU	0.2	1.0	1.4	1.3	1.1	1.0
MT	1.0	1.1	1.2	1.1	1.0	1.1
NL	0.9	1.0	1.0	1.0	1.0	1.0
AT	0.9	1.0	1.0	1.0	1.0	1.0
PL	1.5	1.4	1.4	1.3	1.1	1.3
PT	0.2	1.0	1.3	1.2	1.1	0.9
RO	1.0	1.4	1.5	1.4	1.1	1.3
SI	0.8	1.0	1.1	1.1	1.0	1.0
SK	2.0	1.5	1.3	1.2	1.1	1.4
FI	1.4	1.1	1.0	1.0	1.0	1.1
SE	0.9	1.0	1.0	1.0	1.0	1.0
UK	1.1	1.0	1.0	1.0	1.0	1.0
NO	1.2	1.0	1.0	1.0	1.0	1.1
EA	0.6	0.9	1.0	1.0	1.0	0.9
EU-27	0.7	1.0	1.1	1.0	1.0	1.0

Source: Commission services, EPC

**Table 3.7:**  
Determinants of labour productivity: capital deepening

K deepening						
Country	2010–20	2021–30	2031–40	2041–50	2051–60	2010–60
BE	0.4	0.5	0.5	0.5	0.5	0.5
BG	1.5	0.8	0.8	0.7	0.6	0.9
CZ	0.9	0.7	0.6	0.6	0.6	0.7
DK	0.4	0.5	0.5	0.5	0.5	0.5
DE	0.5	0.5	0.5	0.5	0.5	0.5
EE	1.4	0.7	0.7	0.7	0.6	0.8
IE	0.8	0.5	0.5	0.5	0.5	0.6
EL	–0.3	0.4	0.6	0.6	0.5	0.3
ES	0.8	0.4	0.6	0.6	0.5	0.6
FR	0.6	0.5	0.5	0.5	0.5	0.5
IT	0.2	0.5	0.5	0.5	0.5	0.5
CY	0.5	0.4	0.6	0.6	0.6	0.5
LV	1.5	0.7	0.8	0.7	0.6	0.9
LT	1.3	0.7	0.8	0.7	0.6	0.8
LU	0.7	0.5	0.5	0.5	0.5	0.6
HU	0.9	0.6	0.7	0.7	0.6	0.7
MT	0.5	0.6	0.6	0.6	0.6	0.6
NL	0.5	0.5	0.5	0.5	0.5	0.5
AT	0.5	0.5	0.5	0.5	0.5	0.5
PL	1.3	0.8	0.7	0.7	0.6	0.8
PT	0.2	0.5	0.7	0.6	0.6	0.5
RO	1.2	0.7	0.8	0.7	0.6	0.8
SI	1.0	0.5	0.6	0.6	0.5	0.7
SK	1.3	0.8	0.7	0.7	0.6	0.8
FI	0.6	0.6	0.5	0.5	0.5	0.6
SE	0.5	0.5	0.5	0.5	0.5	0.5
UK	0.6	0.5	0.5	0.5	0.5	0.6
NO	0.5	0.6	0.5	0.5	0.5	0.5
EA	0.5	0.5	0.6	0.6	0.5	0.5
EU-27	0.6	0.6	0.6	0.6	0.6	0.6

Source: Commission services, EPC

Table 3.8 presents the projections for GDP per capita growth rates over the period 2010–60. As expected, following the projected increase in output per capita in both the EU-27 and the euro area up to the late 2030s, the projected

per capita growth is somewhat higher than the projected potential output growth, since total population is projected to decrease from that point onwards.

**Table 3.8:**  
Projected GDP per capita growth rates (period averages)

GDP per capita growth rate								
Country	GDP per capita growth rate					GDP per capita (PPS)		
	2010–20	2021–30	2031–40	2041–50	2051–60	2010–60	2010	2060
BE	1.0	1.0	1.3	1.4	1.5	1.2	26.6	48.4
BG	2.5	2.1	2.0	1.5	1.6	1.9	9.2	24.1
CZ	1.7	1.7	1.7	1.3	1.3	1.6	17.8	38.3
DK	0.6	1.2	1.3	1.6	1.5	1.2	26.9	50.7
DE	1.4	1.0	1.0	1.4	1.4	1.3	25.3	47.2
EE	1.6	2.5	2.1	1.4	1.3	1.8	13.9	34.1
IE	0.5	2.3	1.3	1.0	1.7	1.3	28.6	56.9
EL	–0.3	1.2	1.2	1.1	1.6	0.9	20.6	34.3
ES	0.9	2.2	1.1	0.9	1.5	1.3	21.0	40.8
FR	1.0	1.4	1.3	1.5	1.5	1.4	24.1	48.2
IT	0.3	1.2	1.0	1.3	1.6	1.1	22.2	38.3
CY	0.2	1.1	1.7	1.3	1.1	1.0	19.6	34.3
LV	1.4	2.9	2.1	1.3	1.2	1.8	11.7	28.5
LT	1.6	2.2	2.1	1.6	1.2	1.7	13.1	31.2
LU	1.2	1.0	1.1	1.2	1.3	1.2	56.4	101.6
HU	0.7	2.0	1.7	1.3	1.2	1.4	13.6	27.6
MT	1.8	1.9	1.9	1.3	1.0	1.6	18.1	39.6
NL	0.9	0.9	1.2	1.5	1.5	1.2	28.8	53.3
AT	1.2	1.0	1.3	1.4	1.4	1.3	28.4	53.7
PL	2.9	1.9	1.8	1.2	1.1	1.8	13.6	33.0
PT	0.3	1.8	1.6	1.4	1.4	1.3	16.0	30.7
RO	2.0	1.7	1.6	1.2	1.2	1.5	8.1	17.2
SI	1.4	1.5	1.3	1.1	1.4	1.3	20.4	39.1
SK	2.8	2.3	1.4	1.0	1.2	1.8	15.4	36.3
FI	1.3	1.2	1.5	1.5	1.4	1.4	27.2	54.0
SE	1.1	1.3	1.5	1.4	1.3	1.3	28.8	55.7
UK	1.0	1.3	1.5	1.5	1.4	1.4	26.0	51.9
NO	1.3	1.1	1.3	1.4	1.4	1.3	28.6	54.9
EA-17	1.0	1.3	1.2	1.3	1.5	1.2	23.6	44.4
EU-27	1.1	1.4	1.3	1.4	1.5	1.4	21.9	43.5

Source: Commission services, EPC

### 3.9. CROSS-COUNTRY DIFFERENCES

While almost all EU Member States are projected to experience a more or less marked slowdown in their potential growth rates in the future, owing to the adverse impact of demographic developments, growth rates differ substantially from country to country, as shown in Table 3.3. In the first half of the projection period, productivity growth is the main source of discrepancy across countries, reflecting different productivity growth rates at the outset of the projection and the assumed differentiated paths of productivity growth, reflecting the catch-up potential. In the latter part of the projection

period, developments in labour input have a more dominant role, primarily due to different demographic developments and the assumptions made on productivity growth rate convergence.

### 3.10. SOURCES OF GROWTH

The sources of GDP growth will alter dramatically. Labour will make a positive contribution to growth in both the EU and the euro area up to the 2020s, but turn significantly negative thereafter (Table 3.5). Over time, productivity will become the dominant source of growth.

**Table 3.9:**  
Disaggregation of potential GDP growth, 2010–60

Country	GDP growth 2010–60	Due to:								GDP per capita growth 2010–60
		Labour productivity (GDP per hour worked)	TFP	Capital deepening	Labour input	Total population	Employment rate	Share of Working age population	Change in average hours worked	
	1=2+5	2=3+4	3	4	5=6+7 +8+9	6	7	8	9	10=1–6
BE	1.63	1.42	0.9	0.5	0.22	0.4	–0.1	–0.1	0.01	1.24
BG	1.32	2.27	1.4	0.9	–0.95	–0.6	–0.0	–0.3	–0.01	1.94
CZ	1.55	1.87	1.2	0.7	–0.32	–0.0	–0.0	–0.3	0.01	1.56
DK	1.45	1.43	0.9	0.5	0.02	0.2	–0.0	–0.1	0.01	1.25
DE	0.84	1.46	0.9	0.5	–0.62	–0.4	0.1	–0.3	–0.02	1.25
EE	1.50	2.07	1.2	0.8	–0.57	–0.3	–0.1	–0.2	0.03	1.76
IE	2.10	1.62	1.0	0.6	0.48	0.8	–0.1	–0.2	–0.04	1.34
EL	1.00	1.13	0.8	0.3	–0.13	0.1	0.0	–0.3	0.03	0.93
ES	1.58	1.38	0.8	0.6	0.20	0.3	0.2	–0.3	0.01	1.32
FR	1.65	1.49	0.9	0.5	0.17	0.3	0.0	–0.1	–0.01	1.36
IT	1.22	1.27	0.8	0.5	–0.05	0.2	0.0	–0.2	0.01	1.06
CY	1.83	1.38	0.8	0.5	0.45	0.8	–0.2	–0.2	0.03	1.05
LV	1.14	2.13	1.2	0.9	–0.99	–0.6	–0.0	–0.3	–0.08	1.75
LT	1.29	1.95	1.1	0.8	–0.66	–0.4	–0.1	–0.2	0.14	1.74
LU	1.93	1.50	0.9	0.6	0.43	0.8	–0.1	–0.2	–0.07	1.16
HU	1.16	1.69	1.0	0.7	–0.53	–0.2	–0.0	–0.2	–0.02	1.37
MT	1.45	1.69	1.1	0.6	–0.24	–0.1	0.2	–0.2	–0.07	1.59
NL	1.29	1.49	1.0	0.5	–0.21	0.1	–0.1	–0.2	–0.03	1.21
AT	1.39	1.52	1.0	0.5	–0.13	0.1	–0.0	–0.2	–0.04	1.26
PL	1.52	2.16	1.3	0.8	–0.64	–0.3	–0.1	–0.3	–0.01	1.78
PT	1.21	1.43	0.9	0.5	–0.22	–0.1	0.0	–0.2	0.04	1.28
RO	1.10	2.11	1.3	0.8	–1.00	–0.4	–0.3	–0.3	0.01	1.53
SI	1.32	1.64	1.0	0.7	–0.32	0.0	–0.0	–0.3	0.01	1.31
SK	1.64	2.26	1.4	0.8	–0.62	–0.1	–0.2	–0.3	–0.00	1.75
FI	1.53	1.65	1.1	0.6	–0.13	0.2	–0.1	–0.2	–0.00	1.37
SE	1.75	1.51	1.0	0.5	0.24	0.4	–0.0	–0.2	0.02	1.32
UK	1.86	1.58	1.0	0.6	0.28	0.5	–0.0	–0.2	–0.03	1.36
NO	1.96	1.59	1.1	0.5	0.37	0.6	–0.1	–0.1	0.00	1.35
EA	1.32	1.43	0.9	0.5	–0.11	0.1	0.0	–0.2	0.01	1.25
EU-27	1.39	1.54	1.0	0.6	–0.15	0.1	0.1	–0.2	–0.07	1.31

Source: Commission services, EPC

In order to assess the relative contribution to GDP growth of its two main components, labour productivity and labour utilisation, the standard growth accounting framework is shown in Table 3.9. For the EU and for the euro area, a slight increase in the size of the total population over the entire projection period makes a positive contribution to average potential GDP growth. However, this is more than offset by a decline in the share of the working-age population, being a negative drag on growth (by an annual average of  $-0.2$  percentage point). As a result, labour input contributes negatively to output growth on average over the projection period (by  $0.15$  percentage point and  $0.1$  percentage point, respectively in the EU and in the euro area). Hence, labour productivity growth becomes the sole source for potential output growth in both the EU and the euro area.

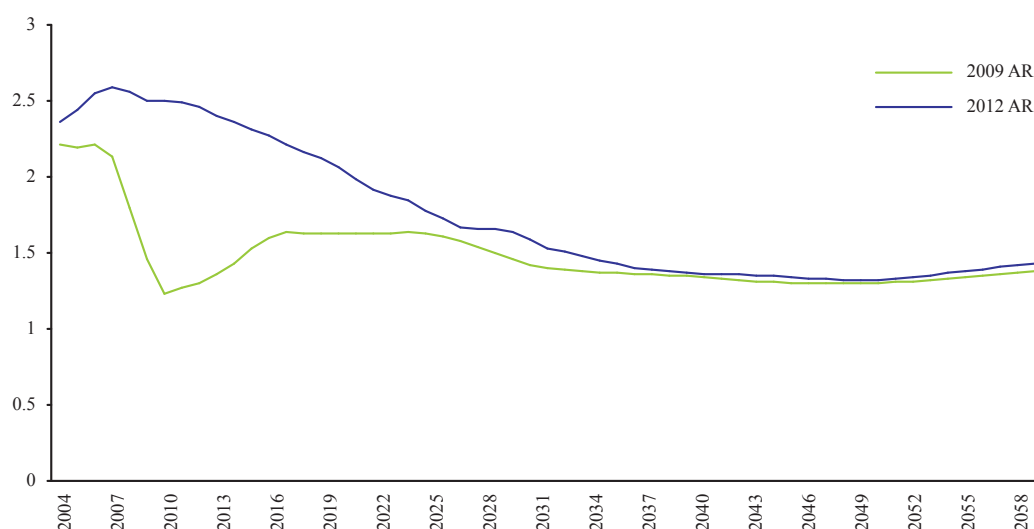
### 3.11. COMPARISON WITH THE PREVIOUS 2009 LONG-TERM BUDGETARY PROJECTION EXERCISE

Following the largest economic crisis in many decades, potential GDP growth has been revised downwards for 2009 and the surrounding years, compared with the baseline projection

in the 2009 Ageing Report (Graph 3.3). The current projections indicate that potential growth in the EU as a whole should only gradually approach the growth rates projected in 2009 before the crisis.

Table 3.10 shows a comparison between the current projection of potential GDP growth and its components and the projection in the 2009 exercise. Annual average potential GDP growth over the period 2010–60 in the EU-27 is projected to be  $1.4\%$ , compared to  $1.6\%$  in the 2009 projection. A similar picture emerges for the euro area (with a slightly lower potential growth of  $1.3\%$  currently being projected, i.e.  $0.3$  percentage point lower compared to the projection in the 2009 Ageing Report). The lower average potential growth rate in the EU can mainly be attributed to the new assumption of convergence to a labour productivity growth rate of  $1.5\%$ , compared to an assumption of  $1.7\%$  in the 2009 Ageing Report. As regards labour input, although there are differences between Member States, the different trends cancel out at the EU aggregate level. This means that the projected labour input trends on average over the entire projection period do not change in the current projection compared to the 2009 Ageing Report.

Graph 3.3: Potential GDP growth compared, EU-27 (% change)



Source: Commission services, EPC

**Table 3.10:**  
2012 and 2009 projections compared, 2010–60 (percentage points)

Country	GDP growth 2010–60	Due to growth in:								GDP per capita growth 2010–60
		Productivity (GDP per hour worked)	TFP	Capital deepening	Labour input	Total population	Employment rate	Share of Working age population	Change in average hours worked	
	1=2+5	2=3+4	3	4	5=6+7+8+9	6	7	8	9	10=1–6
BE	–0.18	–0.28	–0.2	–0.1	0.10	0.1	–0.1	0.1	0.02	–0.30
BG	–0.30	–0.37	–0.1	–0.3	0.07	0.0	0.0	0.0	–0.01	–0.32
CZ	–0.03	–0.23	–0.1	–0.1	0.20	0.2	–0.1	0.1	0.02	–0.19
DK	–0.27	–0.29	–0.2	–0.1	0.02	0.0	–0.1	0.0	0.02	–0.32
DE	–0.36	–0.23	–0.2	–0.1	–0.14	–0.1	–0.0	0.0	–0.00	–0.24
EE	–0.28	–0.42	–0.2	–0.2	0.14	0.1	0.0	0.0	0.03	–0.34
IE	–0.21	–0.11	–0.1	–0.0	–0.10	–0.0	–0.1	0.1	–0.04	–0.18
EL	–0.65	–0.83	–0.4	–0.4	0.18	0.1	0.0	0.0	0.04	–0.74
ES	–0.26	–0.47	–0.4	–0.1	0.21	0.0	0.1	0.1	0.03	–0.28
FR	–0.18	–0.21	–0.1	–0.1	0.03	0.0	–0.0	0.0	–0.01	–0.19
IT	–0.22	–0.34	–0.3	–0.1	0.13	0.2	–0.1	0.0	0.01	–0.39
CY	–0.87	–0.55	–0.4	–0.2	–0.32	–0.2	–0.2	0.1	0.03	–0.68
LV	–0.27	–0.37	–0.2	–0.2	0.10	–0.0	0.1	0.1	–0.08	–0.24
LT	–0.16	–0.50	–0.3	–0.2	0.34	0.1	0.0	0.1	0.14	–0.25
LU	–0.62	–0.25	–0.2	–0.1	–0.37	–0.0	–0.3	–0.0	–0.07	–0.59
HU	–0.51	–0.53	–0.4	–0.1	0.03	0.1	–0.1	0.1	–0.02	–0.57
MT	–0.17	–0.24	–0.1	–0.1	0.07	–0.1	0.2	0.1	–0.06	–0.07
NL	–0.20	–0.22	–0.1	–0.1	0.02	0.1	–0.1	0.0	–0.01	–0.26
AT	–0.24	–0.19	–0.1	–0.1	–0.06	–0.0	–0.1	0.1	–0.03	–0.22
PL	0.04	–0.17	–0.0	–0.2	0.22	0.1	–0.0	0.1	0.00	–0.09
PT	–0.62	–0.50	–0.3	–0.2	–0.12	–0.2	–0.0	0.0	0.06	–0.45
RO	–0.67	–0.61	–0.3	–0.3	–0.05	0.0	–0.2	0.1	0.02	–0.69
SI	–0.10	–0.51	–0.3	–0.2	0.41	0.3	0.0	0.1	0.03	–0.37
SK	–0.07	–0.14	–0.1	–0.1	0.07	0.2	–0.3	0.1	0.01	–0.29
FI	–0.10	–0.13	–0.0	–0.1	0.03	0.1	–0.1	0.0	–0.00	–0.22
SE	–0.13	–0.21	–0.1	–0.1	0.08	0.1	–0.1	0.0	0.02	–0.24
UK	–0.21	–0.17	–0.1	–0.1	–0.04	0.1	–0.1	0.0	–0.02	–0.29
NO	0.09	–0.09	–0.0	–0.0	0.18	0.2	–0.0	0.0	0.01	–0.07
EA	–0.26	–0.30	–0.2	–0.1	0.04	0.0	–0.0	0.0	0.01	–0.29
EU-27	–0.24	–0.28	–0.2	–0.1	0.04	0.0	–0.0	0.0	–0.04	–0.29

Source: Commission services, EPC

## 4. INTEREST RATES

### 4.1. BACKGROUND

In the 2009 projection exercise, the European Commission and the EPC decided:

- to assume a constant real interest rate in the baseline scenario with a prudent value of 3.0 % over the entire projection period <sup>(71)</sup> <sup>(72)</sup>;
- to run a sensitivity test on the interest rate (Chapter 5).

#### *Real interest rates: long-term developments*

While interest rate developments have not been stable over time, rates have been close to 3 % in most European countries and the United States over the long term. Over the last 40 years (1969–2009), average real interest rates have ranged between 2.4 and 3.7 % in most EU countries and the United States. As shown in Table 4.1, average rates were 3.7 % in Belgium and Germany, between 3 and 3.4 % in France, the Netherlands, Austria and Finland, and below 3 % in Ireland, Italy, Sweden and the United Kingdom. Over the same time interval, an average rate of 3 % was reported for the United States.

<sup>(71)</sup> For technical reasons, some countries needed to introduce an assumption on inflation into their models and, in this event, the EPC agreed that it should be 2 % for all countries. Hence, the nominal long-term interest rate was 5 %.

<sup>(72)</sup> It was also agreed that the same 3 % assumption would apply to the discount rate to be used over the whole projection period in the context of sustainability assessments, and that the real rate of return on funded pensions should be equal to 3 % for all Member States. The assumption on administrative costs is aligned to that made by the SPC and its Ageing subgroup. The 3 % rate of return on funded pensions is, therefore, net of administrative costs (0.5 %). In their ongoing work, the SPC further assumes an interest rate to calculate the annuity that is 0.8 % lower than the assumed rate used during the accumulation phase in order to account for the cost of buying the annuity, administrative and managing expenses (given that for the base case the assumed rate is 3 %, this gives an annuity rate of 2.2 %).

### 4.2. ASSUMPTIONS ON INTEREST RATES TO BE USED IN THE 2012 PROJECTION OF AGE-RELATED EXPENDITURE

In view of minimising assumptions-driven revisions and thereby ensuring consistency between budgetary projection exercises, it has been decided that the real interest rate assumption of 3 % for all countries should be maintained in the 2012 projection exercise and that inflation should be assumed to be 2 %. To allow for an adequate degree of cross-country differentiation and avoid big jumps in the initial period of projections, it was decided to introduce a path of linear convergence in both real interest rates (convergence to the 3 % rate by 2015, and constant thereafter till 2060) and inflation rates (convergence to the 2 % rate by 2015, or later if the output gap is closed later, and constant thereafter). The rate of return on pension fund assets also remains at 3 % (net of 0.5 % of administrative costs) in the 2012 projections, with linear convergence to it assumed by 2015.

In view of the analysis of fiscal sustainability, an important aspect is the fulfilment of the dynamic efficiency condition <sup>(73)</sup>. The aforementioned assumptions indeed ensure that real interest rate growth rate differentials are positive for most countries and most years over the projection period <sup>(74)</sup>. The dynamic efficiency condition is therefore ensured in the long term for all countries in the Commission's analysis of fiscal sustainability making use of a time-varying interest rate/growth rate differential <sup>(75)</sup>.

<sup>(73)</sup> Unless the interest rate is equal or higher than the output growth rate, a country may in part debt-finance public expenditures indefinitely, as the debt ratio would always be declining.

<sup>(74)</sup> Negative values are obtained mostly for catching-up economies and only for limited periods of time, consistent with historic evidence.

<sup>(75)</sup> European Commission (2009), *Sustainability Report 2009*, European Economy 9, 2009.

**Table 4.1:**  
Average real long-term interest rates (1969–2009)

1969–2009	AT	BE	DE	DK	FI	FR	IE	IT	NL	SE	UK	US
<b>Real interest rate</b>	3.4	3.7	3.7	4.6	3.1	3	2.6	1.8	3.2	2.8	2.4	3

Source: Directorate-General for Economic and Financial Affairs's AMECO database

Note: The real long-term interest rate corresponds to an aggregate measure of government bond yields (generally 10-year maturity), deflated using the GDP deflator. Data for West Germany until 1991; data for Ireland from 1971.

## 5. SENSITIVITY TESTS

### 5.1. BACKGROUND

The baseline projections cannot capture all the direct and indirect channels through which ageing can influence economic growth as the projection exercise is carried out on the basis of commonly agreed and relatively simple assumptions in order to ensure comparability and clarity. However, given the uncertainty surrounding the assumptions underpinning long-term projections, it is necessary to carry out a number of sensitivity tests so as to quantify the responsiveness of projection results to changes in key underlying assumptions.

This is why, in addition to running a baseline projection based on the assumptions outlined in Chapters 1 to 4 of this report, the European Commission and the EPC have also agreed to run a series of sensitivity tests, an overview of which can be seen in Table 5.1. The sensitivity tests introduce a change or shock to a single underlying assumption/parameter in the projection framework. For each sensitivity test, a uniform shock is applied to all Member States.

The sensitivity tests provide useful information on the robustness of the projections to feasible changes in the key underlying assumptions. The relative impact can also be read as a kind of ‘elasticity’ parameter. Thus, the sensitivity tests enable an assessment of the impact of any possible policy changes with an effect on key assumption variables.

For communication purposes, the sensitivity tests have been calibrated to deliver results of equivalent magnitude to the extent possible <sup>(76)</sup>.

### 5.2. MACROECONOMIC ASSUMPTIONS UNDER THE DIFFERENT SENSITIVITY SCENARIOS

To produce the overall set of assumptions, a bottom-up approach was followed (i.e. from population projections through labour input and to GDP growth projections). Therefore, each sensitivity test may involve the recalculation of all assumptions and a rerun of the labour force and productivity function-based models in order to keep a consistent macroeconomic framework. The macroeconomic assumptions under the different sensitivity scenarios are given in Tables 5.2 to 5.6 following <sup>(77)</sup>.

<sup>(76)</sup> For the EU as a whole, the impact of varying the underlying assumptions on the projected change in pension expenditure (2007–60) was as follows in the 2009 Ageing Report: higher employment rate of older workers (+ 5 percentage points): – 0.1365 percentage point of GDP; higher total employment rate (+ 1 percentage point): – 0.1278 percentage point of GDP; positive labour productivity shock (+ 0.25 percentage point): – 0.4077 percentage point of GDP; higher life expectancy (one extra year): + 0.2886 percentage point of GDP; zero migration: + 1.7526 percentage point of GDP.

<sup>(77)</sup> It should be noted that the sensitivity test on a higher real interest rate was assumed not to have an impact on the real economy, so it will only be applied to pension projections, where feasible and appropriate.

**Table 5.1:**  
Overview of sensitivity tests: difference in assumptions compared to the baseline scenario

Population		Labour force		Productivity	Interest rate
High life expectancy	Lower migration	Higher employment rate	Higher employment rate older workers	Higher/lower labour productivity	Higher/lower interest rate
A scenario with an increase in life expectancy at birth of one year by 2060 compared with the baseline projection.	A scenario with 10 % less migration compared with the baseline projection.	A scenario with the employment rate being 1 percentage point higher compared to the baseline projection for the age group 20–64. The increase is introduced linearly over the period 2016–25 and remains 1 percentage point higher thereafter. The higher employment rate is assumed to be achieved by lowering the rate of structural unemployment (the NAWRU).	A scenario with the employment rate of older workers (55–64) being 5 percentage points higher compared to the baseline projection. The increase is introduced linearly over the period 2016–25 and remains 5 percentage points higher thereafter. The higher employment rate of this group of workers is assumed to be achieved through a reduction of the inactive population.	A scenario with labour productivity growth being assumed to converge, to a productivity growth rate which is 0.1 percentage point higher/lower than in the baseline scenario. The increase is introduced linearly during the period 2016–25, and remains 0.1 percentage point above/below the baseline thereafter.	A scenario with the real interest being 0.5 percentage point above/below that in the baseline scenario (i.e. 2.5 % and 3.5 %).

Source: Commission services, EPC



**Table 5.2:**  
Sensitivity tests: higher employment rate of older workers

<b>HIGHER OLDER ER</b>								
<b>Country</b>	<b>GDP growth 2010–60</b>	<b>Due to growth in:</b>						<b>GDP per capita growth 2010–60</b>
		<i>Productivity (GDP per hour worked)</i>	<i>Labour input</i>	<i>Total population</i>	<i>Employment rate</i>	<i>Share of working age population</i>	<i>Change in average hours worked</i>	
	<b>1=2+3</b>	<b>2</b>	<b>3=4+5+6+7</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8=1–4</b>
BE	1.66	1.42	0.25	0.39	–0.04	–0.11	0.01	1.27
BG	1.35	2.27	–0.92	–0.61	0.01	–0.31	–0.01	1.96
CZ	1.57	1.87	–0.30	–0.01	–0.00	–0.29	0.01	1.58
DK	1.47	1.43	0.04	0.19	–0.02	–0.15	0.01	1.28
DE	0.86	1.46	–0.60	–0.41	0.10	–0.27	–0.02	1.28
EE	1.52	2.07	–0.55	–0.26	–0.06	–0.25	0.03	1.79
IE	2.12	1.62	0.50	0.76	–0.04	–0.17	–0.04	1.36
EL	1.03	1.13	–0.10	0.07	0.06	–0.26	0.03	0.96
ES	1.61	1.38	0.23	0.26	0.23	–0.27	0.01	1.35
FR	1.68	1.49	0.19	0.30	0.04	–0.13	–0.01	1.38
IT	1.25	1.27	–0.02	0.16	0.04	–0.23	0.01	1.09
CY	1.86	1.38	0.48	0.78	–0.16	–0.18	0.03	1.08
LV	1.17	2.13	–0.96	–0.61	0.01	–0.29	–0.08	1.77
LT	1.32	1.95	–0.63	–0.45	–0.09	–0.23	0.14	1.76
LU	1.96	1.50	0.46	0.77	–0.08	–0.16	–0.07	1.19
HU	1.19	1.69	–0.49	–0.21	–0.02	–0.25	–0.02	1.40
MT	1.48	1.69	–0.21	–0.14	0.24	–0.24	–0.07	1.62
NL	1.31	1.49	–0.18	0.08	–0.05	–0.18	–0.03	1.23
AT	1.42	1.52	–0.10	0.13	0.01	–0.20	–0.05	1.29
PL	1.55	2.16	–0.61	–0.26	–0.06	–0.28	–0.01	1.81
PT	1.24	1.43	–0.19	–0.07	0.07	–0.23	0.04	1.31
RO	1.14	2.11	–0.97	–0.43	–0.27	–0.28	0.01	1.57
SI	1.35	1.64	–0.29	0.01	–0.01	–0.31	0.01	1.34
SK	1.67	2.26	–0.59	–0.11	–0.18	–0.29	–0.00	1.79
FI	1.55	1.65	–0.10	0.15	–0.06	–0.19	–0.00	1.40
SE	1.77	1.51	0.26	0.43	–0.01	–0.18	0.02	1.34
UK	1.89	1.58	0.30	0.51	–0.02	–0.15	–0.03	1.38
NO	1.99	1.59	0.40	0.62	–0.09	–0.14	0.00	1.37
EA	1.35	1.43	–0.08	0.07	0.05	–0.22	0.01	1.28
EU-27	1.42	1.54	–0.12	0.08	0.09	–0.22	–0.07	1.34

Source: Commission services, EPC

**Table 5.3:**  
Sensitivity tests: higher employment rate

<b>HIGHER ER</b>								
<b>Country</b>	<b>GDP growth 2010–60</b>	<b>Due to growth in:</b>					<b>GDP per capita growth 2010–60</b>	
		<i>Productivity (GDP per hour worked)</i>	<i>Labour input</i>	<i>Total population</i>	<i>Employment rate</i>	<i>Share of working age population</i>	<i>Change in average hours worked</i>	
	<b>1=2+3</b>	<b>2</b>	<b>3=4+5+6+7</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8=1–4</b>
BE	1.66	1.42	0.24	0.39	–0.04	–0.11	0.01	1.27
BG	1.35	2.27	–0.93	–0.61	0.01	–0.31	–0.01	1.96
CZ	1.57	1.87	–0.30	–0.01	–0.01	–0.29	0.01	1.58
DK	1.47	1.43	0.04	0.19	–0.02	–0.15	0.01	1.27
DE	0.86	1.46	–0.60	–0.41	0.10	–0.27	–0.02	1.27
EE	1.52	2.07	–0.54	–0.26	–0.06	–0.25	0.03	1.79
IE	2.12	1.62	0.50	0.76	–0.04	–0.17	–0.04	1.36
EL	1.02	1.13	–0.11	0.07	0.05	–0.26	0.03	0.95
ES	1.60	1.38	0.23	0.26	0.22	–0.27	0.01	1.34
FR	1.68	1.49	0.19	0.30	0.04	–0.13	–0.01	1.38
IT	1.25	1.27	–0.03	0.16	0.03	–0.23	0.01	1.09
CY	1.86	1.38	0.47	0.78	–0.16	–0.18	0.03	1.08
LV	1.16	2.13	–0.97	–0.61	0.01	–0.29	–0.08	1.77
LT	1.31	1.95	–0.63	–0.45	–0.09	–0.23	0.14	1.76
LU	1.96	1.50	0.46	0.77	–0.08	–0.16	–0.07	1.19
HU	1.19	1.69	–0.50	–0.21	–0.02	–0.25	–0.02	1.40
MT	1.48	1.69	–0.21	–0.14	0.23	–0.24	–0.07	1.62
NL	1.31	1.49	–0.19	0.08	–0.06	–0.18	–0.03	1.23
AT	1.41	1.52	–0.10	0.13	0.01	–0.20	–0.05	1.28
PL	1.55	2.16	–0.61	–0.26	–0.07	–0.28	–0.01	1.81
PT	1.23	1.43	–0.20	–0.07	0.06	–0.23	0.04	1.30
RO	1.13	2.11	–0.97	–0.43	–0.28	–0.28	0.01	1.56
SI	1.35	1.64	–0.30	0.01	–0.01	–0.31	0.01	1.33
SK	1.67	2.26	–0.59	–0.11	–0.18	–0.29	–0.00	1.78
FI	1.55	1.65	–0.10	0.15	–0.06	–0.19	–0.00	1.40
SE	1.77	1.51	0.26	0.43	–0.01	–0.18	0.02	1.34
UK	1.89	1.58	0.30	0.51	–0.02	–0.15	–0.03	1.38
NO	1.99	1.59	0.40	0.62	–0.09	–0.14	0.00	1.37
EA	1.35	1.43	–0.08	0.07	0.05	–0.22	0.01	1.27
EU-27	1.42	1.54	–0.13	0.08	0.08	–0.22	–0.07	1.34

Source: Commission services, EPC

**Table 5.4:**  
Sensitivity tests: higher/lower productivity growth

<b>Higher productivity</b>								
<b>Country</b>	<b>GDP growth 2010–60</b>	<b>Due to growth in:</b>						<b>GDP per capita growth 2010–60</b>
		<i>Productivity (GDP per hour worked)</i>	<i>Labour input</i>	<i>Total population</i>	<i>Employment rate</i>	<i>Share of working age population</i>	<i>Change in average hours worked</i>	
	<b>1=2+3</b>	<b>2</b>	<b>3=4+5+6+7</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8=1–4</b>
BE	1.71	1.50	0.22	0.39	–0.07	–0.11	0.01	1.32
BG	1.40	2.35	–0.95	–0.61	–0.02	–0.31	–0.01	2.01
CZ	1.63	1.95	–0.32	–0.01	–0.03	–0.29	0.01	1.64
DK	1.52	1.51	0.02	0.19	–0.04	–0.15	0.01	1.33
DE	0.92	1.54	–0.62	–0.41	0.07	–0.27	–0.02	1.33
EE	1.58	2.15	–0.57	–0.26	–0.09	–0.25	0.03	1.84
IE	2.18	1.70	0.48	0.76	–0.07	–0.17	–0.04	1.42
EL	1.08	1.21	–0.13	0.07	0.03	–0.26	0.03	1.01
ES	1.66	1.46	0.20	0.26	0.20	–0.27	0.01	1.40
FR	1.73	1.57	0.17	0.30	0.01	–0.13	–0.01	1.44
IT	1.30	1.35	–0.05	0.16	0.00	–0.23	0.01	1.14
CY	1.91	1.46	0.45	0.78	–0.18	–0.18	0.03	1.13
LV	1.22	2.21	–0.99	–0.61	–0.02	–0.29	–0.08	1.83
LT	1.37	2.03	–0.66	–0.45	–0.11	–0.23	0.14	1.82
LU	2.01	1.58	0.43	0.77	–0.11	–0.16	–0.07	1.24
HU	1.24	1.77	–0.53	–0.21	–0.05	–0.25	–0.02	1.45
MT	1.53	1.77	–0.24	–0.14	0.21	–0.24	–0.07	1.67
NL	1.37	1.57	–0.21	0.08	–0.08	–0.18	–0.03	1.28
AT	1.47	1.60	–0.13	0.13	–0.01	–0.20	–0.04	1.34
PL	1.60	2.24	–0.64	–0.26	–0.09	–0.28	–0.01	1.86
PT	1.29	1.51	–0.22	–0.07	0.04	–0.23	0.04	1.36
RO	1.18	2.19	–1.00	–0.43	–0.31	–0.28	0.01	1.61
SI	1.40	1.72	–0.32	0.01	–0.04	–0.31	0.01	1.39
SK	1.72	2.34	–0.62	–0.11	–0.21	–0.29	–0.00	1.83
FI	1.61	1.73	–0.13	0.15	–0.08	–0.19	–0.00	1.45
SE	1.83	1.59	0.24	0.43	–0.03	–0.18	0.02	1.40
UK	1.94	1.66	0.28	0.51	–0.04	–0.15	–0.03	1.44
NO	2.04	1.67	0.37	0.62	–0.11	–0.14	0.00	1.43
EA	1.40	1.51	–0.11	0.07	0.02	–0.22	0.01	1.33
EU-27	1.47	1.62	–0.15	0.08	0.06	–0.22	–0.07	1.39

Lower productivity								
Country	GDP growth 2010–60	Due to growth in:						GDP per capita growth 2010–60
		Productivity (GDP per hour worked)	Labour input	Total population	Employment rate	Share of working age population	Change in average hours worked	
	1=2+3	2	3=4+5+6+7	4	5	6	7	8=1–4
BE	1.55	1.34	0.22	0.39	– 0.07	– 0.11	0.01	1.16
BG	1.24	2.19	– 0.95	– 0.61	– 0.02	– 0.31	– 0.01	1.86
CZ	1.47	1.79	– 0.32	– 0.01	– 0.03	– 0.29	0.01	1.48
DK	1.37	1.35	0.02	0.19	– 0.04	– 0.15	0.01	1.17
DE	0.76	1.38	– 0.62	– 0.41	0.07	– 0.27	– 0.02	1.17
EE	1.42	1.99	– 0.57	– 0.26	– 0.09	– 0.25	0.03	1.68
IE	2.02	1.54	0.48	0.76	– 0.07	– 0.17	– 0.04	1.26
EL	0.92	1.05	– 0.13	0.07	0.03	– 0.26	0.03	0.85
ES	1.50	1.30	0.20	0.26	0.20	– 0.27	0.01	1.24
FR	1.57	1.41	0.17	0.30	0.01	– 0.13	– 0.01	1.28
IT	1.14	1.20	– 0.05	0.16	0.00	– 0.23	0.01	0.98
CY	1.75	1.30	0.45	0.78	– 0.18	– 0.18	0.03	0.97
LV	1.06	2.05	– 0.99	– 0.61	– 0.02	– 0.29	– 0.08	1.67
LT	1.21	1.87	– 0.66	– 0.45	– 0.11	– 0.23	0.14	1.66
LU	1.85	1.42	0.43	0.77	– 0.11	– 0.16	– 0.07	1.08
HU	1.08	1.61	– 0.53	– 0.21	– 0.05	– 0.25	– 0.02	1.29
MT	1.37	1.61	– 0.24	– 0.14	0.21	– 0.24	– 0.07	1.51
NL	1.21	1.42	– 0.21	0.08	– 0.08	– 0.18	– 0.03	1.13
AT	1.31	1.44	– 0.13	0.13	– 0.01	– 0.20	– 0.04	1.18
PL	1.44	2.08	– 0.64	– 0.26	– 0.09	– 0.28	– 0.01	1.70
PT	1.13	1.35	– 0.22	– 0.07	0.04	– 0.23	0.04	1.20
RO	1.03	2.03	– 1.00	– 0.43	– 0.31	– 0.28	0.01	1.46
SI	1.24	1.56	– 0.32	0.01	– 0.04	– 0.31	0.01	1.23
SK	1.56	2.18	– 0.62	– 0.11	– 0.21	– 0.29	– 0.00	1.68
FI	1.45	1.57	– 0.13	0.15	– 0.08	– 0.19	– 0.00	1.29
SE	1.67	1.43	0.24	0.43	– 0.03	– 0.18	0.02	1.24
UK	1.79	1.50	0.28	0.51	– 0.04	– 0.15	– 0.03	1.28
NO	1.89	1.51	0.37	0.62	– 0.11	– 0.14	0.00	1.27
EA	1.24	1.35	– 0.11	0.07	0.02	– 0.22	0.01	1.17
EU27	1.31	1.46	– 0.15	0.08	0.06	– 0.22	– 0.07	1.23

Source: Commission services, EPC

**Table 5.5:**  
Sensitivity tests: Higher life expectancy**LOWER MIG**

Country	GDP growth 2010–60	Due to growth in:					GDP per capita growth 2010–60	
		Productivity (GDP per hour worked)	Labour input	Total population	Employment rate	Share of working age population		Change in average hours worked
1=2+3	2	3=4+5+6+7	4	5	6	7	8=1–4	
BE	1.59	1.42	0.17	0.36	–0.06	–0.13	0.01	1.23
BG	1.32	2.27	–0.95	–0.61	–0.02	–0.30	–0.01	1.93
CZ	1.51	1.87	–0.37	–0.05	–0.03	–0.30	0.01	1.55
DK	1.42	1.43	–0.01	0.16	–0.04	–0.15	0.01	1.25
DE	0.80	1.46	–0.66	–0.44	0.07	–0.27	–0.02	1.24
EE	1.50	2.07	–0.57	–0.27	–0.09	–0.25	0.03	1.76
IE	2.05	1.62	0.43	0.73	–0.08	–0.17	–0.04	1.33
EL	0.95	1.13	–0.18	–0.01	0.07	–0.27	0.03	0.96
ES	1.51	1.38	0.14	0.20	0.20	–0.27	0.01	1.31
FR	1.64	1.49	0.15	0.26	0.04	–0.14	–0.01	1.38
IT	1.16	1.27	–0.12	0.09	0.01	–0.23	0.01	1.07
CY	1.76	1.38	0.38	0.67	–0.13	–0.20	0.03	1.09
LV	1.14	2.13	–0.99	–0.60	–0.03	–0.29	–0.08	1.74
LT	1.29	1.95	–0.66	–0.43	–0.13	–0.23	0.14	1.72
LU	1.86	1.50	0.36	0.68	–0.08	–0.17	–0.07	1.18
HU	1.12	1.69	–0.56	–0.26	–0.03	–0.25	–0.02	1.38
MT	1.41	1.69	–0.27	–0.15	0.19	–0.24	–0.07	1.57
NL	1.27	1.49	–0.22	0.05	–0.06	–0.19	–0.03	1.22
AT	1.33	1.52	–0.19	0.07	–0.00	–0.21	–0.04	1.26
PL	1.51	2.16	–0.65	–0.29	–0.07	–0.28	–0.01	1.80
PT	1.16	1.43	–0.27	–0.11	0.04	–0.24	0.04	1.27
RO	1.10	2.11	–1.01	–0.44	–0.31	–0.28	0.01	1.53
SI	1.28	1.64	–0.36	–0.03	–0.03	–0.31	0.01	1.31
SK	1.62	2.26	–0.64	–0.14	–0.21	–0.29	–0.00	1.76
FI	1.50	1.65	–0.15	0.12	–0.07	–0.19	–0.00	1.38
SE	1.72	1.51	0.21	0.39	–0.02	–0.18	0.02	1.33
UK	1.82	1.58	0.24	0.45	–0.02	–0.16	–0.03	1.37
NO	1.93	1.59	0.34	0.57	–0.09	–0.14	0.00	1.36
EA	1.28	1.43	–0.15	0.03	0.03	–0.23	0.01	1.25
EU-27	1.35	1.54	–0.19	0.04	0.06	–0.22	–0.06	1.32

Source: Commission services, EPC

**Table 5.6:**  
Sensitivity tests: lower migration

HLE

Country	GDP growth 2010–60	Due to growth in:					GDP per capita growth 2010–60	
		Productivity (GDP per hour worked)	Labour input	Total population	Employment rate	Share of working age population		Change in average hours worked
	1=2+3	2	3=4+5+6+7	4	5	6	7	8=1–4
BE	1.64	1.42	0.22	0.43	–0.07	–0.14	0.01	1.21
BG	1.33	2.27	–0.95	–0.59	–0.02	–0.32	–0.01	1.91
CZ	1.55	1.87	–0.32	0.01	–0.03	–0.31	0.01	1.54
DK	1.45	1.43	0.02	0.21	–0.04	–0.16	0.01	1.24
DE	0.84	1.46	–0.62	–0.39	0.07	–0.29	–0.02	1.23
EE	1.50	2.07	–0.56	–0.24	–0.09	–0.26	0.03	1.75
IE	2.10	1.62	0.48	0.77	–0.08	–0.18	–0.04	1.33
EL	1.00	1.13	–0.13	0.06	0.06	–0.28	0.03	0.94
ES	1.58	1.38	0.20	0.28	0.20	–0.28	0.01	1.30
FR	1.66	1.49	0.17	0.30	0.03	–0.15	–0.01	1.36
IT	1.22	1.27	–0.05	0.18	0.01	–0.24	0.01	1.05
CY	1.83	1.38	0.45	0.75	–0.13	–0.20	0.03	1.08
LV	1.15	2.13	–0.98	–0.57	–0.03	–0.31	–0.08	1.71
LT	1.29	1.95	–0.65	–0.41	–0.13	–0.25	0.14	1.71
LU	1.93	1.50	0.44	0.77	–0.09	–0.18	–0.07	1.16
HU	1.16	1.69	–0.52	–0.20	–0.04	–0.26	–0.02	1.37
MT	1.45	1.69	–0.24	–0.11	0.19	–0.25	–0.07	1.56
NL	1.29	1.49	–0.20	0.09	–0.06	–0.20	–0.03	1.20
AT	1.39	1.52	–0.12	0.14	–0.00	–0.22	–0.04	1.25
PL	1.52	2.16	–0.64	–0.26	–0.07	–0.30	–0.01	1.78
PT	1.21	1.43	–0.22	–0.05	0.03	–0.25	0.04	1.26
RO	1.11	2.11	–1.00	–0.40	–0.32	–0.29	0.01	1.51
SI	1.33	1.64	–0.32	0.03	–0.04	–0.33	0.01	1.29
SK	1.64	2.26	–0.62	–0.09	–0.21	–0.31	–0.00	1.74
FI	1.53	1.65	–0.12	0.17	–0.08	–0.21	–0.00	1.36
SE	1.75	1.51	0.24	0.44	–0.03	–0.19	0.02	1.31
UK	1.87	1.58	0.28	0.51	–0.03	–0.17	–0.03	1.36
NO	1.97	1.59	0.38	0.63	–0.10	–0.15	0.00	1.34
EA	1.33	1.43	–0.11	0.09	0.03	–0.24	0.01	1.24
EU-27	1.40	1.54	–0.15	0.09	0.06	–0.24	–0.07	1.30

Source: Commission services, EPC

## PART II — AGE-RELATED EXPENDITURE ITEMS: COVERAGE, PROJECTION METHODOLOGIES AND DATA SOURCES

## 6. PENSIONS

### 6.1. MAIN FEATURES OF PENSION PROJECTIONS

Since the beginning of the activity of the AWG, the diversified manifold of pension systems existing in the Member States has represented a challenging issue when dealing with expenditure projections. Notwithstanding different arrangements in healthcare, long-term care, education and unemployment benefits systems, a common methodology is used to carry out long-term projections for these government budget's components using common models developed by Commission services (Directorate-General for Economic and Financial Affairs) in cooperation with the AWG (Chapters 7 to 10 give detailed descriptions). On the contrary, the EPC decided that it would be preferable if projections of pension expenditure were carried out by the Member States using national models. The latter, on the basis of the commonly agreed underlying assumptions described in Part I of this report, more adequately reflect the institutional features of the pension systems in individual countries, highlighting those that should have relevant bearing on the future budgetary outcomes.

Using different, country-specific projection models may introduce an element of non-comparability in the projection results. Nevertheless, this approach was chosen by the Commission and EPC because pension systems and arrangements are very diverse in the Member States, making it extremely difficult to reliably project pension expenditure on the basis of one common model, to be used for all 27 Member States.

In order to ensure high quality and comparability of the pension projection results, an in-depth peer review is carried out by the AWG members and the Commission. The projected figures are discussed and validated with regard to adherence to the agreed methodology and macroeconomic assumptions and interpretation of the legislation in force in the single Member State. When deemed necessary, the peer group can ask the Member State for a revision of the projection.

### 6.2. COVERAGE OF PENSION PROJECTIONS

The core of the projection exercise is *the government expenditure on pensions* for both the private and public sectors, as in the 2009 pension projection exercise. According to the principle of not changing the modality of the variables that were classified as voluntary in the previous exercise, data on occupational schemes, private schemes (mandatory and non-mandatory), replacement rates (at retirement), benefit ratio and net pension expenditures will be classified as voluntary. Therefore, the reporting sheet consists of 156 variables to be projected; of which 65 to be provided on a voluntary base and five are input data provided by the Commission. In line with previous exercises, the members of the AWG agreed to provide pension projections for the following four items:

- gross pension expenditure;
- number of pensions/pensioners;
- number of contributors;
- contributions to public pension schemes.

In addition, as in the 2009 exercise, Member States can cover on a voluntary basis:

- occupational and private (mandatory and non-mandatory) pension expenditure;
- replacement rates and benefit ratios;
- net pension expenditure.

The Commission and the AWG decided that, for the 2012 pension projection exercise, Member States can provide on a voluntary basis:

- assets of pension funds and reserves.

Moreover, in order to simplify the reporting exercise and considering that figures on net pension can be provided, the AWG agreed that Member States do not project the following item:

- taxes on pension.



Finally, the members of the AWG agreed that, for the 2012 exercise, projections have to be made also on the following item:

- public earnings-related pension expenditure for new pensions.

A complete list of the items covered by the 2012 pension projection exercise is presented in Annex 6.1.

### **Building on and extending the 2009 reporting framework**

In the previous pension projection exercise, several improvements were introduced that form a solid point of departure for the current round of projections. Still, a few changes for the 2012 pension reporting framework were introduced. All of the amendments were duly discussed by AWG and EPC delegates and reflect the need to better understand recent developments and the expected changes over the projection period as regards the main features of the pension systems in the Member States.

The amendments to the 2012 reporting framework mainly stem from the following considerations.

- The willingness to improve the information disclosure of the reporting framework and to enhance the transparency and the reliability of the projections by allowing for consistency and internal coherence checks. Enhanced data availability can have an impact on the effectiveness of the peer review process by facilitating information exchange, highlighting best practices (as far as projection methodologies are concerned), and facilitating benchmarking of Member States when it comes to judging the viability of projection results. Moreover, it will enrich the contents of the forthcoming 2012 Ageing and Sustainability reports.
- The disaggregation of the projected annual flow of earnings-related pensions to new pensions in their main drivers contributes to the understanding of the future functioning of pension systems and is value added to the peer review and the transparency of the projection exercise. The AWG agreed to introduce

some flexibility in the reporting of the breakdown of the expenditure drivers for new pensions and coverage rates to cater for country specificities.

- Projections on contribution years and accrual rates would help by providing a clearer picture of the future drivers of the expenditure and the viability of the pension system as projected accrual rates might change over time and across different types of pensions. Pensionable earnings are essential to evaluate consistency between the development of pension expenditure and accruals. Over the coming years, some Member States have legislated extensions of the number of contributory years to be considered when calculating pensionable earnings: this should be documented and properly reflected in the projections.
- Many countries have introduced pension reforms that will increase the retirement age. To better understand the impact of these reforms on the coverage, and thus on pension spending, the reporting framework for the number of pensions and pensioners is extended to cover a wider range of current and future statutory (and effective) retirement and effective retirement age. The same information allows the driving forces behind the projected dynamics of the benefit ratio and how they are affected by pension reforms to be detached.
- The distribution of pensioners by age groups and gender will help increase the consistency within projections of population and the labour force across countries and over the projection period (as both statutory retirement and effective retirement age varies across countries and will change over time).

On this basis, the 2012 pension reporting framework has been expanded compared to the 2009 version. In particular, Member States have agreed to provide information on public earnings-related pensions for new pensioners and their main drivers, on pension expenditure and pensions by age group and data on pensioners broken down by age and gender (taking into account difficulties arising from double-counting that may undermine comparability). When such data are not available, an estimate for the number of pensioners should be provided.

To sum up, the 2012 reporting sheet is organised in nine broad groups of information to be provided:

- pension expenditure
- benefit ratio
- gross average replacement rates (at retirement)
- number of pensions
- number of pensioners
- contributions
- number of contributors to pension schemes
- assets of pension funds and reserves
- disaggregation of new public pensions (**earnings-related pensions**).

### 6.3. DEFINITIONS OF THE VARIABLES

#### 6.3.1. REPORTING NORMS AND INPUT DATA

Member States will run projections for the period **from 2011 up to 2060**. The data to be provided is annual data for each year of the projections. Both the statistical information for the years 2000–10 and the projections for years 2011–60 have to be presented in current prices. The base year of the projections is 2010.

The **GDP projections** for each country over the period 2011–60 are those generated by Commission services (Directorate-General for Economic and Financial Affairs) using the production function model on the basis of the agreed assumptions.

The change in **total gross wage** is projected for each country according with labour productivity growth and changes in the hours worked <sup>(78)</sup>.

The **average wages** are calculated as the ratio of total gross wages from national account data

and employed persons (both employees and the self-employed) aged 15–74. The average wage is projected to increase in line with the labour productivity growth rate.

All countries report **monetary values in EUR million**. For countries which are not part of the euro area, the conversion should be made on the basis of the average exchange rate for 2010, except for the ERM II countries for which the conversion is based on the central rates.

**The level of pension expenditure** should be adjusted to the official level of national accounts expenditure for the base year 2010.

Member States should report, in the country fiche accompanying the pension projection data, out-turn data back to 2000 and also comment on actual developments since 2000 to clarify the reasons behind specific changes and the overall evolution of pension spending in the past and their implications for the projections.

The pension projections include the impact of **the most recent pension reforms that will have entered into legislation before the cut-off date for the submission of the pension projections by delegates**. To this end, Member States will provide detailed descriptions of the projections, including recently introduced reforms, their implementation and their impact on the projection outcome in their updated country fiches.

#### 6.3.2. VARIABLES DEFINITIONS AND CLARIFICATIONS

##### Pension expenditure

*Definition:* Pensions expenditures should cover pensions and equivalent cash benefits granted for a long period (over one year) for old-age, early retirement, disability, survivors (widows and orphans) and other specific purposes which should be considered as equivalents or substitutes for the above mentioned types of pensions (i.e. pensions due to reduced capacity to work or due to labour market reasons).

*Clarification:* Pensions should include earnings-related pensions, flat-rate, means-tested benefits that aim to provide a social minimum pension and supplements which are a part of the pension and are granted for an indefinite period on

<sup>(78)</sup> In line with the assumption of constant labour share, gross wages includes employers' social security contributions.

the basis of certain criteria but which are not directly linked to the remuneration of costs (i.e. supplements aimed at supporting the purchase of home or healthcare services). Pensions and benefits can be paid from specific schemes or directly from government budgets. In particular, social assistance should be included if it is equivalent to a minimum pension (as for non-earnings-related minimum pensions). On the other hand, housing subsidies should be excluded from pensions and considered as other means-tested social transfers.

Short-term disability benefits should be considered as sickness benefits, while prolonged unemployment benefits to older workers should be considered within unemployment benefits.

Pensions should not include (additional) benefits in the form of reimbursements for certain costs to beneficiaries or directly provided goods and services for the specific needs of beneficiaries. Furthermore, they should not include social security contributions paid by pension schemes on behalf of their pensioners to other social protection schemes, notably to health schemes.

#### *Pension expenditure by age*

Many countries have introduced pension reforms that will increase the retirement age. To better understand the impact of these reforms, pension expenditure disaggregated by age groups between 54 and 75+ will be provided by the Member States with regards to public pensions and all pensions. This breakdown will increase transparency and consistency between population, labour force and pensioner projections.

#### *New pensions*

With the issue of targeting reforms and increasing transparency, Member States will provide annual projections for new pension expenditure for each of the pension schemes.

#### *Gross pension*

Pensions should be recorded as **gross pension expenditure** (i.e. without deductions of tax and compulsory social security contributions paid on benefits provided to the beneficiaries). In those countries where pensions are non-taxable income, gross pensions are equal to net pensions.

#### *Net pension*

Pensions should be recorded as net pensions (i.e. after deducting tax and compulsory social security contributions paid by the beneficiaries from gross expenditure).

#### *Categories of pension expenditure*

Many Member States have a multiplicity of pension schemes in place (e.g. for employees in different sectors). The parameters across systems might differ and the share of population covered by each system might change over time. To address these issues, Member States should fill the questionnaire for each scheme separately, in addition to the combined overall information.

#### *Public schemes and other public pensions*

*Definition:* Public schemes and other public pensions are the schemes that are statutory and that the general government sector administers <sup>(79)</sup>.

---

<sup>(79)</sup> In line with Eurostat (2004), 'If a government unit is responsible for the management of a defined-contribution funded scheme for which no government guarantee exists for the risks of defaulting payments covering the majority of the participants, the scheme is not treated in the national accounts as a social security scheme in the government sector. In such schemes, the schemes are not financed by the government nor does the government define the level of pensions to be paid (the members have a say in how much they contribute and how their contributions are invested). Thus, the contributions and payments in respect of such schemes have no impact on the EDP deficit, as they are stripped out of general government revenue and general government expenditure, respectively'. Moreover the same source, with regards to funded schemes underlines that 'In recent years, some countries have set up defined-contributions funded pension schemes (or identifiable as such — see below) where a government imposes or encourages participation, collects contributions from employers and pays pension benefits to households, fixes the level of contributions and maybe change the rules, but where it is explicitly stated that pension benefits will predominantly depend on accumulated assets. Under these conditions, it seems that all ESA95 criteria for classifying such schemes as social security schemes are not fulfilled, as government is not fixing the level of the pension benefit and it is difficult to consider that it is "financing" the scheme'. Further information can be found in Eurostat (2004), *Classification of funded pension schemes and impact on government finance*, Economy and finance collection: Methods and nomenclatures working papers, Office for Official Publications of the European Communities, Luxembourg, 2004.

*Clarification:* The aim is to cover those pension schemes that affect public finances, in other words schemes that are considered to belong to the general government sector in the national account system. Usually, there is a specific or general social security contribution to the scheme, which is defined as part of total taxes in the national accounting system. However, the scheme can also be financed, either partially or fully, by general taxes. Thus, ultimately, the government bears the financial cost and risk attached to the scheme. The pensions provided by the social security schemes can be either earnings-related, flat-rate or means-tested. In addition, this category should cover pensions that are paid directly from the state or other public sector entity budget without forming a specific scheme such as special pensions to public sector and armed forces' employees. Cash benefits equivalent to pensions, notably social assistance to older persons (people aged over the statutory retirement age, usually 65 years), should be included in this category.

Regarding the distinctions between public and occupational pensions as well as the identification of pension schemes within these categories, see Table 6.3: Coverage and specification of pension schemes in the 2012 projection.

The statutory-funded part of old-age pension schemes that is attached to notional defined contribution schemes in some countries should be excluded from social security schemes and included in the private sector schemes in accordance with the Eurostat decision <sup>(80)</sup>.

#### *Occupational pensions*

*Definition:* Pensions provided by occupational schemes are those that, rather than being statutory by law, are linked to an employment relationship with the scheme provider. They are based on contractual agreements between employers and employees, either at company level or organisations at union level. The schemes are run by private sector pension funds, insurance companies or the sponsoring companies themselves (in balance sheets).

*Clarification:* These schemes can be quasi-mandatory in the sense that, on the basis of a nation or industry-wide bargaining agreement, the employers are obliged to provide an occupational pension scheme to their employees. On the contrary, participation of an individual remains voluntary. Occupational schemes can be equivalent to statutory earnings-related pension schemes or complementary to them. In particular, it is important to include in the projections the schemes that play a role equivalent to social security schemes in the pension provision. The AWG agreed that, for the projection of private pensions, the real rate of return on private funded pensions should be equal to the real interest rate (3 %).

#### *Private pensions*

For the most part, private individual pension schemes are non-mandatory but they can also be mandatory <sup>(81)</sup>. The insured persons have ownership of the pension assets. This means that the owner enjoys the rewards and bears the risks regarding the value of the assets. The insurance contract specifies a schedule of contribution in exchange of which benefits will be paid when the members reach a specific retirement age. The scheme provider administers the scheme by managing the pension assets through a separate account on behalf of its members. The access to such a scheme does not require an employment relationship, even though, in some cases, contributions may be set on the basis of the individual's wage. The AWG agreed that, for the projection of private pensions, the real rate of return on private funded pensions should be equal to the real interest rate (3 %).

#### *Mandatory private pensions*

*Definition:* Mandatory private pension schemes are similar to public schemes. Transactions occur between the individual and the insurance provider. Transactions are not recorded as government revenues or government expenditure and, therefore, do not have an impact on government surplus or deficit. Pension expenditure projections should cover the individual schemes that switch at least a part, either voluntarily or

---

<sup>(80)</sup> 'Classification of funded pension schemes in case of government responsibility and guarantee', Eurostat news release 30/2004, 2 March 2004.

---

<sup>(81)</sup> Definitions of mandatory and non-mandatory pension funds are given in the next paragraphs.



statutorily (especially to new entrants to the labour market), from the current social security scheme to private funds. Such schemes have an increasing relevance in a number of countries.

*Clarification:* In some cases, there are government guarantees to these pension schemes. Nevertheless, such a guarantee is a contingent liability by nature and these liabilities are not considered as economic transactions until they materialise. Thus, the Eurostat decision further specifies that a government guarantee is not an adequate condition to classify such schemes as social security schemes.

#### *Non-mandatory private pensions*

*Definition:* Non-mandatory private pensions are based on individual insurance contracts between the individual and the private pension scheme provider, usually an insurance company or a pension fund. The category of individual schemes includes pension schemes for which membership is not required by law and is independent of any employment link (even if members are mostly employed people). However, employers or the State may, in some cases, contribute to the plan. Such schemes may also be adhered to through membership in an association.

*Clarification:* The main difficulty in analysing individual provision stems from the fact that it is difficult to distinguish from the various types of savings, those that are clearly for retirement purposes. Part of the savings that are not specifically labelled ‘pension savings’ may be used for retirement purposes, whereas part of the savings collected by retirement schemes may — depending on national rules — in fact be used for other purposes than providing periodic retirement income (e.g. one-off lump sums benefits, early withdrawal options). The extent to which these schemes are used for retirement savings depends notably on the conditions attached to them (e.g. tax incentives linked to the condition that the bulk of such savings must be used for a regular income (annuity) rather than for paying out a lump sum or the minimum age at which a person can access such retirement savings). In some cases, pension instruments are used rather as investment vehicles with noticeable tax advantages, for instance when a number of years are requested for the plan participation in order to benefit from the lower tax rate.

### **Breakdown of public pensions**

#### *Old-age and early pensions*

Old-age and early pensions should be considered as a single category of pensions due to the fact that, in many countries, a proper distinction between these two components cannot be made, either because early retirement is included in the old-age pension system, or because the standard retirement age varies between gender and will increase or become more flexible with time. Early pensions should include — in addition to genuine (actuarial) early retirement schemes — other early pensions schemes that are granted, primarily on the basis of reduced work capacity or labour market reasons, to a specified (age) group at an age below the statutory retirement age (different from disability pensions to be reported separately).

Moreover, with the aim of identifying earnings-related pension expenditures, the modality ‘**Non-earnings-related minimum pensions/ minimum income guarantee for persons at or over statutory retirement age**’ has been included in the reporting framework. In line with what was stated regarding the general definition of pension expenditure, social assistance, if equivalent to a minimum pension and targeted to people aged over 55, must be included in the projections.

#### *Earnings-related pensions to private sector employees*

Within the category of old-age and early public pensions, a separation of earnings-related pensions into **public and private sector employees** is requested in order to follow the projected evolution of pensions between private and public sector employees. Flat-rate or means-tested minimum pensions that are not based on employment, but which only guarantee a certain social minimum, should be excluded in this category and reported elsewhere (while the minima of earnings-related pension schemes and supplements to reach the minimum should be included). If it is possible to follow the pension accrual of those persons who have worked both in the private and public sector, this distinction could be made both regarding the expenditure of pensions and the number of pensioners. Otherwise, estimates can be made on the basis of a full career in one of the sectors.

### *Earnings-related pensions to public sector employees*

As above, employees of the public sector should include those working in national, regional and municipal government bodies as well as social security institutions. In practice, where there are different pension schemes for public and private sector employees, the definitions of the schemes can be followed.

### *Disability pensions*

Expenditure related to disability should consider both earnings-related pensions and flat-rate or means-tested minimum pensions of this type. Some countries, for instance, consider disability pensions (benefits) as part of their sickness insurance scheme while in others they belong to the pension scheme. Furthermore, in some countries, the pension retains the same classification from the time when it is first granted until payments end, in most countries, an early disability pension is transformed into an old-age pension when the beneficiary reaches the standard old-age retirement age.

In line with the agreement regarding to long-term care and healthcare projection methodologies (Chapter 8), *care allowances* (benefits paid to disabled people who need frequent or constant assistance to help them meet the extra costs of attendance) and *economic integration of the handicapped* (allowances paid to disabled people when they undertake work adapted to their condition, normally in a sheltered workshop, or when they undergo vocational training) have to be considered as long-term care expenditure and, hence, should not be included when calculating disability pensions.

### *Other pensions (survivors)*

Other pensions should mostly include survivors' pensions without any age limit. These should include both earnings-related pensions and flat-rate or similar means-tested minimum pensions.

### **6.3.3. BENEFIT RATIO AND REPLACEMENT RATE AT RETIREMENT**

For a better understanding of projected expenditure, the following components of the reporting framework are key.

### *Benefit ratio*

*Definition:* The benefit ratio is the average pension benefit divided by an economy-wide average wage, as calculated by the Commission.

*Clarification:* The evolution of the benefit ratio is crucial in analysing and understanding the projection results as it reflects the features of the legal framework of pension systems as far as the calculation and indexation rules are concerned.

The benefit ratio captures several features at the same time. Firstly, it reflects the assumed increases in average pensions due to indexation rules, the maturation of the pension system and longer contribution periods. Secondly, it reflects the changes in average wages driven by the assumptions on labour productivity growth rates. Thirdly, it also captures the changes in the structure of the respective population groups, in particular the share of pensioners and wage earners in each year of the projection exercise.

### *Gross average replacement rate (at retirement)*

*Definition:* The gross average replacement rate at retirement is the ratio of the first pension of those who retire in a given year over the average wage *at retirement*. The (economy-wide) average wage of old people at their retirement usually differs from the overall economy-wide average wage, unless a flat wage profile over the entire working career is assumed in the projection exercise.

*Clarification:* In the case of social security pension schemes, the gross average replacement rate (at retirement) reflects only earnings-related pensions.

Gross average replacement rates (at retirement) should be provided for all schemes, if possible.

### **6.3.4. DISAGGREGATION INTO STOCK AND FLOWS OF PENSION EXPENDITURE**

#### *New public earnings-related pensions*

*Definition:* New pensions expenditure is to be calculated separately for those who retire in the considered year.

New pensions expenditure can be disaggregated as follows:

$$P_{new} = \bar{C}_{new} \bar{A}_{new} \bar{P}\bar{E}_{new} N_{new} \quad [1]$$

where:

$P_{new}$  is the overall spending on new pensions;

$\bar{C}_{new}$  is the average contributory period or the average years of service of the new pensions;

$\bar{A}_{new}$  is the average accrual rate of the new pensions;

$\bar{P}\bar{E}_{new}$  is the average pensionable earning over the contributory period related to the new pensions; and

$N_{new}$  is the number of new pensions (pensioners).

Changes in the flows of pensions and pension expenditure over time should properly reflect the impact of recently legislated reforms in the functioning of pension systems and would provide useful insights on their impact.

*Clarification:* Publicly provided earnings-related pension schemes can be classified in the following three broad schemes: *defined benefit* (DB); *notional defined contribution* (NDC); and a *points system* (PS). According to Table 6.1: Pensions schemes across Member States, 19 of the 27 Member States have public DB schemes, five of them have an NDC and four are based broadly on a PS<sup>(82)</sup>.

In order to accommodate every single different scheme into the agreed reporting a simple and stylised version of these schemes can be used<sup>(83)</sup>.

For every single person who retires, a simple defined-benefit plan pays an average accrual rate  $a$  for each year of service. The accrual rate is calculated on (lifetime) average revalued

**Table 6.1:**  
Pensions schemes across Member States

Country	Type	Country	Type
BE	DB	LU	DB
BG	DB	HU	DB
CZ	DB	MT	Flat rate + DB
DK	DB	NL	DB
DE	PS	AT	DB
EE	DB	PL	NDC
EL	Flat rate + DB	PT	DB
ES	DB	RO	PS
FR	DB + PS	SI	DB
IE	Flat rate + DB	SK	PS
IT	NDC	FI	DB
CY	DB	SE	NDC
LV	NDC	UK	DB
LT	DB	NO	NDC

Source: Commission services

earnings. The pension benefit can therefore be written as:

#### Defined benefit

$$P = \sum_{t=0}^T w_t (1 + v_t)^{T-t} a_t \quad [2]$$

where:

$w$  is the individual's earnings (or contribution bases) in year  $t$ ;

$T$  is the year of retirement; and

$v$  is the factor by which earlier years' earnings are revalued<sup>(84)</sup>.

*Notional defined contribution schemes:* In notional defined contribution schemes, the financing inflow over the contribution period is given by wages multiplied by the contribution rate  $c$ . This notional capital is increased each year by the notional interest rate,  $\beta$ . At retirement, the accumulated notional capital is divided by a notional annuity factor  $A$ . The pension benefit for a single person can be written as:

$$P = \frac{\sum_{t=0}^T w_t c_t (1 + \beta_t)^{T-t}}{A_T} \quad [3]$$

<sup>(82)</sup> France is counted twice: in the DB group and in the PS group.

<sup>(83)</sup> The approach is largely based on Whitehouse, E. R. (2010), 'Decomposing National Defined-Contribution Pensions: Experience of OECD Countries' Reforms', *OECD Social, Employment and Migration Working Papers* No 109, OECD Publishing.

<sup>(84)</sup> In most Member States, this is the growth of economy-wide average earnings.

### Points systems

In a points system, pension points ( $w/k$ ) are calculated by dividing earnings  $w$  by the cost of the pension point  $k$ . The pension benefit then depends on the value of a point  $v$  at the time of retirement. This last variable is upgraded over time according with the parameter  $\delta$  in the following equation. Thus, the pension benefit can be written as:

$$P = \sum_{t=0}^T \frac{w_t v_t}{k_t} (1 + \delta_t)^{T-t} \quad [4]$$

If the rule for indexing earlier years' earnings in DB systems is the same as for notional interest rate and for the upgrading procedure for the pension point (i.e.  $v = \beta = \delta$ ), then the structure of the three equations is similar. If this is the case, **the accrual rate  $a$**  under a generic defined-benefit scheme is equivalent to the **ratio of the pension-point value to its cost ( $v/k$ )** and to the **ratio of the notional-accounts contribution rate to the annuity factor ( $c/A$ )**. So, for  $v = \beta = \delta$ :

$$a = \frac{v}{k} = \frac{c}{A} \quad [5]$$

Moreover, **pensionable earnings** in the three schemes are calculated as the **sum over the contributory period (years of service) of the valorised wages**. Finally,  $T$  is the **contributory period**.

As underlined by Whitehouse (2010), this approach has two implications for the comparison of these three different types of earnings-related pension scheme:

- (a) it allows the calculation of the effective accrual rate for pension-point schemes and notional-accounts schemes;
- (b) the valorisation procedure in defined-benefit plans, the upgrading policy for the pension-point value and the setting of the notional interest rate can be seen as similar policies.

To deal with the three different schemes, the following components have been introduced to the reporting framework (Annex 6.1). *Block 9 — Disaggregation of new public pension expenditure — earnings-related is*

divided into three subgroups related to DB, PS and NDC schemes and Member States will provide information on their own system in accordance with the structure of the specific subgroup. In particular, for those who adopt an NDC or a PS, the components of the average accrual rate are to be provided: *point value ( $v$ )* and *point cost ( $k$ )* for Member States adopting a PS and *notional accounts contribution rate ( $c$ )* and *annuity factor ( $A$ )* for those who rely on NDC systems.

To assure the sustainability of their pension systems, several Member States introduced automatic balancing mechanisms referred to as '**sustainability/adjustment factors**'. The way these factors operate has to be taken into account when dealing with new pension expenditure projections, according to their specific rules. Member States will also provide information about the evolution of the adjustment factors when reporting new pensions expenditures.

As not all new pensioners retire on 1 January, the simple formula proposed refers to the average monthly new pension. To be consistent with the data on the total expenditure on new pensions (line 16 in the reporting sheet, Annex 6.1), and to allow for a check of the reported data, Member States are asked to provide the **average number of months of pension paid the first year**. If there is no specific constraint due to legislation, the new pensioners are spread over the year according to some distribution. If a symmetrical distribution over the year is assumed (or empirically fitted to the data), the **average number of months of pension paid the first year** turns out to be six. If the distribution is asymmetrical, the average should be calculated according to the distribution considered. If there is a single retirement date fixed by law, the **average number of months of pension paid the first year** turns out to be the difference to the end of the year. If more than one retirement date is fixed by law, the **average number of months of pension paid the first year** should be calculated as an average of the remaining months (the difference between 12 and the month of retirement), weighted by the number of people that retire at each specific date (if available, or assuming a distribution of new retire persons among the dates).

Hence, independently of the type of scheme adopted by the Member State, the following



calculation should be effective and exploited as a check of the correctness of projections on new pensions expenditure (all numbers are referred to lines in the pension reporting sheet (Annex 6.1):

$$\text{line 16} - [\text{line 152} \times \text{line 153} \times \text{line 154} \times \text{line 156} \times \text{line 151}] = 0 \quad [5]$$

An alternative use of the data on new public earnings-related pension is that of analysing the development and internal consistency of the stock of old pensions (those already existing at the beginning of the year to be calculated as the difference of the total and the ‘new’ pensions in the reporting sheet). At every point in time  $t$ , the projection of average pension expenditure related to ‘old pensions’ must be close to the value of average pension expenditure at the year  $t-1$  indexed by the rule applied in each country and scheme, and thus:

$$\frac{(P_{t-1}/N_{t-1})(1+\varepsilon)}{P_t^{old}/N_t^{old}} \approx 1 \quad [6]$$

where:

$P_{t-1}$  is the projection of total public earnings-related pensions expenditure at time  $t-1$  (line 15);

$N_{t-1}$  is the number of pensioners entitled to a public earnings-related pension at time  $t-1$  (line 93);

$(1+\varepsilon)$  is the pension indexation rule applied in each country and scheme;

$P_t^{old}$  is the projection of the ‘old’ pensions expenditure at time  $t$  (total public earnings-related pensions expenditure (line 15) minus the expenditure related to ‘new’ public earnings-related pensions (line 16));

$N_t^{old}$  is the number of old pensioners at time  $t$ . This is to be calculated as the difference between total pensioners entitled to a public earnings-related pension (line 93) minus the new pensioners in the same typology of pension (line 151), as reported in the last block of the reporting sheet.

Such an indicator is expected to take value close to 1 if projections are internally consistent and

the distribution of the retired people has not been selected by mortality <sup>(85)</sup>.

#### 6.3.5. ADDITIONAL INFORMATION ON THE NUMBER OF PENSIONERS, CONTRIBUTORS AND CONTRIBUTIONS TO PENSION SCHEMES AND ASSETS OF PENSION FUNDS

##### *The number of pensions*

The number of pensions reflects the number of cases in which a pension is paid to an individual. Each type of pension should be considered separately.

The total of all pensions and public pensions should be reported by age groups. This breakdown, the provision is mandatory with regard to the public scheme, will increase transparency and consistency between population, labour force and pension projections.

##### *The number of pensioners*

The number of pensioners for each type of pension should be considered separately, allowing for the fact that the same person may be the recipient of several types of pension: for instance, a recipient of a social security pension and a private mandatory pension. Thus, the detailed lines should reflect the number of recipients of specific pensions but the figures in the summary lines (in particular the total of all pensioners) are not likely to match the sum of the subtotals. Ideally, the number of all pensioners (line 101) should be the number of persons who receive pension benefits but calculated only once in case of receipt of multiple pensions. If an exact figure is not available, an estimate is preferred to a mere summing up. If such a rule is applied, a minimum requirement of the projections is that the number of pensioners should be smaller than the number of pensions.

<sup>(85)</sup> If the assumption of orthogonality between mortality and pension distribution is removed, we are left with the empirical evidence that mortality rates are higher for older people, and that these people receive, on average, smaller pensions. This will result in  $P_t^{old}/N_t^{old}$  being larger than  $P_{t-1}/N_{t-1}$ . In terms of the proposed indicator, a value smaller than 1 (but still close) is to be expected.

The overall number of pensioners by age group should be consistent with agreed figures on the labour force. The share of pensioners in each age group should be below, but very close to, the total of the inactive population in the same group.

A breakdown of pensioners by age and gender should be provided by Member States with regards to public pensions and all pensions. This breakdown is needed to increase transparency and consistency between the population, labour force and pensioner projections. In particular, it will allow for consistency checks between gender-specific labour force participation rates and gender-specific pensioners. Some form of correlation should be evident (once mortality rates have been taken into account) between today's participation rates and pensioner groups projected for 30/40 years in the future. These data should be particularly interesting when analysing the effects of reforms with regards to the effective retirement age. Furthermore, the overall number of pensioners can be compared with the inactive population, for different age groups so as to gain further insights.

The availability of data on pensioners (or pensions as a second best) is particularly relevant when decomposing pension expenditure on GDP. In particular, they allow for the calculation of the **coverage ratio**.

The coverage ratio effect is defined as the number of pensioners of all ages in relation to the population over 65 years or any other defined age threshold. The analysis of the coverage ratio provides information on how the developments of the effective exit age and the percentage of population covered impact on pension spending. The coverage ratio should also be disaggregated by age groups and be calculated in relation to the inactive population (to check the consistency with labour force projections).

#### *Contributions to pension schemes*

Contributions to pension schemes paid by both employers and employees as well as self-employed persons provide information on whether or not there is a potential future financial gap in the pension system. If the pension contribution is part of a broader social security contribution rate, an estimate should be provided, if possible, for the share of the

pension contribution, for example on the basis of the most recent expenditure structure. In the case that the pension is financed by general tax revenues, no estimate should be provided here.

Estimates of pension contributions to public and private mandatory schemes, notably concerning the category of old-age and early pensions are relevant. As regards other pensions, such as disability and survivors' pensions, contributions should be reported separately only if these pensions are managed by separate, specific schemes. In the case where they are part of the old-age pension scheme, no separation of contributions between different types of pensions is requested but the total contribution should be presented in the context of old-age and early pensions.

#### *Number of contributors*

As in the case of the number of pensioners, the number of contributors to each type of pensions should be considered separately, allowing for the fact that the same person may be a contributor to several schemes. This is the case, for instance, for pension systems in which a part from a public scheme is switched to a private (mandatory) pension scheme. However, the line of total pension contributors should count contributors only once in the case where the person contributes to more than one scheme at the same time. Thus, the number of contributors should be close to the number of employed persons or active-age population as projected by Commission services and AWG.

As for contributions, it is important to provide estimates of the numbers of contributors to social security and private mandatory schemes, notably concerning the category of old-age and early pensions. The number of contributors to other schemes should be presented only in the case of separate schemes for these purposes.

The number of contributors should correspond to an estimate of the number of persons covered by pension schemes without regard to the amount of the contribution. Thus, a contributor in a short-term contract should count as a contributor in a permanent (full-time) contract. However, in practice, a contributor in a short-term contract may appear as a contributor several times during a year and it may not be possible to disaggregate the number of contributors during a year from the number

of contribution periods. Therefore, a better proxy for the number of persons covered by pension schemes would be the number of contributors at a given point of time (e.g. at the end of the year).

#### *Assets of pension funds and reserves*

The information on assets of pension's funds and reserves, including pre-financing to specific reserves within the government sector, is requested separately for public schemes, occupational pension schemes and private mandatory and non-mandatory pension schemes. This information is an important complement to the contribution information when the financial balance of the pension schemes is assessed.

As regards the government sector, a distinction needs to be made between national government bonds and other assets, since the former are netted out in the compilation of gross debt (Maastricht debt), while the latter are not.

It is important for Member States to provide information on the current situation

from 2000 up to the most recent year for which the information is available. It remains optional to make projections of assets' evolution. This should take into account both the gross accumulation and withdrawals for the payment of pensions. It is important to know the factors affecting the accumulation and withdrawals, in particular, if the accumulation is not based on the surplus of pension contributions over pension payments and if the withdrawals are discretionary. For example, in some countries, accumulation of pension reserve funds (for social security schemes) is based on the surplus in the social security schemes or on deliberate decisions to put aside a fraction of government revenues. For the rate of return on assets, the same value (3 %) and dynamics (convergence up to 2015 for almost all Member States) of the real interest rate are assumed; furthermore, this rate is assumed to cover the administrative expenses of the fund. The information on the total value of assets in pension funds, including pre-financing to specific reserves within the government sector, is provided separately concerning public pension schemes, occupational pension schemes and private pension schemes.

**Table 6.2:**  
Overview of the pension systems in Member States

Public pensions (public sector schemes)		Occupational pension schemes (private sector schemes)
BE	<i>Minimum guarantee pensions:</i>	The legal framework has been established: the Law on additional pensions of 28 April 2003, centred on sectoral pension scheme, improving the access to them and giving more guarantees to workers. Pensions: 1.1 % of GDP in 2007
	Means-tested minimum pensions through social assistance (GRAPA-IGO)	
	<i>Earnings-related public pensions:</i>	
	Separate schemes for private and public sector employees, self-employed; schemes cover old-age and survivors' pensions, and disability pensions in the case of civil servants (which are included in public (public) pensions in this report).	
	These schemes include minimum pensions based on career conditions. The wage earner scheme includes the minimum claim per working year.	
	Disability pension schemes for private sector employees and self-employed.	
	Early retirement (pre-pension) through an unemployment benefit and a supplement from the employer.	

	Public pensions (public sector schemes)	Occupational pension schemes (private sector schemes)
<b>BG</b>	<p><i>Minimum guarantee pensions:</i></p> <p>Social pension for old age (means-tested). As of 2013 will be shifted to Social Assistance.</p> <p><i>Earnings-related public pensions:</i></p> <p>One DB pension scheme covering all employees and self-employed.</p> <p>Earnings-related old-age, disability and survivors' pensions including minimum pension amounts stipulated in the annual Law on the PSI Budget.</p> <p><i>Non-contributory pensions:</i></p> <p><i>Pensions at the State budget expense:</i></p> <p>Special merits pensions</p> <p>Social pensions for old age — will be shifted to Social Assistance as of 2013</p> <p>Social pensions for disability — will be shifted to Social Assistance as of 2013</p> <p>Military disability pensions</p> <p>Civil disability pensions</p> <p>Special personal pensions</p> <p>Some pensions under revoked laws</p>	<p>Supplementary voluntary pension funds under occupational schemes (third pillar).</p>
<b>CZ</b>	<p><i>Minimum guarantee pensions:</i></p> <p>No special scheme, embedded in the pension formula (flat-rate component).</p> <p><i>Earnings-related public pensions:</i></p> <p>One scheme covering the whole population, covering old-age, disability and survivors' pensions.</p>	<p>Do not exist</p>
<b>DK</b>	<p><i>Minimum guarantee pensions:</i></p> <p>Universal flat-rate pensions for every citizen (subject to the time lived in Denmark), means-tested supplements to those without occupational pensions, tax-financed</p> <p>Disability pensions for those aged less than 65</p> <p><i>Earnings-related public pensions:</i></p> <p>Voluntary early retirement pensions (requires 30 years of contributions; pension benefit dependent on age, not on contributions)</p> <p>Civil servants' pensions for central and local government employees (in coming years these schemes will be replaced by ordinary labour market (occupational) pensions)</p>	<p>Labour market (occupational) pensions (private sector covering 90 % of the employees)</p> <p>Labour market supplementary pensions (ATP)</p> <p>Labour market supplementary pensions for recipients of anticipatory pensions (SAP)</p> <p>Employees' capital fund (LD); all these schemes are fully funded</p>
<b>DE</b>	<p><i>Minimum guarantee pensions:</i></p> <p>No special scheme but disabled and older people without sufficient income are entitled to means-tested benefits (social assistance)</p> <p><i>Earnings-related public pensions:</i></p> <p>General scheme covering private and public sector employees: the scheme covers old-age, disability, early retirement and widows' pensions; specific schemes for lifetime civil servants as well as farmers and miners</p>	<p>Occupational pension provision existing</p> <p>Benefits accounted for 1.3 % of GDP in 2009</p>
<b>EE</b>	<p><i>Minimum guarantee pensions:</i></p> <p>National pension equal to the base amount of the pension insurance scheme, available to those not qualifying for the insurance scheme and having lived in Estonia for at least five years</p> <p><i>Earnings-related public pensions:</i></p> <p>One scheme covering the whole population; old-age, disability and survivors' pensions; benefits are flat-rate plus a length-of-service supplement for careers before 1999; from 1999 benefits have been earnings-related</p>	<p>Do not exist</p>

	Public pensions (public sector schemes)	Occupational pension schemes (private sector schemes)
EL	<p><i>Minimum guarantee pensions:</i></p> <p>Means-tested minimum pensions through OGA for uninsured old-age beneficiaries beyond the age of 65.</p> <p><i>Earnings-related social security pensions:</i></p> <p>A great number of separate main pension insurance and auxiliary funds for different sectors and occupational groups; schemes cover old-age, early retirement, disability and survivors' pensions; benefit levels differ across schemes</p>	<p>The few already existing occupational funds do not cover pensions except one which pays a 10-year annuity.</p>
ES	<p><i>Minimum guarantee pensions:</i></p> <p>Means-tested minimum pension scheme (non-contributory) <sup>(1)</sup></p> <p>Means-tested minimum pension (contributory)</p> <p><i>Earnings-related public pensions:</i></p> <p>One main social insurance scheme, covering private sector employees, self-employed and the regional and local public administrations, providing earnings-related old-age, disability and survivors' pensions</p> <p>Public sector employees' (contributory) pension scheme (CPE) for civil servants of the central public administration and the military, providing mainly old-age, disability and survivors' pensions, though five different levels of pensions according to the career level. Starting from 1.1.2011, all new civil servants are in the public scheme and not the CPE.</p> <p><small>(1) This is a minimum income for the elderly and the disabled who have not contributed before. It includes old-age pensions (65+) and disability pensions (-64). The share of old-age is 57 % of total non-contributory pensions: this amounted to 0.1 % of GDP in 2007. Total non-contributory pensions amounted to EUR 2 119 million in 2007; EUR 2 137 million in 2008.</small></p>	<p>Voluntary enterprise pension schemes for private sector employees (funded DC schemes and collective insurance DB)</p> <p>Mandatory supplementary pension scheme for public sector employees of the central administration (funded DC scheme)</p> <p>Schemes are of some importance.</p>
FR	<p><i>Minimum guarantee pensions:</i></p> <p>Means-tested minimum pension</p> <p><i>Earnings-related public pensions</i></p> <p>Several separate pension schemes for different sectors and occupational groups providing earnings-related pensions; additionally, there are mandatory 'second tier' supplementary funds that complement the pension provision; these schemes cover old-age and survivors' pensions</p> <p>Disability pensions (benefits) are covered by the health insurance scheme.</p>	<p>Voluntary occupational pension schemes for private sector employees (PERE and PERCO) were introduced by 2003 reform covering 400 000 people for a cumulated amount of contributions of EUR 2 billion in 2008.</p> <p>Also an old occupational pension scheme (Articles 82, 83 and 89 of the <i>Code Général des impôts</i>, CGI) covering roughly 3.6 million of people for a cumulated amount of contributions of EUR 76 billion in 2008.</p> <p>Self-employed occupational pension scheme (Madelin Law No 94 and Law No 97) covering 1.3 million of people for a cumulated amount of contributions of EUR 19 billion in 2008.</p>

	Public pensions (public sector schemes)	Occupational pension schemes (private sector schemes)
IE	<p><i>Minimum guarantee pensions:</i></p> <p>Means-tested minimum flat-rate pensions and age-related benefits (old-age, widows', disability, carers' and blind persons' and pre-retirement allowances) through non-contributory social assistance scheme</p> <p><i>Contributory social insurance pensions:</i></p> <p>Contributory social insurance scheme provides flat-rate pensions and age-related benefits (old-age, transition, and widow(er)s' pensions, carers, invalidity and disability benefits)</p> <p><i>Public service (occupational) pensions:</i></p> <p>Public service occupational pension scheme</p>	<p>Voluntary occupational schemes for private sector employees</p> <p>Some 31.6 % of current pensioners also receive occupational pensions, amounting to 24.2 % of total pension income.</p> <p>Pension coverage for workers aged between 20 and 69 was 51 % in the first quarter of 2009.</p>
IT	<p><i>Public pension system:</i></p> <p>There is one main public pension system, based on NDC (contributions-based) regime, covering the whole population, providing old-age, early retirement, disability and survivors' pensions. It is financed according to the pay-as-you-go principle. It is flanked by the DB (earnings-related), mixed regimes in the transitional phase.</p> <p><i>DB and Mixed regimes:</i></p> <p>Old DB regime fully applies to workers with at least 18 years of contributions at the end of 1995. The Mixed regime (part DB and part NDC, according to the pro rata rule) applies to workers with less than 18 years of contribution in 1995. Means-tested topping up to a minimum pension (EUR 6 088 per year, in 2011) is foreseen, subject to the fulfilment of the general eligibility requirements.</p> <p><i>NDC regime:</i></p> <p>NDC regime applies fully to workers entering the labour market as of 1996. Means-tested topping up to a minimum pension, foreseen under DB and Mixed schemes, is no longer provided. Pensions awarded to people less than 65 must be at least 1.2 times the old-age allowance.</p> <p><i>Minimum income guaranteed to the elderly:</i></p> <p>Social assistance benefits are provided to low-income elderly above a given age, regardless of their contribution record. They are means-tested and include: old-age allowance (EUR 5 435 per year, in 2011) and social assistance additional lump sums.</p> <p>They are provided to the elderly with a personal income (in case of a single) or couple's income (in case of married people), including public pensions, below and up to certain limits.</p> <p>In 2011, personal income limits are EUR 5 600 per year (aged 65–69) and EUR 7 850 (aged 70+). For married people, a couple's income limits are EUR 11 680 per year (aged 65–69 (referring to the beneficiary)) and EUR 13 290 (aged 70+).</p>	<p><i>Occupational pension schemes:</i></p> <p>Occupational, supplementary pension schemes exist. They are funded and never mandatory. The 2004 reform (Law 243/2004) and its 2005 implementation (Law Decree 252/2005 and Law 296/2006) increased the provisions for occupational pensions through the possibility to transform TFR (end-of-service allowance) into an occupational pension scheme. Contributors and contributions has increased significantly.</p> <p>Current pension expenditure is 0.1 % of GDP.</p>
CY	<p><i>Minimum guarantee pensions:</i></p> <p>Through the minimum pension under the General Social Insurance Scheme and through the Social Pension scheme and special allowances to pensioners</p> <p><i>Earnings-related public pensions:</i></p> <p>General social insurance scheme covering all employees and the self-employed, providing old-age, disability, survivors' and orphans' pensions; and Government Employees Pension Scheme (paid from the Government budget)</p>	<p>Mandatory funded pension schemes for semi-state sector employees and for employees in certain professions</p> <p>Voluntary funded pension schemes, including provident funds, for private sector employees</p>



	Public pensions (public sector schemes)	Occupational pension schemes (private sector schemes)
LV	<p><i>Minimum guarantee pensions:</i></p> <p>Through the state public benefit, if the person's insurance records less than 10 years.</p> <p><i>Earnings-related public pensions:</i></p> <p>The minimum of the earnings-related pension system is paid with a length-of-service supplement to the amount of the state security benefit, if the contribution record exceeds 10 years.</p> <p>One social insurance old-age pension scheme, which is a defined-benefit scheme for those, retired before 1996 and notional defined contribution scheme for those retired from 1996, providing old-age pensions. Also survivors' pensions are based on NDC contributions (except for those retired before 1996).</p> <p>Separate provisions for disability pensions, though under the general public system</p> <p>Specific public sector service pensions (selected professions) paid from the State budget.</p>	Do not exist
LT	<p><i>Minimum guarantee pensions:</i></p> <p>Through a social assistance pension (also to young disabled persons and orphans).</p> <p><i>Earnings-related public pensions:</i></p> <p>One social insurance pension scheme covering all employees and the self-employed, providing old-age, disability and survivors' pensions, and early retirement pensions as of 2004.</p> <p>Special state (old-age, disability and survivors') pensions paid from the State budget to specific groups: scientists, judges, officials and military personnel).</p> <p>State pensions for meritorious persons and casualties: state pensions of the first and second degree of the Republic of Lithuania (State budget); state pensions for deprived persons.</p>	Do not exist
LU	<p><i>Minimum guarantee pensions:</i></p> <p>Through means-tested minimum income provision (RMG)</p> <p><i>Earnings-related public pensions:</i></p> <p>A general social insurance pension scheme for private sector workers, providing old-age, disability and survivors' pensions</p> <p>A special pension scheme for public sector employees (10 % of pensioners)</p>	Exists for some sectors such as banking and for large foreign companies
HU	<p><i>Minimum guarantee pensions:</i></p> <p>Through means-tested social assistance</p> <p><i>Earnings-related public pensions:</i></p> <p>One public pension scheme covering all employees and the self-employed, providing old-age, early retirement, disability and survivors' pensions</p>	Do not exist
MT	<p><i>Minimum guarantee pensions:</i></p> <p>Means-tested minimum pensions through social assistance (non-contributory) scheme to persons not qualified for the contributory scheme</p> <p><i>Earnings-related public pensions:</i></p> <p>One public (contributory) pension scheme covering all employees and the self-employed, providing old-age, disability and survivors' pensions (apart from unemployment, sickness and work injury benefits).</p>	Exists only to a minor extent
NL	<p><i>Minimum guarantee pensions:</i></p> <p>Social assistance to those not qualifying (i.e. have not lived in the Netherlands for 50 years) to contributory flat-rate scheme</p> <p><i>Contributory social insurance pensions:</i></p> <p>General flat-rate old-age pensions (AOW) to all citizens</p> <p>Separate disability benefits (WIA) and survivors' pensions (ANW); flat-rate or earnings-related benefits</p>	A high number of funds (industry-wide, company-specific and professional group specific) for the provision of occupational old-age pensions and early retirement schemes (VUT), covering over 90 % of employees.

	Public pensions (public sector schemes)	Occupational pension schemes (private sector schemes)
AT	Minimum guarantee pensions:	The New Severance Payment (Abfertigung Neu) has been a compulsory system since 2002. The employer pays monthly contributions at a rate of 1.53 % of gross wages. The employee can choose between a single payment at the end of their career and a transfer to a pension fund system. By the end of 2010, assets had increased to EUR 3.5 billion.
	Means-tested minimum pensions through social assistance scheme ( <i>Ausgleichszulagen</i> ).	The pension fund system has been an occupational system since 1990. By the end of 2010, assets had increased to EUR 14.9 billion.
	Earnings-related public pensions:	
	Harmonised public pension schemes covering all employees and the self-employed (gradually harmonised as of 2005), providing old-age, disability and survivors' pensions	
PL	Minimum guarantee pensions:	Exists only to a very minor extent, with very low coverage (2 % of employees)
	Means-tested minimum pensions financed from the State budget, topping-up benefits paid from mandatory pension schemes	
	Earnings-related public pensions:	
	One social insurance pension scheme (ZUS), covering all employees and the self-employed (except farmers), which is a defined-benefit scheme to those born before 1949 and a notional defined contribution scheme to those born after 1948, providing old-age pensions	
	Separate schemes for disability and survivors' pensions under the social security system	
	A separate scheme for farmers (KRUS), providing old-age, disability and survivors' pensions	
	Specific public sector service pensions (armed forces, police, judges etc.) paid from the State budget	
PT	Pre-retirement benefits paid from the State budget	
	Minimum guarantee pensions:	Exist mainly for banking, insurance and telecommunication sectors as a substitute for the general social security scheme
	Means-tested minimum pensions through social assistance scheme including all types of minimum pensions (non-contributory/social pensions and contributory scheme (the pension amount depends on the contributory career length)	Also exists as complementary schemes for other DB and DC pensions
	Earnings-related public pensions:	
	A general social security pension scheme covering all employees and the self-employed in the private sector and public sector employees since January 2006 providing old-age, disability and survivors' pensions (apart from short-term benefits)	
RO	A separate pension scheme (CGA) for other public sector employees	
	Minimum guarantee pensions: for PAYG and farmer pensioners only as annually set minimum threshold (RON 350 in 2010).	Draft of the law to be promoted.
	Earnings-related public pensions:	Lawyers' pension scheme
	One scheme, covering public and private sector employees, self-employed, covering old-age, disability, early retirement, survivors' pensions.	
SI	Minimum guarantee pensions:	Mandatory supplementary insurance for some high-risk professions (about 42 000 workers, minor importance), voluntary collective supplementary pensions (covering half the employees)
	National, means-tested pensions (for 15 years of insurance, pension cannot be less than 35 % of the minimum pension rating base)	
	National, means-tested supplementary allowance paid to lower pensions through social assistance	
	Earnings-related public pensions:	
	One public pension scheme covering all employees and the self-employed, providing old-age, disability and survivors' pensions	
	Flat-rate pensions to farmers, military personnel of the Yugoslav army and for retirees from other republics of the former Socialist Federal Republic of Yugoslavia	



	Public pensions (public sector schemes)	Occupational pension schemes (private sector schemes)
<b>SK</b>	<p><i>Minimum guarantee pensions:</i></p> <p>No special minimum pension scheme, minimum subsistence for old people and widows provided through means-tested social assistance paid from the State budget.</p> <p><i>Earnings-related public pensions:</i></p> <p>PAYG DB public pension scheme covering almost all employees and self-employed, providing old-age, early old-age, disability and survivors' pensions (first pillar of the pension scheme)</p>	Do not exist
<b>FI</b>	<p><i>Minimum guarantee pensions:</i></p> <p>National pension scheme provides means-tested (against other pensions) minimum pensions to all citizens, a full national pension after 40 years of living in Finland and means-tested housing allowances for pensioners; guarantee pension provides pension if a total pre-tax pension income is less than EUR 687.74 per month (2011)</p> <p><i>Earnings-related public pensions:</i></p> <p>Several but harmonised public pension schemes for different sectors of employees and the self-employed, covering all gainfully employed, providing old-age, part-time, disability and survivors' pensions</p>	Supplementary occupational pensions, accounting for about 2 % of total pension benefits
<b>SE</b>	<p><i>Minimum guarantee pensions:</i></p> <p>National pension scheme provides means-tested (against other pensions) minimum pensions to all citizens, a full national pension after 40 years of living in Sweden. Also means-tested housing allowances for pensioners (BTP) and maintenance support for the elderly (ÄFS).</p> <p><i>Earnings-related public pensions:</i></p> <p>The PAYG general public (NDC) pension scheme covering all employees and the self-employed, providing old-age pensions; the old earnings-related transitional DB scheme works in parallel during the phasing-in period of the new system</p> <p>Disability pension for individuals (19–64 years) and survivors' benefits, including widow's pension (applies only to women married before 1989)</p>	Quasi-mandatory supplementary occupational old-age pensions for all sectors, covering approximately 90 % of employees
<b>UK</b>	<p><i>Minimum guaranteed and contributory social insurance pensions:</i></p> <p>Flat-rate (contributory) state basic (old-age) pensions to all citizens and means-tested supplements through pension credits and Council taxes (financed out of taxes)</p> <p><i>Earnings-related social security and other public pensions:</i></p> <p>State second pension scheme, of which people can opt out with an occupational pension</p> <p>Public service pensions paid from the State budget</p> <p>Separate disability and widows' allowance schemes</p>	A high number of funds for the provision of occupational pensions (about 60 % of employees are contributing either to occupational or personal pension schemes)
<b>NO</b>	<p><i>Minimum guarantee old-age and disability pensions:</i></p> <p>Minimum income guarantee</p> <p><i>Earnings-related public old-age and disability pensions:</i></p> <p>Earnings-related benefit</p>	<p>Central government occupational pension scheme financed by employee contributions and transfers from the State budget Supplement to public old-age pension</p> <p>Local government occupational pension schemes are funded systems Supplement to public old-age pension</p> <p>Mandatory private sector occupational schemes are funded defined contribution systems Supplement to public old-age pension</p>

Source: EPC-AWG delegates

**Table 6.3:**  
Coverage and specification of pension schemes

	Schemes covered in the projections (*E-r = earnings-related)	Schemes not covered
<b>BE</b>	<b>Public pensions: old-age and early pensions:</b>	Pre-pensions include only the part paid from unemployment benefit scheme, not the complement paid by the employer.
	Means-tested minimum benefits: 65+	<b>Occupational pension schemes:</b>
	E-r old-age 60+ and widows, public sector	(pensions 1.1 % of GDP in 2007).
	E-r old-age 60+ and widows, private sector	<b>Individual private pensions:</b>
	E-r old-age 60+ and widows, self-employed	(non-mandatory)
	Early retirement embedded in the unemployment scheme (pre-pension) 60+, private sector	
	Early retirement (pre-pension for heavy jobs): 58+, private sector	
	Early retirement (pre-pension for labour market reasons): 52–55, private sector	
	<b>Public pensions: other</b>	
	Disability pensions –64, private sector	
	Disability pensions –64, self-employed	
<b>BG</b>	<b>State public insurance — pensions related to employment:</b>	<b>State public insurance — pensions not related to labour activity — without numbers</b>
	<b>Old-age pensions</b>	Veterans of war pensions
	Old-age and length of service pensions (including farmers, COOP, military officials)	Military disability pension
	<b>Disability pensions</b>	Special merit pension (Article 28 — abolished)
	Disability (including farmers, COOP, military officials)	Special merit pension (Article 30 — abolished)
	Disability due to work injury and professional disease (including farmers, COOP, military officials)	Pension for special merit
	<b>Survivors' pensions according to relationship to the deceased: widow, children, parent</b>	Civil disability pension
		Private farmers' pensions
		Pensions by decree
		Social pension for disability — will be shifted to social assistance from 2013
		Personal pensions
		Old-age social pensions — will be shifted to social assistance from 2013
		<b>Supplementary mandatory pension insurance</b>
		Universal Pension Funds (UPF) — supplementary lifelong old-age pension
		Professional Pension Funds (PPF) — professional early retirement pension for a limited period for people working under the conditions of the first and second labour categories
		Teachers' pensions
		Supplementary Voluntary Pension Funds (VPF)
		Personal pensions — personal old-age pension — for a limited period — personal disability pension — for a limited period — survivor's pension — for a limited period
		Occupational pensions

	Schemes covered in the projections (*E-r = earnings-related)	Schemes not covered
<b>CZ</b>	<b>Public pensions: old-age and early pensions</b> Minimum and e-r old-age pensions, 62+ (65+ as of 2030), all sectors Proportional old-age pensions, 65+, all sectors Widows' and disability pensions, 62+ (65+ as of 2030) Early pensions (with permanent reductions) <b>Public pensions: other</b> Widows' and disability pensions –62 (–65 as of 2030) Orphans' pensions	
<b>DK</b>	<b>Public pensions: old-age and early pensions</b> Public flat-rate old-age pensions and means-tested supplements, all citizens 65+ Civil servants old-age pensions 65+, central and local government Voluntary early retirement schemes, all wage earners <b>Public pensions: other</b> Disability and survivors' pensions, –64	<b>Occupational pensions</b> Labour market pensions (e-r old-age, disability and spouse's pensions), private sector (ATP) Labour market pensions (e-r old-age, disability and spouses' pensions), new public sector schemes (ATP) Labour market supplementary pensions (SP) Labour market supplementary pensions for recipients of anticipatory pension
<b>DE</b>	<b>Public pensions: old-age and early pensions</b> E-r old-age, widows' and disability schemes, all ages General scheme and lifetime civil servants Early pensions for long-serving workers Early pensions for severely handicapped <b>Public pensions: other</b> (covered above, not shown separately)	Means-tested minimum benefits to elderly (social assistance); 0.1 % of GDP (2009) Farmers' pensions (0.14 % of GDP) (2009) <b>Occupational pensions</b> Annual contributions Pension expenditure 1.3 % of GDP in 2009 Individually funded and state-subsidised private pension ( <i>Riester-Rente</i> ), schemes at a preliminary stage, only contributions to the schemes
<b>EE</b>	<b>Public pensions: old-age and early pensions</b> Minimum flat-rate pensions, all citizens E-r old-age pensions; length-of-service component to 60+ (w) and 63+ (m) in 2007, 65+ for both sexes as of 2026, all sectors (pension insurance fund) Early pensions (possible to retire three years before the statutory retirement age), all sectors <b>Public pensions: other</b> Disability and widows' pensions, all ages, all sectors (pension insurance fund) <b>Private mandatory pensions</b> Private mandatory pensions mandatory funded pensions, mandatory for young persons born 1983 and later	

	Schemes covered in the projections (*E-r = earnings-related)	Schemes not covered
<b>EL</b>	<p><b>Public pensions: old-age and early pensions (planned coverage, projections not yet completed)</b></p> <p>Minimum pensions (State budget and EKAS (Pensioners Social solidarity Fund))</p> <p>Old-age basic pension branch (flat-rate) and main pension branch pensions, farmers aged 65+ (OGA)</p> <p>Means-tested flat-rate pensions of uninsured individuals 65+</p> <p>Old-age pensions, other self-employed (TEVE)</p> <p>E-r old-age and supplementary old-age pensions, private sector (IKA and merged funds)</p> <p>E-r old-age pensions, public sector (civil servants, army, public power corporation), of all ages (some groups employed before 1983 had no age thresholds)</p> <p>E-r supplementary pensions, public sector (auxiliary funds)</p> <p>Disability pensions, all ages</p> <p>Widows' pensions, all ages</p> <p>Early pensions, of all ages</p> <p><b>Public pensions: other</b></p> <p>Orphans' pensions</p>	<p>Welfare benefits</p> <p>Occupational funds due to their minor financial importance</p> <p>Private pensions due to their minor financial importance</p>
<b>ES</b>	<p><b>Public pensions: old-age and early pensions</b></p> <p>E-r old-age and early retirement pensions for private sector employees, the self-employed, regional and local government</p> <p>Means-tested minimum pension supplements (contributory)</p> <p>Old-age and early retirement pensions for central government employees and the military, including war pensions</p> <p><b>Public pensions: other</b></p> <p>Disability –64 and survivors' pensions (all ages) for private sector employees, self-employed, regional, local and central government and the military</p> <p>Means-tested minimum pension supplements (contributory)</p> <p>Private (supplementary and voluntary) pension schemes: occupational and individual</p> <p>Means-tested minimum pension scheme (non-contributory)</p>	
<b>FR</b>	<p>E-r private sector pensions scheme for private sector wage-earners and non-civil servants public sector workers (CNAV)</p> <p>E-r complementary pension scheme for private wage-earners (Agirc, for executives, and Arrco, for all workers)</p> <p>E-r agricultural sector pension scheme (MSA)</p> <p>E-r public sector pension schemes (CNRACL, for civil servants in local administrations, and FPE, for civil servants in State administration and military)</p> <p>E-r public sector complementary pension schemes (RAFP, for civil servants, and Ircantec, for non-civil servants public sector workers)</p> <p>E-r pension scheme for licensed workers (RSI, for professions such as craftsmen, tradesmen)</p> <p>E-r pension scheme for law professions (CNAVPL, CNBF specifically for lawyers);</p> <p>General old-age solidarity fund scheme (FSV)</p> <p>Small e-r pension schemes for specific professions (railwaymen etc.)</p>	<p>Occupational and private pension schemes (PERP, PERCO, PERE, PREFON)</p>

	Schemes covered in the projections (*E-r = earnings-related)	Schemes not covered
IE	<p><b>Public pensions: old-age and early pensions</b></p> <p>Minimum flat-rate old-age non-contributory pensions, 66+ <sup>(1)</sup> (also includes widow(er)s' non-contributory pensions, blind persons, lone parents, deserted wives, 66+), all sectors <sup>(2)</sup></p> <p>Carers, 66+, all sectors <sup>(2)</sup></p> <p>Flat-rate contributory 66+ and transition pensions, 65+ (also includes invalidity) <sup>(1)</sup>, private sector, self-employed and some civil servants <sup>(3)</sup></p> <p>Widow(er)s' contributory pensions, 66+, all sectors</p> <p>Carers and deserted wives' 65+, private sector, self-employed and some civil servants <sup>(3)</sup></p> <p><b>Public pensions: others</b></p> <p>Widow(er)s' non-contributory pensions, –65, all sectors <sup>(2)</sup></p> <p>Blind persons, carers, non-contributory, –65, all sectors <sup>(2)</sup></p> <p>Pre-retirement allowance, 55–65, all sectors <sup>(2)</sup></p> <p>Disability pensions, –65, and invalidity pensions –64, private sector, self-employed, some civil servants <sup>(3)</sup></p> <p>Carers, contributory, –64, private sector, self-employed, some civil servants <sup>(3)</sup></p> <p>Widow(er)s' contributory pension, –65, all sectors</p> <p><b>Public sector (occupational) pensions</b></p> <p>Pensions, lump sums and spouses, civil service, defence, police, education, health and local authorities, non-commercial state bodies</p> <p><sup>(1)</sup> Includes dependent adults of all ages.  <sup>(2)</sup> While individuals from all sectors of the economy are eligible to apply for these pensions, some sectors may not be eligible to receive them due to the means-tested nature of the schemes.  <sup>(3)</sup> Public servants hired on or after 6 April 1995 pay the standard full-rate social insurance contribution, thereby (in general) becoming entitled on retirement to the contributory public pension, along with a public service occupational pension which is 'integrated', i.e. reduced to reflect the public pension income. By contrast, most public servants hired before 6 April 2005 pay a lower 'modified' social insurance contribution, but may qualify for some other social welfare benefits.  Note: State pension (transition) which is currently payable at age 65 is set to be abolished in 2014 thereby standardising the state pension age at 66. Thereafter, the state pension age is set to increase to 67 in 2021 and to 68 in 2028.</p>	<p><b>Occupational pensions:</b></p> <p>Private sector schemes and public sector commercial bodies</p>
IT	<p><b>Public pension system — public pensions and social assistance benefits (pay-as-you-go):</b></p> <p>Old-age and early retirement pensions</p> <p>Disability pensions</p> <p>Survivors' pensions</p> <p>Old-age allowances and social assistance additional lump sums (State budget)</p>	<p><b>Occupational pensions schemes (funded)</b></p> <p>They are not included in the definition of 'public pension system' (which is utilised for the analysis of the sustainability of public finances) insofar as:</p> <p>(i) they are never mandatory;</p> <p>(ii) they provide a supplement to the pension which corresponds to a minor fraction of the pension guaranteed by the public pension system and never replace it.</p> <p>No risk is taken by the State on investment returns.</p>
CY	<p><b>Public pensions: old-age and early pensions</b></p> <p>General Social Insurance scheme covering e-r old-age, widows' pensions and orphans' pensions</p> <p>Early old-age pensions, 63–64</p> <p>Invalidity and disablement pensions, –62</p> <p>Government Employees Pension scheme covering old-age, widows' and disability pensions</p>	<p><b>Public pensions</b></p> <p>Social pension scheme and special allowances to pensioners</p> <p><b>Occupational funded pension plans:</b></p> <p>(i) DB pension schemes for semi-state and private sector employees;</p> <p>(ii) DC provident funds for private sector employees.</p>

	Schemes covered in the projections (*E-r = earnings-related)	Schemes not covered
LV	<p><b>Public pensions: old-age and early pensions:</b></p> <p>Old-age minimum guaranteed pension, 62+</p> <p>E-r old-age DB pensions, granted before 1995</p> <p>E-r old-age NDC pensions, 62+, granted 1996 and after (included early retirement during transition period)</p> <p>Service pensions (early pensions), selected professions, public sector (during the transition period)</p> <p>Disability pensions, granted before 1995 and not transformed to old-age pensions</p> <p>Survivors' pensions (for widows during the transition period)</p> <p><b>Public pensions: other</b></p> <p>Disability pensions, -62</p> <p>Survivor's pensions, -24</p> <p><b>Private mandatory pensions:</b></p> <p>Individual funded old-age, mandatory for persons born 1971 and later</p>	<p><b>Voluntary private funded pension scheme</b></p> <p>Social pension (public benefit, if the person's insurance record is less than 10 years, paid from the State basic budget)</p> <p>Specific public sector service pensions schemes (paid from State basic budget)</p>
LT	<p><b>Public pensions: old-age and early pensions</b></p> <p>Social assistance pensions, 60+ (w)/62.5+ (m) (65+ as of 2026); (State budget)</p> <p>E-r old-age pensions, 60+ (w)/62.5+ (m) (65+ as of 2026), all sectors (Social insurance scheme)</p> <p>Special public service (state) pensions for selected professions (scientists, judges) (State budget); state pensions of the first and second degree of the Republic of Lithuania (State budget); state pensions of deprived persons (State budget) 60+ (w)/62.5+ (w) (65+ as of 2026).</p> <p>Early retirement pensions (possible to retire five years before the statutory retirement age), all sectors (social insurance scheme)</p> <p>Officials and military personnel pensions for service, public sector (State budget); length of service pensions, compensation for extraordinary working conditions (social insurance scheme).</p> <p><b>Public pensions: disability pensions</b></p> <p>Social assistance disability pensions (State budget)</p> <p>E-r disability pensions, all sectors (social insurance scheme)</p> <p>Officials and military personnel disability pensions, public sector (State budget)</p> <p><b>Public pensions: other</b></p> <p>Social assistance survivors' pensions (State budget)</p> <p>Survivors' pensions, all sectors (social insurance scheme)</p> <p>Officials and military personnel survivors' pensions, public sector (State budget)</p> <p><b>Private mandatory pensions:</b></p> <p>Individual funded old-age pension, voluntary, all sectors</p>	
LU	<p><b>Public pensions: old-age and early pensions</b></p> <p>E-r old-age, early retirement and disability pensions, 65+, private sector and self-employed (RGAP, general pension insurance scheme)</p> <p>E-r old-age, early retirement and disability pensions, 65+ , public sector (rsp, special pension scheme), State budget</p> <p><b>Public pensions: other</b></p> <p>Disability (-64 years) and survivors' pensions, all sectors</p>	<p>Minimum benefits (RMG, social assistance)</p>

	Schemes covered in the projections (*E-r = earnings-related)	Schemes not covered
HU	<p><b>Public pensions: old-age and early pensions:</b></p> <p>Social allowances equivalent to pensions to persons 62+</p> <p>E-r old-age and anticipatory old-age pensions, all sectors</p> <p>Survivors' pensions, 62+, all sectors</p> <p>Disability pensions, 62+, all sectors</p> <p><b>Public pensions: other</b></p> <p>Disability pensions, –61, all sectors</p> <p>Survivors' pensions, –61, all sectors</p> <p>Pension, similar to regular social allowances, –61</p> <p><b>Private mandatory pensions:</b></p> <p>Individually funded pensions, voluntary: individuals can choose whether they become a member of the 100 % public pension system or have a 100 % private pension system. Those entering the labour market before 2010 and choosing the private pension system will also have taken part in the public system; thus, they could also have some entitlements from that scheme.</p>	Handicap support, political compensation allowances
MT	<p><b>Public pensions: old-age and early pensions:</b></p> <p>Two-thirds pension scheme (incorporating two-thirds retirement pension, national minimum pension, increased national minimum pension, increased retirement pension, decreased national minimum pension), currently 60+ (w)/61+ (m), 62+ in 2012, 63+ in 2018, 64+ in 2022 and 65+ in 2026</p> <p><b>Public pensions: other</b></p> <p>Pensions other than those listed above, notably disability and survivors' pensions and some pensions, which will be phased out over a transition period, to specific groups of pensioners</p>	Treasury Pensions (a DB pension scheme open to public officers who joined the Public Service of Malta prior to 15 January 1979) (closed to new members)
NL	<p><b>Public pensions: old-age and early pensions:</b></p> <p>Public flat-rate old-age pensions, 65+, all citizens (AOW)</p> <p>Widows' pensions, 55+ (w), all sectors (ANW)</p> <p><b>Public pensions: other</b></p> <p>Disability benefits, all sectors (WIA)</p> <p><b>Occupational pensions</b></p> <p>Occupational old-age pensions, 65+, all sectors</p> <p>Occupational early retirement pensions, all sectors (VUT)</p>	
AT	<p><b>Public pensions: old-age and early pensions:</b></p> <p>E-r old-age and early retirement pensions, 60+ (w)/65+ (m), private sector (ASVG, general social insurance scheme, also including farmers and self-employed)</p> <p><b>Public pensions: other</b></p> <p>Survivors' pensions, all ages, all sectors</p> <p>Disability pensions, all ages, all sectors</p>	<p><b>Public pensions: old-age and early pensions:</b></p> <p>Minimum pensions (<i>Ausgleichszulagen</i>), financed by general taxes revenues.</p> <p>Other pension related expenditures: some pension expenditures not directly linked to pension benefits (rehabilitation, administrative costs, etc.) are not included in the projections; these other pension expenditures make up approximately 0.9 % of GDP</p>
PL	<p><b>Public pensions: old-age and early pensions</b></p> <p>E-r DB old-age, 60+ (w)/65+ (m), disability, widows' and early retirement pensions, 55–59 (w)/55–64 (m), to persons born 1948 and earlier and to those people who earned fully their pension rights before the end of 2006, private and public sector, the self-employed (ZUS, social insurance Institution)</p> <p>E-r NDC old-age and anticipatory pensions, to persons born before 1949 and earlier (with the exception of the transitional group), private and public sector, self-employed (ZUS, social insurance institution)</p> <p>E-r NDC bridging-pensions (employment in special conditions or character) 55 (w)/60+ (m)</p> <p>E-r DB old-age, disability and widows' pensions, all ages, farmers (KRUS, farmers' social insurance scheme), armed forces old-age pensions (State budget)</p> <p><b>Public pensions: other</b></p> <p>Disability and survivors' pensions, –54, private and public sector, self-employed (ZUS)</p> <p><b>Private mandatory pensions</b></p> <p>Individual funded old-age pensions, mandatory to persons born 1969 and after and voluntary to those born 1949–68 joining the scheme by the end of 1999</p>	<p><b>Public pensions: old-age and early pensions:</b></p> <p>Minimum means-tested pensions (current rule of indexation leads to very low coverage of this benefit in the future)</p> <p><b>Occupational pensions</b> (of minor importance)</p>

	Schemes covered in the projections (*E-r = earnings-related)	Schemes not covered
PT	<b>Public pensions: old-age and early pensions:</b>	<b>Private pensions:</b>
	Social pensions (minimum, means-tested and non-contributory), old-age, 65+, disability pensions, 65+	Individual (non-mandatory) private pension schemes (of minor importance)
	General contributory (social insurance) scheme (employees and self-employed of the private sector and public employees since 2006): old-age and early pensions; disability pensions, 65+ (includes supplements to ensure minimum pensions value)	
	RESSAA (special social security scheme for agriculture workers): e-r old-age, 65+, disability pensions, 65+	
	CGA (pension scheme of civil servants hired until December 2005): old-age and early pensions, disability pensions, all ages (includes supplements to ensure minimum pensions value)	
	<b>Public pensions: other</b>	
	Social pensions, including Complemento Solidário para Idosos (income supplement for the elderly 65+) (means-tested non-contributory); disability pensions, -64, survivors' pensions, all ages	
RO	General contributory scheme and RESSAA: disability pensions, -64, survivors' pensions, all ages	
	CGA scheme: survivors' pensions, all ages	
	<b>Occupational pensions:</b>	
	First pillar schemes for some sectors (e.g. banking and insurance) and complementary schemes for other DB and DC pensions	
	<b>Public pensions old-age pensions:</b>	Farmers' pensions (as % of GDP)
	59+/63 (w), 64+/65 (m), standard contribution period 28/30 (w) 33/35 (m)	Non-mandatory pensions (third pillar) (as % of GDP)
	Early and Partial early retirement and survivors' pensions	Minimum pensions (as % of GDP)
SI	Disability Pensions: (including farmers and the military)	
	<b>Private mandatory pension</b>	
	<b>Public pensions: old-age and early pensions:</b>	National (state) pensions (State budget) — from 1 June 2011 governed by Public Act (excluded from Pension and Disability Act)
	Old-age pensions	Flat-rate pensions for farmers
	E-r old-age (58–63+ (w)/58–65+ (m))	Pensions (supplements) for the military personnel of the Yugoslav army and retirees from other republics of the former Socialist Federal Republic of Yugoslavia
	Disability and widows' pensions, all ages, all sectors	Occupational pensions:
	Special compulsory pensions to workers in high-risk occupations, private and public sector	Collective supplementary pensions
SK	<b>Private non-mandatory pensions (collective, individual) (including mandatory pensions to workers in high risk occupations)</b>	
	Collective (semi-mandatory) and individual supplementary pensions	
	<b>Public pensions: old-age and early pensions</b>	Voluntary pension funded DC scheme introduced in 1996 (third pillar of the pension scheme)
	E-r old-age, 53–57+ (w)/60+ (m) (62+ (w) 2024 and 62+ (m) 2008)	
	<b>Public pensions: other</b>	
SK	Disability, widow(er)s' pensions, orphans' pensions	
	<b>Private mandatory pensions</b>	
	Individual funded old-age pension, voluntary to persons entering the labour market in 2008 and later	



	Schemes covered in the projections (*E-r = earnings-related)	Schemes not covered
FI	<p><b>Public pensions: old-age and early pensions</b></p> <p>National (minimum) pension (National pension insurance) 65+</p> <p>Guarantee pension (guaranteed minimum amount) 62+ 1.3.2011 and later</p> <p>E-r old-age, 63+, early, private sector and the self-employed:</p> <ul style="list-style-type: none"> <li>— TyEL (private sector employees);</li> <li>— YEL (self-employed);</li> <li>— MYEL (farmers);</li> </ul> <p>and the public sector:</p> <ul style="list-style-type: none"> <li>— VEL (central government employees);</li> <li>— KuEL (municipal sector employees);</li> <li>— KiEL (church employees);</li> <li>— Unemployment pensions, 60–62, to be phased out by 2014.</li> </ul> <p><b>Public pensions: other</b></p> <p>National (minimum) disability and survivors' pension, –64; (guarantee pension, which guarantees a minimum amount to all (disability) pensioners 1.3.2011 and later)</p> <p>E-r disability, –63 and survivors' pensions, all sectors (early pensions change into old-age pensions at the age of 63 and are then included in the above category)</p>	<p>Occupational and voluntary pensions</p> <p>Collective and voluntary supplementary schemes</p>
SE	<p><b>Public pensions: old-age and early pensions</b></p> <p>Minimum pensions, housing supplement for pensioners and maintenance support for the elderly (State budget) E-r NDC old-age pensions, flexible age (including old transitional DB system), all sectors (social insurance scheme)</p> <p><b>Public pensions: other</b></p> <p>Disability pensions, 19–64, and survivors benefits, all ages (State budget)</p> <p><b>Occupational pensions</b></p> <p>Occupational (supplementary) pensions, all sectors (including old transitional DB systems)</p> <p><b>Private mandatory pensions</b></p> <p>Individual mandatory funded old-age pensions</p> <p><b>Private non-mandatory pensions</b></p> <p>Tax-deductible pension savings</p>	
UK	<p><b>Public pensions (and other public) pensions: old-age and early pensions</b></p> <p>Basic state (minimum) pensions and their additions (winter fuel allowance), state pension age and above, all citizens (national insurance scheme)</p> <p>Pension credits and council tax benefits, 60+, all citizens (State budget)</p> <p>State second pension (S2P)/state earnings-related pensions (SERPS), state pension age, all sectors (national insurance scheme)</p> <p>Widows' benefits are covered for individuals above state pension age</p> <p>E-r old-age pensions, 60+, public sector employees (State budget)</p> <p><b>Public pensions: other</b></p>	<p><b>Public pensions</b></p> <p>Disability benefits to people below state pension age (above state pension age, all individuals are covered by social security pensions)</p> <p><b>Occupational pensions</b></p> <p>Supplementary old-age pensions, private sector; important part of the pension system</p>
NO	<p><b>Public pensions: old-age and early pensions</b></p> <p>Minimum income guarantee</p> <p>Earnings-related benefits</p> <p><b>Public pensions: other</b></p> <p>Disability pensions</p>	<p>Central government occupational pension scheme financed by employee contributions and transfers from State budget (supplement to public old-age pension)</p> <p>Local government occupational pension schemes are funded systems (supplement to public old-age pension)</p> <p>Mandatory private sector occupational schemes are funded defined contribution systems (supplement to public old-age pension)</p> <p>Private non-mandatory defined benefits (and, from 2001, also defined contribution schemes)</p>

Source: EPC-AWG delegates

**Table 6.4:**  
Summary of pension schemes

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valuation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>BE</b>															
<b>Public pensions</b>															
1. Wage-earner	DB		65/35			full career	43.7 % for head of household with dependent spouse; 35 % in other cases	1.67 % for head of household with dependent spouse; 1.33 % in other cases (!) + bonus of EUR 2.16/day of effective work from 62 (or after 44 years of career) up to age 65	24.77 % (all Social Security schemes)	13.07 % (all Social Security schemes)		The reference wage up to a ceiling is adjusted to the current prices by the CPI. Periods of unemployment, pre-pension or disability are valued at the last corresponding earned wage. A min. claim per working year also exists: if the adjusted wage in a full-time employment of one year of career is lower than a specific amount, then the pension for this year of career is calculated on basis of the min. claim per working year.	Auto-matically adjusted to the CPI and partially adapted to living standards following the Generation Fact (!)	75 % for head of household with dependent spouse; 60 % in other cases	
			60/35		45	full career	49.1 % for head of household with dependent spouse; 37.6 % in other cases		2011: EUR 12 129.76–52 378.55; 22 %; EUR 52 378.55–77 189.40; 14.16 % (all Social Security schemes)			The reference income (valued at a fixed income before 1984, and calculated on the basis of the business income from 1984) up to an income ceiling is adjusted to the current prices by the CPI.			
3. Civil servants			60/5			last 5 years	51.7 % for head of household with a dependent spouse; 41.4 % in other cases	1.67 % (!) + bonus of 1.5 % each year if still working at 61 or 62 and bonus of 2 % each year if still working at 63, 64 or 65		7.5 % survivor's pension (other rules for local authorities)		The wage is adjusted to the current prices by the CPI.	Auto-matically adjusted to the CPI and to the real wage increases of working civil servants	75 %; up to 90 % including bonus and complements	

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
	4. Pre-pension (only the part paid from unemployment benefit scheme)		60/30 m, 35 in 2012; 26 w, 28 in 2012, 30 in 2016, 32 in 2020, 34 in 2024, 35 in 2028	60		last wage			24.77 % (all Social Security schemes)	13.07 % (all Social Security schemes)			Auto-matically adjusted to the CPI and partially adapted to living standards following the Generation Pact <sup>(2)</sup>	60 %	
	5. Disability		no min. age (18–64)  min. 120 days work during last 6 months for the wage-earner			last wage for wage-earner; lump-sum benefit for self-employed	wage-earner: 43.7 % for head of household; 35 % for single people; 30.6 % for cohabitants  self-employed: 49.1 % for head of a household; 37.6 % for single people; 30.7 % for cohabitants		24.77 % (all Social Security schemes)	13.07 % (all Social Security schemes)				65 % for head of a household; 55 % for single people; 40 % for cohabitants	
	6. Assistance scheme	means-tested	65	65			20.9 % for cohabitants (individual amount); 31.3 % for single people		financed by taxes						
Occupational pensions															

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
	1. Wage-earner: Law on additional pensions of 28 April 2003	majority of DB	65 with exceptions	65		depends on the pension scheme		depends on the pension scheme	dependent on the pension scheme					80 %	
	2. Self-employed: Law on additional pensions for the self-employed of 24 December 2002	DB, DC, hybrid							ordinary convention: max. 8.17 % of the professional income up to a ceiling social convention: max. 9.40 % of the professional income up to a ceiling						
Non-mandatory private scheme															
	1. Pension fund	DC	contract min. 10 years, min. 5 deposits	65											
	2. Life insurance														
Additional information: (1) Those accrual rates are not met in practice because of the various parameters in the calculation of the pension: min.pension, min.claim per working year, ceiling. (2) The adaptation to the living standards is made within a total budget corresponding to the necessary budget required for an increase (of all replacement benefits in the scheme) of 1.25 % indexation of the wage ceilings + 1 % indexation of lump-sum benefits + 0.5 % indexation of the earning-related benefits + 1.25 % indexation of the min. claim per year.															

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
BG 2010	<b>Public pensions</b>														
	1. State Public Insurance, labour category I	DB	52 m/47 f		at least 10 y and 100 points m; at least 10 y and 94 points f (!)	3 best years of insurance before 1.1.1997 + all insurance years after that	21 %	1.1 %	9.1 % for persons born after 31.12.1959; 11.9 % for persons born before 1.1.1960	4.9 % for persons born after 31.12.1959; 7.1 % for persons born before 1.1.1960	12 %		none		
	2. State Public Insurance, labour category II		57 m/52 f		at least 15 y and 100 points m; at least 15 y and 94 points f (!)										
	3. State Public Insurance, labour category III		63 m/60 f	63 m/60 f	37 y and 100 points m; 34 y and 94 points f (!)										
	4. Teachers' Fund		60 m/57 f		30 y m/25 y f				4.3 %						
<b>Occupational pensions</b>															
	1. Supplementary voluntary pension funds under occupational schemes		55 m and f	60 m and f		full insurance period									
<b>Mandatory private scheme</b>															
	1. Professional pension funds, labour category I	DC	52 m/47 f						12 %						
	2. Professional pension funds, labour category II		57 m/52 f						7 %						
	3. Universal pension funds — supplementary life-long old-age pensions		58m/55 f			full insurance period			2.8 % — only for persons born after 31.12.1959	2.2 % — only for persons born after 31.12.1959					

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
Non-mandatory private scheme															
BG 2060	1. Supplementary voluntary pension funds	DC	58 m/55 f	63 m/60 f		full insurance period									
	Additional information:	(!) The number of points equals age plus years of contributions.													
	Public pensions														
	1. State Public Insurance	DB		65 m/63 f	40 y m/37 y f	full insurance period		1.2 %	7.1 %	5.7 %	12 %		50 % wages + 50 % CPI		
	2. Teachers' Fund		62 m/60 f		33 y m/ 28 y f				4.3 %						
Occupational pensions															
	1. Supplementary voluntary pension funds under occupational schemes	DC	60 m/58 f	60 m and f		full insurance period									
Mandatory private scheme															
	1. Professional pension funds, labour category I	DC	57 m/55 f		at least 10 y m and f				12 %						
	2. Professional pension funds, labour category II		62 m/60 f		at least 15 y m and f				7 %						
	3. Universal pension funds — supplementary life-long old-age pensions		60 m/58 f			full insurance period			4.2 % from 2017	2.8 % from 2017					
Non-mandatory private scheme															
	1. Supplementary voluntary pension funds	DC	60 m/58 f	65 m/63 f		full insurance period									

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
CZ 2010	<b>Public pensions</b>														
	Public system (PAYG)	DB	min. retirement age: 5 y before statutory age but not earlier than 60 contributory period: min. 26 y, or 16 y at age 5 y higher than statutory	men: 2 y 2 m women: no child-dren: 60 y 8 m 1 child: 59 y 8 m 2 child-dren: 58 y 8 m 3 and 4: 57 y 8 m 5 and more: 56 y 8 m	min. 26 y, or 16 y at age 5 y higher than statutory	last 30 years of career, but only back to 1986	12.5 %	1.5 %	21.5 %	6.5 %	none	2 % (nominal wage growth; pensionable earnings = wage)	min. valorisation: CPI + 1/3 real wage growth	none	none
	<b>Non-mandatory private scheme</b>														
CZ 2060	Voluntary fully funded private pension	DC	none	none	min. 5 years	contributions	none	none	voluntary, subject to tax allowances	voluntary, subject to tax allowances	max. EUR 71/ year, depends on contributions	depends on pension fund performance — pension funds must have non-negative yield	none	none	none
	<b>Public pensions</b>														
	Public system (PAYG)	DB	min. retirement age: 5 y before statutory age but not earlier than 60 contributory period: min. 35 y, or 20 y at age 5 y higher than statutory	men: 65 y women: none or 1 child: 65 y 2 child-dren: 64 y 3 child-dren: 63 y 4 and more: 62 y	min. 35 y or 20 y at age 5 y more than statutory	last 30 years of career	12.5 %	1.5 %	21.5 %	6.5 %	none	based on nominal wage growth	min. valorisation: CPI + 1/3 real wage growth	none	none
CZ 2060	<b>Non-mandatory private scheme</b>														
	Voluntary fully funded private pension	DC	none	none	min. 5 years	contributions	none	none	voluntary, subject to tax allowances	voluntary, subject to tax allowances	max. EUR 71/ year, depends on contributions	depends on pension fund performance — pension funds must have non-negative yield	none	none	none

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>DK</b>															
<b>Public pensions</b>															
	1. Public old-age pension	DB	65/na	65	40							depends on pension fund performance — pension funds must have non-negative yield	Adjusted once a year on the basis of wage developments in the private sector (the area covered by the Danish Employers' Confederation), cf. the Rate Adjustment Percentage Act.		
	2. Civil servants old-age pension	DB	60/na	60–65	37 (employed as civil servant; there are no contributions)	Depends on tenure and final wage							Adjusted once a year on the basis of wage of (similar) civil servants, which are regulated according to agreements, in general biannually.	57 (gross)	
	3. Voluntary early retirement	mixed	60/15	60	30								Adjusted once a year on the basis of wage developments in the private sector (the area covered by the Danish Employers' Confederation), cf. the Rate Adjustment Percentage Act.		



Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
DK	4. Disability pensions	DB	18/na										Adjusted once a year on the basis of wage developments in the private sector (the area covered by the Danish Employers' Confederation), cf. the Rate Adjustment Percentage Act.		
	<b>Occupational pensions</b>														
	1. Labour mkt pensions (ATP) <sup>(1)</sup>	DC	65/na	65				market return <sup>(3)</sup>	33	67	0				
	2. Special pensions savings plan (SAP)	DC	65/na	65				market return <sup>(3)</sup>	0	33	67				
	3. Various old-age <sup>(2)</sup>	mixed	60/na	65				market return <sup>(3)</sup>							
	4. Various disability, spouses <sup>(2)</sup>	mixed	18/na					market return <sup>(3)</sup>							
Additional information:															
<sup>(1)</sup> ATP also mandatory for most persons of working age on transfer incomes.															
<sup>(2)</sup> Many labour market pension schemes are quasi-mandatory due to collective agreements between employer and labour organisations.															
<sup>(3)</sup> In the long term, this is assumed to be 5.25 %.															
<sup>(4)</sup> Age limits are indexed to the development in life expectancy according to the Welfare Agreement (2006).															

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valuation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
DE 2010	Public pensions														
	1. Statutory pension system	points system	63/5	65 y (!)	no explicit full pension	lifetime			9.95 %	9.95 %		equal to pension indexation	wages plus sustainability factor	na	change in relationship of pensioners to contributors
DE 2012	Public pensions														
	1. Statutory pension system	points system	63/5	65 y 1 m (!)	no explicit full pension	lifetime			9.95 %	9.95 %		equal to pension indexation	wages plus sustainability factor	na	change in relationship of pensioners to contributors
DE 2060	Public pensions														
	1. Statutory pension system	points system	63/5	67 y (!)	no explicit full pension	lifetime						equal to pension indexation	wages plus sustainability factor	na	change in relationship of pensioners to contributors
Additional information: (!) Starting 1 January 2012, the statutory retirement age increases gradually from 65 to 67; over 2012–24, the statutory retirement age increases by one month per year; over 2025–30, the statutory retirement age increases by two months per year.															

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
EE 2010	<b>Public pensions</b>														
	State pension insurance (first pillar)	DB	statutory minus 3 years	63 m/ 61 w (2016; 63 m and 65 m and w)	min. contributory period is 15 years	full career	16 %	1 %	16 %	0 %			20 % CPI + 80 % social tax revenue growth		
	<b>Mandatory private scheme</b>														
	Private mandatory funded pension (second pillar)	DC	63 m/61 w	63 m/61 w (2016; 63 m and 65 m and w)		full career		2.5 % (real, used in projections)	4 %	2 %					
	<b>Non-mandatory private scheme</b>														
	Voluntary pension (third pillar)	DC	55 m/55 w	none		full career			voluntary	voluntary					
EE 2060	<b>Public pensions</b>														
	State pension insurance (first pillar)	DB	Statutory minus 3 years	65	min. contributory period is 15 years	full career	10 %		16 %	0 %			20 % CPI + 80 % social tax revenue growth		
	<b>Mandatory private scheme</b>														
	Private mandatory funded pension (second pillar)	DC	65	65		full career		2.5 % (real, used in projections)	4 %	2 %					
	<b>Non-mandatory private scheme</b>														
	Voluntary pension (third pillar)	DC	55 m /55 w	none		full career			voluntary	voluntary					

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>Public pensions</b>															
EL 2010-15	1. IKA-ETAM	DB	no min. retirement age, for 37 years of past service for pre-1993 insured people	various	various	average of the best five years of the last decade, accordingly indexed by the pension indexation	—	2 % and 3.3 % for over 35 years of credits and age 65 until 2010; from 2011, Table II	6.67 % until 2010; from 2011, Table II	13.33 % until 2010; from 2011, Table II	( <sup>2</sup> )	annual decrees	according to yearly decrees depending on government economic policy	—	—
	2. PS		no min. retirement age for 17.5 years past service for pre-1983 insured military married women or women with unmarried children	various	various	average of the best five years of the last decade, accordingly indexed by the pension indexation	—	2 % and 3.3 % for over 35 years of credits and age 65 until 2010; from 2011, Table II	6.67 %	—	—	annual decrees	according to yearly decrees depending on government economic policy	—	—
	3. OAE		no min. retirement age, for 37 years of past service for pre-1993 insured people	various	various	depends on the history of insurance classes	—	2 % and 3.3 % for over 35 years of credits and age 65 until 2010; from 2011, Table II	0.2 %		10 % for insureds after 1.1.1993	annual decrees	according to yearly decrees depending on government economic policy	—	—
	4. OGA		65 years and 15(1) years of service	65	15	depends on the history of insurance classes	—	0.02 %	0.07 %		0.14 %	according to pension indexation	according to yearly decrees depending on government economic policy	—	—
Additional information: (1) Age and years of service requirements are interrelated. (2) 1 % of GDP per year on average intended for all branches of IKA-ETAM. (3) May be reduced according to income or residential criteria.															

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>Public pensions</b>															
EL 2016-60	1. IKA-ETAM	DB	60 and 15 <sup>(1)</sup> years of service	65 or 60	15 or 40	average salary of all career years indexed according to salary escalation	—	according to past credits, 0.8–1.5 %	6.67 % additional social transfer 0.96 %	13.33 % additional social transfer 2.04 %	<sup>(2)</sup>	annual decrees	min. (i) 50 % GDP change + 50 % CPI change or (ii) CPI change	—	The limits of retirement age will change for the period 1.1.2021–31.12.2023 by the change in life expectancy in relation to age 65 for the decade 2010–20.
	2. PS		no age limit for people with 35 career years	65 or 60	15 or 40	average salary of all career years indexed according to salary escalation	—	according to past credits, 0.8–1.5 %	6.67 %	—	—	annual decrees	min. (i) 50 % GDP change + 50 % CPI change or (ii) CPI change	—	From 1.1.2024, the above limits will be determined anew every 3 years by a joint ministerial decision of the Ministries of Finance and Labour and Social Security which will be issued in the last year of every period based on the relative indicators determined by the Greek Statistical Authority and Eurostat and which concern the next period.
	3. OAEE		60 and 40 years of service	65 or 60	15 or 40	depends on the history of insurance classes	—	according to past credits, 0.8–1.5 %	0.2 %	—	10 % for insureds after 1.1.1993	annual decrees	min. (i) 50 % GDP change + 50 % CPI change or (ii) CPI change	—	
	4. OGA		65 and 15 <sup>(3)</sup> years of service	65	15	depends on the history of insurance classes	—	0.02 %	0.07 %	—	0.14 %	according to pension indexation	min. (i) 50 % GDP change + 50 % CPI change or (ii) CPI change	—	
Additional information: (1) Age and years of service requirements are interrelated. (2) 1 % of GDP per year on average intended for all branches of IKA-ETAM. (3) May be reduced according to income or residential criteria.															

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>ES</b>															
<b>Public pensions</b>															
	Public pensions (applies to 1, 2, 3)	DB	min. 15 years of contribution	increase in the statutory age from 65 to 67 years from 2013 till 2027; 65 still possible with 38.5 years of contributions (Pension Reform Law 27/2011, 1 August)	37 years 38.5 years (Pension Reform Law 27/2011, 1 August)		The min. contributory pension is between 115% and 88% of the min. wage depending on family charges (EUR 10 152/year in 2010 for a person 65+ with dependent spouse). The non-contributory pension is lower, EUR 4 500/year on average in 2010. Both are means-tested.		TOTAL general contribution not earmarked, only to public retirement pensions			The contribution base is the monthly earned income within thresholds regulated by the Annual Budget Law. Evolution with wages, but the max. contributory base is normally closer to CPI inflation. Contribution bases corresponding to the 24 months prior to retirement are computed in nominal terms. The remaining CBs are adjusted according to the evolution of the Consumer Price Index.	CPI inflation	max. pension EUR 34 527/year (2010)	After 2027 parameters will change with life expectancy at 67 and revisions every 5 years (Pension Reform Law 27/2011, 1 August).
	1. Social Security Employees (private sector) general regime		immediate 2 year increase for early retirement from 2013; reduction coefficients apply			gradual 10 year increase till 2022 (from 15 to 25 last years)		With 15 years of contribution: 50% of pensionable earnings. Linear increase till 100% with 37 years of contribution. Reduction and increasing coefficients for early (7.5–6.5%) or late retirement (2–4%) (Pension Reform Law 27/2011, 1 August).	23.6 %	4.7 %					
			63 y for early retirement and 33 years min. contribution			(Pension Reform Law 27/2011, 1 August)									
			61 y in limited cases of economic crisis (Pension Reform Law 27/2011, 1 August)												
	2. Social Security Self-employed		immediate 2 year increase for early retirement from 2013; reduction coefficients apply						29.8 %						
			63 y for early retirement and 33 years min. contribution												
			61 y in limited cases of economic crisis (Pension Reform Law 27/2011, 1 August)												
	3. Civil servants scheme, central government employees and military		60 y for early retirement/and 30 years min. contribution (civil servants' special scheme was closed to new entrants on 1.1.2011)			entire working life		different % accrued by year worked applied to a base by professional level		3.86 %	imputed payments				
Additional information: Other special regimes exist but of less quantitative relevance.															

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>FR</b>															
<b>Public pensions</b>															
	E-r private sector pensions scheme CNAV	DB	62 <sup>(1)</sup> , no requirement on contributory years	67 <sup>(2)</sup>	41.25 years <sup>(3)</sup> under 67 <sup>(2)</sup>	25 best annual wages, under the SSC <sup>(3)</sup>		1.2 % (2010)	8.30 % up to the SSC <sup>(4)</sup> , plus 1.60 % of the full wage	6.65 % up to the SSC <sup>(4)</sup> , plus 0.10 % on the full wage	not relevant	prices	prices		not relevant
	E-r complementary pension scheme Agric <sup>(1)</sup>	points	55, no requirement on contributory years			all wages (under 8 SSC) <sup>(2)</sup>		1.4 % (2010)	5.70 % up to the SSC <sup>(4)</sup> , plus 13.90 % between one and four SSC <sup>(4)</sup> , plus 12.60 % between four and eight SSC <sup>(4)</sup> , plus 0.22 % up to eight SSC <sup>(4)</sup>	3.80 % up to the SSC <sup>(4)</sup> , plus 8.60 % between one and four SSC <sup>(4)</sup> , plus 7.70 % between four and eight SSC <sup>(4)</sup> , plus 0.13 % up to eight SSC <sup>(4)</sup>		wages – 1.5 %	wages – 1.5 %		
	E-r complementary pension scheme Airco <sup>(1)</sup>					all wages (under 3 SSC) <sup>(2)</sup>		0.5 % (2010)	5.70 % up to the SSC <sup>(4)</sup> , plus 13.30 % between one and three SSC <sup>(4)</sup>	3.80 % up to the SSC <sup>(4)</sup> , plus 8.90 % between one and three SSC <sup>(4)</sup>		wages – 1.5 %	wages – 1.5 %		
	E-r public sector pension scheme FPE	DB	62 <sup>(2)</sup> , except for some specific categories such as police and military: 2 years of contributions, otherwise CNAV pension	67 <sup>(2)</sup> , except for some specific categories such as police and military		last wage (without bonuses and emoluments)		1.9 % (2010)	not relevant	10.55 % <sup>(5)</sup>	65.39 % <sup>(5)</sup>	not relevant	prices		
Additional information:															
<sup>(1)</sup> Parameters fixed by the last agreement (2011): according to this agreement, valorisation of pensionable earnings and indexation of pensions will be changed from a system 'wage/price' to a system 'wage – 1.5 %/wage – 1.5 %'.															
<sup>(2)</sup> Since the 2010 pension reform, for the 1956 generation onwards.															
<sup>(3)</sup> For the 1954 generation; since the 2003 pension reform, the contributory period for full pension is planned to increase in line with increases in life expectancy, so that the ratio of period of pension payment to the contributory period remains constant. After age 67, the full pension is reached, independently of the contributory period.															
<sup>(4)</sup> SSC (social security ceiling), wage ceiling which determines the contribution rate level. In 2011, the SSC is EUR 2 946/month.															
<sup>(5)</sup> The 2010 pension reform plans an increase from 7.85 % in 2010 to 10.55 % in 2020.															
<sup>(6)</sup> For civil servants in 2011.															

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valuation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>IE</b>															
<b>Public pensions</b>															
	State pension, contributory	flat rate	65	66	career average 48+ contributions	flat rate	34 %	na	na	average 9 %	4 %	na, flat rate	discretionary	na, flat rate	Increase retirement age and tighten link between contributions and benefits
	Public sector (occupational) pensions	DB	55		40 y	full career									
<b>Occupational pensions</b>															
	DB		55	65	40 y	career average + full career			15 %	5 %	tax relief at marginal rate	yes	scheme rules		
	FDC		55	65					8 %	5 %					
<b>Non-mandatory private scheme</b>															
	FDC		50	60	scheme rules			rate of return			tax relief at marginal rate				



Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>Public pensions</b>														
	Public sector employees	(i) earnings-related (DB); workers with at least 18 years of contribution at the end of 1995; (ii) mixed: contribution at age 61 in 2012 increasing to 62 from 2013; the age requirement is 1 year less with 36 years of contribution; (iii) contributory-based new workers insured after 1995.	Early retirement before the statutory retirement age (old-age pension), is allowed with: (i) 40 years of contributions regardless of age; or (ii) 35 years of contribution at age 61 in 2012 increasing to 62 from 2013; the age requirement is 1 year less with 36 years of contribution; (iii) contributory-based new workers insured after 1995.	Statutory retirement age (?): 65 for men and women with min. contribution requirement (20 years in DB and mixed regimes).  Indexation of age requirements: starting from 2013, the age requirements are indexed to changes in life expectancy, every three years.  Exit windows: payment of pension (and, then, actual retirement age) is further postponed by 1 year once the age and/or contribution requirements are met.	Earnings-related (DB): 40 y mixed: 40 y contributory-based (NDC): full career	Earnings-related (DB): last monthly wage, for the contribution period up to 1992; last 10 years thereafter.  Mixed: last monthly wage, for the contribution period up to 1992; gradual increasing for the contribution period 1993–95. For the contribution period after 1995, see NDC method. Contributory-based (NDC): full career.	Min. income is guaranteed to the elderly. Social assistance benefits: means-tested old-age allowance (EUR 5 435/year in 2011) and social assistance additional lump sums.  Beneficiaries: social assistance benefits are provided to the elderly with a personal or couple's income (including social security pensions) below certain limits and up to them.  For single people, in 2011, the income limit is EUR 5 600/year (65–69) and EUR 7 860 (70+). In any case, social assistance benefits are provided up to these income limits.  For married couples, in 2011, social assistance benefits are provided as long as the total income of the couple falls below EUR 11 680/year (65–69) and EUR 13 290 (70+). In any case, social assistance benefits are provided up to these income limits.	Earnings-related (DB): generally 2% of the reference wage (average of pensionable earnings)  Contributory-based (NDC): approximately the product of the transformation coefficient and the contribution rate (?)	33 % of which one third paid by the employee		Earnings-related (DB): prices Mixed: prices for the DB component, nominal GDP for NDC component  Contributory-based (NDC): nominal GDP (5-year moving average)	Price inflation which is differentiated by pension brackets: (i) 100 % of the inflation rate for the amount of pension up to 3 times the min. pension; (ii) 90 % for the amount between 3 and 5 times the min.; (iii) 75 % for the part above 5 times the min.  For the two-year period 2012–13 and limited to pensions above 5 times the min. pension, the indexation to price inflation is reduced to 70 % and only applied to the part of the pension up to 3 times the min.	Earnings-related (DB): 80 % Mixed: 80 % for the DB component, no upper limit for the NDC component  Contributory-based (NDC): no upper limit  Age requirements: 3-year revision according to changes in life expectancy, first update in 2013	Transformation coefficients: 3-year revision according to changes in life expectancy, first update in 2013

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
IT	Private sector employees	(i) earnings-related (DB): workers with at least 18 years of contribution at the end of 1995; (ii) mixed: workers with less than 18 years of contribution at the end of 1995; (iii) contributions-based new workers insured after 1995.	Early retirement, retirement before the statutory retirement age (old-age pension), is allowed with: (i) 40 years of contributions regardless of age; or (ii) 35 years of contribution at age 61 in 2012 increasing to 62 from 2013; the age requirement is 1 year less with 36 years of contributions. Indexation of age requirements: from 2013, the age requirements are indexed to changes in life expectancy, every three years. Exit windows: payment of pension (and, then, actual retirement age) is further postponed by 1 year once the age and/or contribution requirements are met.	Statutory retirement age (i): 65 for men and 60 women with min. contribution requirement (20 years in DB and mixed regimes). As for women, the statutory retirement age will be gradually equalised to that of men 2014–26. Indexation of age requirements: starting from 2013, the age requirements are indexed to changes in life expectancy, every three years.	Earnings-related (DB): 40 y mixed: 40 y contributions-based (NDC): full career	Earnings-related (DB): last 5 year wages, for the contribution period up to 1992; last 10 years thereafter. Mixed: 5 year wages, for the contribution period up to 1992; increasing for the contribution period 1993–95. For the contribution period after 1995, see NDC method. Contributions-based (NDC): full career.	Min. income is guaranteed to the elderly. Social assistance benefits: means-tested old-age allowance (EUR 5 435/year in 2011) and social assistance additional lump sums. Beneficiaries: social assistance benefits are provided to the elderly with a personal or couple's income (including social security pensions) below certain limits and up to them. For single people, in 2011, the income limit is EUR 5 600/year (65–69) and EUR 7 860 (70+). In any case, social assistance benefits are provided up to these income limits. For married couples, in 2011, social assistance benefits are provided as long as the total income of the couple falls below EUR 11 680/year (65–69) and EUR 13 290 (70+). In any case, social assistance benefits are provided up to these income limits.	Earnings-related (DB): generally 2 % of the reference wage (average of pensionable earnings) Contributions-based (NDC): approximately the product of the transformation coefficient and the contribution rate (i)	33 % of which one third paid by the employee		Earnings-related (DB): prices Mixed: prices for the DB component, nominal GDP for NDC component Contributions-based (NDC): nominal GDP (5-year moving average)	Price inflation which is differentiated by pension brackets: (i) 100 % of the inflation rate for the amount of pension up to 3 times the min. pension; (ii) 90 % for the amount between 3 and 5 times the min; (iii) 75 % for the part above 5 times the min. For the two-year period 2012–13 and limited to pensions above 5 times the min. pension, the indexation to price inflation is reduced to 70 % and only applied to the part of the pension up to 3 times the min.	Earnings-related (DB): 80 % Mixed: 80 % for the DB component, no upper limit for the NDC component Contributions-based (NDC): no upper limit	Transformation coefficients: 3-year revision according to changes in life expectancy, next update in 2013 Age requirements: 3-year revision according to changes in life expectancy, first update in 2013	

IT	Self-employed	(i) earnings-related (DB): workers with at least 18 years of contributory age at the end of 1995; (ii) mixed: workers without less than 18 years of contributory age at the end of 1995; (iii) contributions-based (NDC): new workers insured after 1995.	Early retirement: age requirements are 1 year higher than for public and private sector employees (see above). Indexation of age requirements: as for public and private sector employee(see above). Exit windows: payment of the pension (and, then, the actual retirement age) is further postponed by 1 year and a half once the age and/or contribution requirements are met.	Statutory retirement age (²): as for private sector employees (see above). Indexation of age requirements: as for private sector employees (see above). Exit windows: payment of pension (and, then, actual retirement age) is further postponed by 1 year and a half once the age and/or contribution requirements are met.	Earnings-related (DB): 40 y mixed: contributory period (NDC): full career	Earnings-related (DB): last 10 year wages, for the contributory period up to 1992, last 15 years thereafter. Mixed: last 10 year wages, for the contribution period 1992–95. For the contribution period after 1995, see NDC method.	Min. income is guaranteed to the elderly. Social assistance benefits: means-tested old-age allowance (EUR 5 435/year in 2011) and social assistance additional lump sums. Beneficiaries: social assistance benefits are provided to the elderly with a personal or couple's income (including social security pensions) below certain limits and up to them. For single people, in 2011, the income limit is EUR 5 600/year (65–69) and EUR 7 860 (70+). In any case, social assistance benefits are provided up to these income limits. For married couples, in 2011, social assistance benefits are provided as long as the total income of the couple falls below EUR 11 680/year (65–69) and EUR 13 290 (70+). In any case, social assistance benefits are provided up to these income limits.	Earnings-related (DB): generally 2 % of the reference wage (average of pensionable earnings)	20 %	Earnings-related (DB): prices: Mixed: (i) 100 % of the DB component, nominal GDP for NDC component	Price inflation which is differentiated by pension brackets: (i) 100 % of the inflation rate for the amount of pension up to 3 times the min. pension; (ii) 90 % for the amount between 3 and 5 times the min; (iii) 75 % for the part above 5 times the min. For the two-year period 2012–13 and limited to pensions above 5 times the min, pension, the indexation to price inflation is reduced to 70 % and only applied to the part of the pension up to 3 times the min.	Earnings-related (DB): 80 % Mixed: 80 % for the DB component, no upper limit for the NDC component	Transformation coefficients: 3-year revision according to changes in life expectancy, next update in 2013	
	Atypical workers	Contributions-based (NDC) New workers insured after 1995	(21 months starting from 2014 for retirement with 40 years of contributions).		Contributions-based (NDC): full career	Contributions-based (NDC): full career			26 % of which 1/3 paid by the employee (³)					
Additional information: (¹) There are several different regimes for professionals which account for a minor part of the public pension system. (²) Old-age pension. (³) Assuming as a reference wage/earnings full career average contribution base capitalised with GDP growth. The implicit accrual rate varies over time and by age of retirement. (⁴) In the case of professionals, contribution rate is entirely paid by the insured. The contribution rate is reduced to 17 % in the case the worker is either entitled to a direct pension or insured in other schemes.														

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
CY	<b>Public pensions</b>														
	General Social Insurance Scheme	DB, points system	63/14.85 y at 65	65	47.5 years	full insurance period	85% of basic insurable earnings	1.5 %	6.8 % of earnings up to max. insurable (MIE)	6.8 % of earnings up to insurable earnings	4.3 % of earnings up to MIE	wage indexation	basic part: wage indexation supplementary part: price indexation	60 % MIE	na
	Government Employee Pension Scheme	DB, final salary	58/5	63	33.33 years	last annual pensionable salary	—	1.5 %	PAYG			na	wage indexation	50 % final salary	na
	<b>Mandatory private scheme</b>														
	Semi-state and private sector employee/self-employed pension schemes	DB	58–60/5–30 y	63–65	30–40 years	varies	—	1.5 %	varies		—	na	varies	varies	na
	<b>Mandatory private scheme</b>														
	Private sector	DC		63–65	full career	—		—	6.5 %						
	<b>Social security pensions</b>														
	General social insurance scheme	DB, points system	63/14.85 years at 65	65	47.5 years	full insurance period	85% of basic insurable earnings	1.5 %	6.8 % of earnings up to max. insurable (MIE)	6.8 % of earnings up to MIE	4.3 % of earnings up to MIE	wage indexation	basic: wage indexation supplementary: price indexation	60 % of MIE	na
	Government employee pension scheme	DB, final salary	58/5	63	33.33 years	last annual pensionable salary	—	1.5 %	PAYG	0.75% of salary up to MIE; 1.75% in excess of MIE		na	wage indexation	50 % of final salary	na
	<b>Mandatory occupational pension schemes</b>														
	Semi-state and private sector employee/self-employed pension schemes	DB	58–60/5–30 years	63–65	30–40 years	varies	—	1.5 %	varies	varies	—	na	Varies	varies	na

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
CY Non-mandatory occupational pension schemes															
LV	Private sector	DC		63–65	full career	—		—	6.5 %	6.5 %					
	Public pensions														
		NDC	normally, 62; including early retirement schemes, where min. retirement age is – 48/10 contributory years for rights	62	10 years for old-age pension rights	full	11 % (from average gross salary of the State)	contribution wage sum index	20 % together but if not participant of second tier, 18 %; if participant of second tier: 14 % from 2013			Contribution wage sum index	no indexation until 2013; from 2014, with CPI		indexation with contribution wage sum index, even if it is negative
Mandatory private scheme															
		FDC	In accordance with retirement age in NDC	in accordance with retirement age in NDC		full		rate of return	2 % together, 6 % from 2013				if choice is refund, then no indexation until 2013; from 2014, with CPI		
Non-mandatory private scheme															
		voluntary private funded pension scheme	5	55 and over		full		rate of return	free choice						

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
LT	Public pensions														
		DB	5 years before statutory retirement age; 15 years min. contribution period (30 years in case of early retirement)	62.5 m/60 w (65 as of 2026)	30	5 best from the period 1984–93 and 25 best years after 1994	no min. pension	0.5 % for earnings-related part + basic pension (estimated accrual rate is 1 %)	0.233	3 % (1 % for participant in the second pillar)	0	discretionary	discretionary	does not exist (insurable income coefficient is capped at 5)	—
	Mandatory private scheme														
		DC	—	according to statutory retirement age	—	full career	—	—	—	0.02 %	0	market rate of return	—	—	—
LU	Non-mandatory private scheme														
		DC	—	—	—	full career	—	—	—	free choice	—	market rate of return	—	—	—
LU	Public pensions														
	1. General and special pension schemes	DB	57 with 40 years of contribution	65	40	full career	90 % of the social min. wage (EUR 1 785 in 2010)	1.85 % per year	8 % (general scheme only)	8 %	8 % (general scheme only)	price evolution, wage evolution if sufficient financial resources available	price evolution, wage evolution if sufficient financial resources available	na	—

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
HU Social security pensions															
HU	1. Old-age pension	DB	62 (min. contributory years 15 for partial pension, 20 for full pension)	62	20	all income from 1988	min. pension: HUF 28 500; gross average wage: HUF 202 576 (2010); net average wage: HUF 132 628 (2010) 21.5 %	1.22 %	24 %	10 %		net wage	if real GDP growth is below 3 %; 100 % CPI if GDP growth is 3.0–3.9 %; 80 % CPI and 20 % net wage if GDP growth is 4.0–4.9 %; 60 % CPI and 40 % net wage if GDP growth is 5 % or above; 50 % CPI and 50 % net wage	no max., though there are limits in the pension calculation system (degressive methods in calculation)	
	2. General early pension		60	60	40										
	3. Women with 40 years real contribution period				40 years (included the working years and max. 8 child-care years)										
	4. Miners, artists pensions		60 (min. contributory years 10 m, 8 f)	60	min. 10 m and 8 w contributory years										

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
	5. Early pension subsidised by the employer	DB	57	57	20	all income from 1988	min. pension: HUF 28 500; gross average wage: HUF 202 576 (2010); net average wage: HUF 132 628 (2010) 21.5 %		24 %	10 %		net wage			
	6. Disability pensions				depends on age		group I: HUF 30 850; group II: HUF 29 800; group III: HUF 28 500								
	7. Survivors' pensions						min. orphan benefit: HUF 24 250; widow(er)'s pension 30 % or 60 % of pension of deceased; parental pension equal to the widow(er)'s pension								
Mandatory private scheme															
	DC		same as old-age pension (62) and 15 years (lump sum payment)	62					24 %	10 %			min. CPI		
Non-mandatory private scheme															
	Voluntary pension fund	DC	same as old-age pension, life annuity or lump sum payment — taxable	62											



Public pensions														
Con-tributory scheme	2/3 pen-sion scheme (DB scheme)	Presently, the full pension is paid to those who have paid an average of 50 contri-butions over a 30-year period on reaching pension age. Fewer years of contribution result in linearly reduced pen-sions, with the min. years of contributions paid required to collect a pension set at around 10.	currently m/61+ w/ 62+ (from 2012); 63+ (from 2018); 64+ (from 2022); and 65+ (from 2026)	Presently, the full rate of the two-thirds pen-sion is equal to 2/3 of pension-able income for a claim-ant who has paid or been cred-ited with a annual aver-age of 50 contri-butions over 30 years.	Presently, the pension for employ-ees is deter-mined on the basis of the yearly average of wage (€) dur-ing the best 3 y of the last 10 y, while the pension for self-employed persons is calculated on the basis of the best 10 y.	The full rates of the contributory national min. pen-sion are calculated at 4/5 national min. wage in the case of a married person who is maintaining a spouse and 2/3 in the case of any person, as provided in Article 50 of the Social Security Act (Cap. 318).	Class 1 contributions: 10% basic sal-ary of the employee	Class 1 contributions: 10% basic sal-ary of the employee	Class 2 contributions: self-employed pay 15% of the annual income that is subject to the same ceil-ing that applies for employ-ees (!)	Class 2 contributions: gov-ernment pays 7.5% of the annual income that is subject to the same ceiling that applies for employ-ees (!)	Pension-able earn-ings are valourised on the basis of the Cost of Living Adjustment (COLA) (!). This may represent a strong indexation depending on the pen-sion level since as explained in footnote 4, COLA is a flat sum.	Persons born before 1 Janu-ary 1962 (includ-ing present retirees) receive pensions updated on the basis of increases in wages or weak indexation to inflation depending through col-lective bar-gaining to the occu-pation or salary scale previously occupied by retiree.	Expressing the max. pension as a proportion of the average wage in 2010: max. pensionable income (€) as a share of the current average wage.	
		Following the 2006 Pension Reform, a per-son who has reached the age of 61 but has not yet reached pen-sion age may, after reach-ing 61, claim a pension in respect of retirement if such person is no longer gain-fully occupied. In this case, it is necessary that since their 18th birthday the claimant has made a total of: 2 080 (or 40 y) paid or cred-ited contribu-tions for those born on or after 1 January 1962; or 1 820 (or 35 y) paid or cred-ited contribu-tions for those born during 1952-61.				Following the 2006 Pensions Reform, persons born on or after 1 January 1962 will have their pension updated annually by such sum that corres-ponds to 70 % of the increase in the national average wage and 30 % of the inflation rate as pub-lished by the NSO.								

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
MT	Non-contributory scheme <sup>(2)</sup>	means-tested min. pension through social assistance scheme to persons not qualified for the contributory scheme	payable to citizens of Malta over 60 years of age	payable to citizens of Malta over 60 years of age	Under this type of scheme, the main rule is that a person who is married and who did not contribute enough to be eligible for the min. pension would receive no social security benefit and would rely on the income of the spouse. On the other hand, a single person with a poor contributory record would be eligible for a non-contributory old-age pension, subject to satisfying the means-testing criteria.							As from 2008, pensions under this category are indexed on the basis of current law, i.e. full indexation to COLA.	Under the non-contributory old-age pension scheme, the rate depends on whether the pensioner is married or single, whereby: a married couple where both qualify for a pension under the Social Security Act would receive a highest rate of EUR 108.08/week; a married couple where only one person qualifies for a pension under the Social Security Act would receive a highest rate of EUR 66.36/week; and widowed, single persons or a married person where the spouse is in receipt of a state-financed residential service in terms of the Social Security Act would receive a highest rate of EUR 83.97/week.	
<b>Occupational pensions</b>														
Exist only to a minor extent														
Additional information: (1) A self-employed person is defined by the Social Security Act as 'a self-employed person who is engaged in any activity through which earnings exceeding EUR 910 per annum are being derived'. (2) The basic wage refers to the gross wage or salary that is payable to an employed person by or on behalf of his employer excluding any remuneration for overtime, any form of bonus, any extra allowances, any remuneration in kind and commissions. (3) COLA is a flat amount <sup>(1)</sup> in money terms that is calculated as the multiple of the 12-month moving average inflation rate as at end of September and the base wage (a wage level which is higher than the min. wage but much lower than the average wage. The base wage is updated annually by the COLA granted in the previous period. (4) It is important to point out that, as a result of the Pension Reform, there will be different max. pension regimes for three groups of persons: those born before 31 December 1951; persons born during calendar years 1952 and 1961; and persons born on or after 1 January 1962.														

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
NL	Public pensions														
	Social security pensions (AOW)	flat rate	65	65	50 years of residency	na	na	2 %	0	17.9 %	0	na	wages	30 %	
	Occupational pensions														
	Supplementary private pensions (quasi-mandatory, average scheme)	mixed	± 60	65	full career	na	na	± 2 %	± 13.3 %	± 6.7 %	0	na	wages/ prices	62 %	
Additional information: Occupational pensions are for the most part quasi-mandatory private pension schemes. The total max. gross replacement rate for the average worker retiring at age 65 after 40 working years equals 92 % (= 30 % + 62 %). Neither public nor private pension schemes have min. contributory years.															

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings*	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>AT</b>															
<b>Public pensions</b>															
		mixed (emphasis on DB)	min. 15 years of contributory years	65 m 60 f (2010) 65 f (2060) (gradual linear increase 2024–33)	45 years	—	37.9 % gross wage 54.0 % net wage	1.78 % p.a.	employed: 12.55 %	employed: 10.25 % self-employed: 17.50 % farmers: 16.00 %	employed: — self-employed: 5.30 % farmers: 6.80 %	benchmark: average insured wage	benchmark: consumer price index	80 % (can potentially increase for people working beyond the statutory retirement age)	—
<b>PL 2010</b>															
<b>Public pensions</b>															
1. General pension system	NDC/DB		65 m/60 f; contributory years: NDC not relevant; DB 25 m/20 f	65 m/60 f	DB 25 m/20 f	for NDC (full career); DB (10 consecutive years or 20 years from full career)	about 20 %	0.67 %	9.76 % (!)	9.76 % (!)	—	growth of the c. revenue	CPI + at least 20 % of wage growth		
2. Farmers' pension system	DB		65 m/60 f and 25 contributory years or 60 m/55 f and 30 contributory years		20 years	general min. pension and contributory period			—	10 % of general min. pension	—	not relevant			
3. Security provision systems			no min. age (excluding judges: 65) and 15 contributory years	not relevant	not relevant	75 % of last wage			—	—	—				
4. Pre-retirement			61 m/56 f and 25 m/20 f contributory years		25 m/20 f	not relevant	about 25 %								
5. Bridging pensions	NDC		60 m/55 f; contributory years 25 m/20 f including at least a 15-year period of employment in special conditions or in special character	60 m/55 f	25 m/20 f	full career	about 20 %		1.5 %	—		growth of the c. revenue			

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Government	Valorisation of pensionable earnings*	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
PL 2010	Mandatory private scheme													
	1. Open Pension Funds (OFE)	DC	65 m/60 f; contributory years not relevant	65 m/60 f	not relevant	full career	—		9.76 % (!)		market rate of return			
Additional information: (!) Employees and employer pay between them 19.52 % from which, in NDC scheme, 12.22 % is provided to the general pension system (ZUS) and 7.3 % to the mandatory private scheme. In the DC scheme, 19.52 % is destined for ZUS. Security provision system, pre-retirement and bridging pensions are financed from the State budget (bridging pensions additionally from contributions paid by employers 1.5 %). Pre-retirement is a fixed sum. Growth of the C (contribution) revenue means nominal increase of the sum of the old-age contributions.														
PL 2060	Public pensions													
	1. General pension system	NDC	65 m/60 f; contributory years, not relevant	65 m/60 f		full career	about 20 %		9.76 % (!)	—	growth of the c. revenue	CPI + at least 20 % of wage growth		
	2. Farmers' pension system	DB	65 m/60 f and 25 contributory years or 60 m/55 f and 30 contributory years		20 years	general min. pension and contributory period			—	10 % of general min. pension	not relevant			
	3. Security provision systems		no min. age (excluding judges: 65) and 15 contributory years	not relevant	not relevant	75 % of last wage			—	—				
	4. Pre-retirement		61 m/56 f and 25 m/20 f contributory years		25 m/20 f	not relevant	about 25 %							
Mandatory private scheme														
	1. Open Pension Funds (OFE)	DC	65 m/60 f; contributory years not relevant	65 3/60 f	not relevant	full career	—		9.76 % (!)		market rate of return			
Additional information: (!) From May 2011, 2.3 % (of 7.3 %) is diverted to the funded scheme. The other 5 % is placed in a special individual subaccount. This proportion will change gradually to 2017, until it reaches 3.8 % (subaccount in ZUS) and 3.5 % (open pension funds). The subaccount collected capital is the subject to inheritance. The newly created subaccounts will be indexed according to the average of the previous 5 years' nominal GDP growth (excluding any decline in GDP).														

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>PT 2010 Public pensions</b>															
	1. General contributory (social insurance) scheme: old-age and early pensions	DB	55/30 (1) or 65/15	65	40	10 out of 15 + full career (transition) (2)	60 % (2009)	2-2.3 %	23.75 %	11 %	—	CPI	CPI, GDP and pension amount (3)	± 80.9 % (	98.35 % (2010)
	2. General contributory (social insurance) scheme: disability pensions		—/3	—			70 % ('relative disability', 2009)				—				—
	3. General contributory (social insurance) scheme: survivors' pensions		—/3 (for the pension producer)	—			—	—	23.75 % (for the pension producer)	11 % (for the pension producer)	—	CPI (for the pension producer)		± 48.5 % (60 % of 80.9 %)	98.35 % (2010) (4)
4. RESSA (Spec. Soc. Sec. Scheme for agriculture workers) scheme: old-age, disability, survivors															
Closed scheme (no new pensioners expected)															
	5. Social pensions: old-age (means-tested)	—	65/< 15	65	—	—	—	—	—	—	—	—	CPI and GDP (3)	—	—
	6. Social pensions: disability (means-tested)	—	18/< 3	18	—	—	—	—	—	—	—	—		—	—
	7. Other social assistance: social supplement for the elderly (means-tested)	—	—	65	—	—	—	—	—	—	—	—	not automatically indexed	—	—
	8. CGA (pension scheme for civil servants hired until December 2005), old-age, disability, survivors	DB	62.5/38.5	62.5	38.5	last wage 2005 (with valorisation) + full career (transition) (2)	—	—	15 % (28.4 % according to national accounts)	10 %	—	CPI	CPI, GDP and pension amount (3)	81 %	98.35 % (2010)

Country	Pension scheme	Type	Minimum retirement age/ contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
PT 2010	Occupational pensions														
		first pillar DB plans, other DB plans and DC plans	for first pillar DB plans: 40 years of service before 65 y or 35 years of service for over 60 y; for other DB plans: 65 y (usually)	65	for first pillar DB plans: min. 35 y; for other DB plans: 30–40 y	There is no common formula for DB benefits (final salary is the most common).	There is no standard pension.	DB plans: first 10 contributory years, employees are entitled to 20 % of a fixed salary level. Then, this percentage is increased 3–4 p.p., according to the number of contributory years, until it reach 100 %. DB plans: which are integrated with social security system, the accrual rate is commonly around 2 % per year. DC plans: the effective accrual rate (defined as the ratio of the contribution rate to the annuity factor) is estimated to be around 0.4 % ( <sup>1</sup> ).	DB plans: depends on the market fluctuation in terms of the real return on assets and interest rates. DC plans: estimated around 4 % (on the basis of 2009 and 2010 data)	for first pillar DB plans: 5 % for DC plans: 1 % (average employee contribution)	—	rule not established	CPI for first pillar DB plans and other DB plans defined under collective bargaining agreements. Not guaranteed for other type of pension provision (indexation is made on a discretionary basis).	not defined	—
	Mandatory private scheme														
	1. First pillar pensions for the banking sector	Closed scheme in what concerns new workers since 2009 (new pensioners are expected, but new workers have been compulsorily registered under the social security schemes since 2009)													
	Additional information: ( <sup>1</sup> ) Early pensions subject to penalties. ( <sup>2</sup> ) During the transition period, pension formulae weight '10 best of 15' and the full career (max: 40). ( <sup>3</sup> ) Indexation is according to CPI but there are bonus/malus according to GDP growth defined brackets. Due to deflation, this rule was partly bypassed in 2010. Due to the crisis, there was no indexation in 2011. ( <sup>4</sup> ) Before the sustainability factor: this replacement rate is only attainable in lower pensions (below 1.1 x social support index). The estimation of the max. replacement rate in 2010 takes into account the weighting of the previous and the new pension formulae, assuming constant wages during the entire working career. ( <sup>5</sup> ) The survivors' pension is derived from the pension the deceased relative (the 'pension producer') was receiving (A) or would be entitled to at the year of death (B). Thus, the 2010 sustainability factor is only applicable in case (B) or case (A) if the producer started the pension in that year. For pensions the producer started earlier, previous FS would be implicit. ( <sup>6</sup> ) Source: 2009 Ageing Report. ( <sup>7</sup> ) Given a contribution rate of 4 % (simple average of the real contribution rate, determined dividing current contributions by the gross salaries, observed in years 2009 and 2010) and an annuity factor of 13.826.														

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
Public pensions															
PT 2060	1. General contributory (social insurance) scheme: old-age and early pensions	DB	55/30 or 65/15	65	40	full career (max: 40)	—	—	23.75 %	11 %	—	CPI	CPI, GDP and pension amount <sup>(1)</sup>	92 % <sup>(2)</sup>	76.15 % <sup>(3)</sup>
	2.General contributory (social insurance) scheme: disability pensions		—/3	—			—	—			—				—
	3. General contributory (social insurance) scheme: survivors' pensions		—/3 (for the pension producer)	—			—	—	23.75 % (for the pension producer)	11 % (for the pension producer)	—	CPI (for the pension producer)		55.2 % (60 % of 92 %)	76.15 % <sup>(3)</sup>
	4. Social pensions: old-age (means-tested)	—	65/< 15	65	—	—	—	—	—	—	—	—		—	—
	5. Social pensions: disability (means-tested)	—	18/< 3	18	—	—	—	—	—	—	—	—		—	—
	6. Other social assistance: social supplement for the elderly (means-tested)	—	65/—	65	—	—	—	—	—	—	—	—	not automatically indexed	—	—
	7. CGA (pension scheme for civil servants hired until December 2005), old-age, disability, survivors	Closed scheme (no new pensioners expected)													
Additional information:															
<sup>(1)</sup> Indexation is according to CPI but there are bonus/malus according to GDP growth defined brackets.															
<sup>(2)</sup> Before the sustainability factor: this replacement rate is only attainable in lower pensions (below 1.1 x social support index).															
<sup>(3)</sup> Sources: INE and EUROPOP 2010.															



Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
SL 2010	Public pensions														
	Public pension scheme	DB	58 m/56y 8m w pension period: 40 m/37y 3m w	63 m/ 61 w	length of effective contributory work: 40m/38 w	best consecutive 18 years	45.16–45.44 % (net average wage)/29.20–29.38 % (gross average wage) (!)	15 years of insurance period: 35 % (men), 38 % (women); each additional year 1.5 %	8.85 %	15.5 %		growth of average wage and pensions	wage growth	accrual rate in 2010 79.5 % of pension base (full contributory period)	mechanism on lower indexation of pensions for persons retired before 2000
	Non-mandatory private scheme														
SL 2060	Voluntary supplementary pension	DC with min. yield guarantee		58											
	Public pensions														
	Public pension scheme	DB	58 m and w pension period: 40 m/38 w	63 m/ 61 w	length of effective contributory work: 40 m/38 w	best consecutive 18 years	na	15 years of insurance period: 35 % (men), 38 % (women); each additional year 1.5 %	8.85 %	15.5 %		growth of average wage and pensions	wage growth	accrual rate in 2060 72.5 % of pension base (in case of full contributory period)	mechanism on lower indexation of pensions for persons retired before 2000
	Non-mandatory private scheme														
	Voluntary supplementary pension	DC with min. yield guarantee		58											
	Additional information: (!) Old-age pension for full pensionable period (40 years) (men), assessed from min. pension rating base.														

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>RO</b>															
<b>Public pensions</b>															
1.	Public pension system (2010)	PAYG, calculation formula based on pension points	min. retirement age not regulated by the law; min. contributory period for men and women in January 2010 was 12.6	January 2010: 63.9 m/ 58.9 w	January 2010: 32.6 m/ 27.6 w	contributory scheme, full career	min. guaranteed social pension represents approximately 19 % of the average gross wage used for State budget grounding in 2010		normal work conditions 20.8 %; difficult work conditions 25.8 %; special work conditions 30.8 %	individual social insurance contribution 10.5 %			from 1 January 2010, no indexation of the pension point value; it is set by the law on the state social insurance budget, according to macro-economic indicators		
2.	Public pension system (2011)		min. retirement age not regulated by the law; min. contributory period for men and women in January 2011 was 13	January 2011: 64 m/ 59 w	January 2011: 33 m/ 28 w		min. indemnity for pensioners represents approximately 17 % of the average gross earnings used for State budget grounding in 2011		normal work conditions 20.8 %; difficult work conditions 25.8 %; special work conditions 30.8 %						
3.	Public pension system (2012)		min. retirement age not regulated by the law; min. contributory period for men and women in January 2012 was 13.6	January 2012: 64.3 m/ 59.3 w	January 2012: 33.6 m/ 28.6 w								pension point value is increased annually by 100 % inflation rate plus 50 % of the real growth of the average gross earnings for the previous year		

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
RO	Mandatory private scheme														
	1. Privately administered pension funds	DC with investment guarantees (hybrid)	The same as the statutory retirement age in the public pension system.							2010: 2.5 % of the individual social contribution from first pillar; 2011: 3 % (gradual increase by 0.5 % per year until reaching 6 %)					
	Non-mandatory private scheme														
	1. Voluntary pensions	DC	60 m and w/min. contributory period 90 months						up to 15 % of monthly gross earnings can be shared between employer and employee	up to 15 % of monthly gross earnings. can be shared between employer and employee					

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
SK 2010	Public pensions														
	Public pension scheme	DB, points	early retirement possible 2 years before statutory retirement age; min. contributory period is 15 years	62 m and w (gradually increasing for women until 2024)	no limit	—	no min. pension	1.25 %	21.75 % (14 % = pension contribution + 3 % = disability contribution + 4.75 % = reserve solidarity fund)	7 % (4 % = pension contribution + 3 % disability contribution)	26 % (18 % pension contribution + 6 % disability contribution + 2 % solidarity reserve fund; only for certain groups defined by law)	wages	Swiss indexation (0.5 % inflation + 0.5 % average wage growth)	—	
	Mandatory private scheme														
SK 2060	Mandatory fully funded private scheme	DC	early retirement possible 2 years before statutory retirement age; min. contributory period is 15 years	62 m and w (gradually increasing for women until 2024)	no limit	—	no min. pension		9 %	0	9 %	—	—		
	Public pensions														
	Public pension scheme	DB, points	early retirement possible 2 years before statutory retirement age; min. contributory period is 15 years	62 m and w	no limit	lifetime average (starting in year 1984 due to data availability)	no min. pension	1.25 %	21.75 % (14 % = pension contribution + 3 % = disability contribution + 4.75 % = reserve solidarity fund)	7 % (4 % = pension contribution + 3 % disability contribution)	26 % (18 % pension contribution + 6 % disability contribution + 2 % solidarity reserve fund; only for certain groups defined by law)	wages	Swiss indexation (0.5 % inflation + 0.5 % average wage growth)	—	
	Mandatory private scheme														
	Mandatory fully funded private scheme	DC	early retirement possible 2 years before statutory retirement age; min. contributory period is 15 years	62 m and w	no limit	—	no min. pension		9 %	0	9 %	—	—		

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
FI	Public pensions														
	1. National pensions	means-tested	other than early pensions: 65	65	40	na	about 25 %	na	abolished in 2010				100 % prices	na	
	2. Guarantee pensions							na					100 % prices	na	
	3. Earnings-related pensions	DB	old-age pension 63; early old-age pension 62; contributory period 18–68	63–68	na, no full pension	full career (18–68)	na	1.5 (18–52); 1.9 (53–62); 4.5 (63–68)	average 16.9 (TyEL) in 2010	employees 18–52 years 4.5 (2010) and 53–68 years 5.7 (2010)	—	80 % wages, 20 % prices	80 % prices, 20 % wages	na	life expectancy coefficient
Occupational pensions															
DB and DC															
Non-mandatory private scheme															
	DC		New legislation from 1.1.2010; 62												

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
SE															
Public pensions															
	Public pensions							17.21 %	10.21 %	7.00 %					
	1. Income pension	NDC	61/1	no limit	no limit	0.423 PBA < gross pensionable earnings < 8.07 IBA	na	14.88 %	8.83 %	6.05 %	'employer contributory rate' for social insurances, e.g. unemployment benefits	IBA + inheritance gains	change in IBA – 1.6 %	na	Annuity factor based on unisex life expectancy at date of retirement. Also, an automatic balancing mechanism that is activated in case of financial imbalance in the system.
	2. Old transitional supplementary pension (for individuals born before 1954)	DB	61/3		30 years	average of 15 best	na	14.88 %	8.83 %	6.05 %		IBA	change in IBA – 1.6 %	na	bonus 0.7 %/ month or malus 0.5 %/month if retirement age other than 65.
	3. Guarantee income pension	top-up to income pension	65/3		40 years	min. pension 2.13 price base amounts (PBA) for singles and 1.90 PBA for cohabitants: benefits are reduced with 100 % for pension income below the min. level and with 48 % above the min. level	na	0	0	0	general taxes	na	PBB	na	no

Country	Pension scheme	Type	Minimum retirement age/contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
<b>Occupational pensions</b>														
SE	1. Private blue-collar	DC	normally 65/1	65			na							
	2. Private white-collar	mixed												
	3. Local government	mixed												
	4. Central government	DB												
<b>Mandatory private scheme</b>														
	1. Pre-mium pension	FDC	61/1	no limit	no limit	0.423 PBA < gross pensionable earnings < 8.07 IBA	na	2.33 %	1.38 %	0.95 %	market return on individual chosen mutual funds, net of administration	fixed or variable annuity, calculated on actuarial principles	na	annuity factor based on unisex life expectancy at date of retirement
<b>Non-mandatory private scheme</b>														
	1. Tax deductible pensions savings	FDC	55	no limit	na	max. SEK 12 000/year for employees	na		na	na	market return on individual chosen mutual funds, net of administration	fixed or variable annuity, calculated on actuarial principles	na	min. 5 years
Additional information: In 2010, the price base amount (PBA) = SEK 42 400 and the income base amount (IBA) = SEK 51 100. Using the exchange rate SEK 9.5373 = EUR 1 as assumed in the reporting framework, PBA = EUR 4 446 and IBA = EUR 5 358.														

Country	Pension scheme	Type	Minimum retirement age and contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
UK															
Public pensions															
	Social security pensions		In 2010, SPA of 60 for women, 65 for men, currently legislating to increase to 66 for men and women by 2020. Already legislated for 68 for men and women by 2046.												
	Basic state pension, flat-rate scheme	DB, PAYG	each year of National Insurance contributions count for new pensioners since April 2010		30 qualifying years	na	no min.					highest of earnings, CPI, 2.5 %	highest of earnings, CPI, 2.5 %		
	Additional pension, earnings-related scheme				from 16 to SPA, first scheme ran until 1975, current scheme began in 1978		no min.					earnings	CPI		
	Pension credit	low income protection	income-related benefit		na	na	34.0 %, 2011 guarantee credit singles rate GBP 137.35 divided by ASHE 2010 median gross weekly earnings for all of GBP 404					earnings	earnings		



Country	Pension scheme	Type	Minimum retirement age and contributory years	Statutory retirement age	Contributory period for full pension	Pensionable earning reference	Minimum pension as a share of the average wage	Accrual rate (for non-DB systems effective accrual rate)	Contributory rate: Employers	Contributory rate: Employees	Contributory rate: Government	Valorisation of pensionable earnings *	Indexation of pensions in payment	Maximum replacement rate	Sustainability factor
UK	Occupational pensions														
	Occupational pensions	DB	55 (some members are lower due to legacy rules)/0	na	varies	varies	na	varies	varies	varies	tax relief, corporation tax relief, contracted-out rebate, national insurance relief — so contribution rate varies	varies	varies, currently lower of CPI or 2.5 %, subject to 0 % floor	na	very low, most closed
		DC	55 (some members are lower due to legacy rules)/0	na	na	varies	na	varies	varies	varies	tax relief, corporation tax relief, contracted-out rebate, national insurance relief — so contribution rate varies	varies	varies	na	very high
	Mandatory private scheme														
NO	Mandatory private scheme	na	na	na	na	na	na	na	na	na	na	na	na	na	na
	Non-mandatory private scheme														
	Non-mandatory private scheme	DC	55 (some members are lower due to legacy rules) & 0	na	na	varies	na	varies	varies	varies	tax relief, corporation tax relief, contracted-out rebate, national insurance relief — so contribution rate varies	varies	varies	na	very high
	Additional information: Note that responses are high level and should be used for general information only. The detail on State rules is too complicated for a table such as this.														
NO	Public pensions														
	1. Old-age	NDC	62/between ages 13 and 75 years	67 (reference)	no explicit full pension	full career (1)	31 %	1.35 % (2)					wage growth – 0.75 p.p.		
	2. Disability														
	Additional information: (1) From 2011, there are flexible retirement for the age group 62-75 based on actuarial neutrality. Pension entitlements are accumulated through income between the age of 13 and 75 years. The individual will each year increase their pension entitlements corresponding to 18.1 % of their pensionable income, up to a ceiling equal to 7.1 basic amounts (G. NOK 74721 for 2010). (2) There is no explicit accrual rate in the new old-age pension scheme. Pension entitlements are accumulated at a rate of 18.1 % of yearly pensionable income and are converted to yearly pension through division number reflecting life expectancy at the age of retirement. The correspondence is 18.1/1.35 = 13.41 reflecting the reference cohort 1943 when 67 years of age.														

## ANNEX 6.1. PENSION PROJECTION REPORTING SHEET

<b>Country:</b>									
<b>Scenario:</b>									
<b>Pension scheme:</b>									
<b>Voluntary</b>									
<b>A. FIXED TABLE</b>									
		2000	...	2009	2010	2020	...	2060	Control variable (1-0)
		Out-turn data in current prices			Base year				
<b>GDP (ECFIN projection, current prices: EUR billion)</b>									
1	<b>GDP (used in projections, current prices)</b>								
2	<b>GDP deflator</b>								
3	<b>Gross wage (used in projections, current prices: EUR billion)</b>								
4	<b>Average wage (used in the projections, in current prices: EUR '000)</b>								
5	<b>Consumer price inflation</b>								
<b>1 — PENSION EXPENDITURES (gross and net: EUR million)</b>									
6	<b>Public pensions scheme, gross</b>								
	Of which:								
7	aged –54								
8	aged 55–59								
9	aged 60–64								
10	aged 65–69								
11	aged 70–74								
12	aged 75+								
13	Old-age and early pensions								
14	Of which: new pensions								
15	Of which: earnings-related pensions								
16	new pensions								
17	private sector employees								
18	public sector employees								
19	Of which: non-earnings-related minimum pensions/minimum income guarantee for persons over statutory retirement age								
20	Disability								
21	Of which: new pensions								
22	Other pensions (survivors')								
23	Of which: new pensions								
24	<b>Occupational scheme, gross</b>								
25	Of which: new pensions								
26	<b>Private scheme gross</b>								
27	Of which: new pensions								
28	Mandatory private scheme								

		2000	...	2009	2010	2020	...	2060	Control variable (1-0)
		Out-turn data in current prices			Base year				
29	<i>Of which: new pensions</i>								
30	Non-mandatory private scheme								
31	<i>Of which: new pensions</i>								
32	<b>Total pension expenditure, gross</b>								
	<i>Of which:</i>								
33	aged –54								
34	aged 55–59								
35	aged 60–64								
36	aged 65–69								
37	aged 70–								
38	aged 75+								
39	<b>Public pensions scheme, net</b>								
40	<i>Of which: non-earnings-related minimum pensions/minimum income guarantee for persons over statutory retirement age</i>								
41	<b>Occupational scheme, net</b>								
42	<b>Private scheme, net</b>								
43	<b>Total pension expenditure, net</b>								
<b>2 — BENEFIT RATIO</b>									
44	Public pensions								
45	Occupational pensions								
46	Private mandatory pensions								
47	Private non-mandatory pensions								
48	<b>Total benefit ratio</b>								
<b>3 — GROSS AVERAGE REPLACEMENT RATES (at retirement)</b>									
49	Public pensions (earnings related)								
50	Occupational pensions								
51	Private mandatory pensions								
52	Private non-mandatory pensions								
53	<b>Total gross replacement rate</b>								
<b>4 — NUMBER OF PENSIONS ('000)</b>									
54	<b>Public pensions</b>								
	<i>Of which:</i>								
55	aged –54								
56	aged 55–59								
57	aged 60–64								
58	aged 65–69								
59	aged 70–74								
60	aged 75+								
61	Old-age and early pensions								
62	<i>Of which: earnings-related pensions</i>								
63	Private sector employees								
64	Public sector employees								
65	Disability								
66	Other pensions (survivors')								

	2000	...	2009	2010	2020	...	2060	Control variable (1-0)
	Out-turn data in current prices			Base year				
67 <b>Occupational scheme</b>								
68 <b>Private scheme</b>								
69 Mandatory private scheme								
70 Non-mandatory private scheme								
71 <b>Non-earnings-related minimum pensions</b>								
72 <b>All pensions</b>								
Of which:								
73 aged –54								
74 aged 55–59								
75 aged 60–64								
76 aged 65–69								
77 aged 70–74								
78 aged 75+								
<b>5 — NUMBER OF PENSIONERS ('000)</b>								
79 <b>Public pensions</b>								
Of which:								
80 aged –54								
81 Of which: female								
82 aged 55–59								
83 Of which: female								
84 aged 60–64								
85 Of which: female								
86 aged 65–69								
87 Of which: female								
88 aged 70–74								
89 Of which: female								
90 aged 75+								
91 Of which: female								
92 Old-age and early pensions								
93 Of which: earnings-related pensions								
94 Private sector employees								
95 Public sector employees								
96 Other pensions (disability, survivors')								
97 <b>Occupational scheme</b>								
98 <b>Private scheme</b>								
99 Mandatory private scheme								
100 Non-mandatory private scheme								
101 <b>Pensioners receiving non-earnings-related minimum pensions</b>								
102 <b>All pensioners</b>								
Of which:								
103 aged –54								
104 Of which: female								
105 aged 55–59								

		2000	...	2009	2010	2020	...	2060	Control variable (1–0)
		Out-turn data in current prices			Base year				
106	<i>Of which: female</i>								
107	aged 60–64								
108	<i>Of which: female</i>								
109	aged 65–69								
110	<i>Of which: female</i>								
111	aged 70–74								
112	<i>Of which: female</i>								
113	aged 75+								
114	<i>Of which: female</i>								
<b>6 — CONTRIBUTIONS (employee and employer: EUR million)</b>									
115	<b>Public pensions</b>								
116	Old-age and early pensions								
117	<i>Of which: earnings-related pensions</i>								
118	<i>Private sector employees</i>								
119	<i>Public sector employees</i>								
120	Other pensions (disability, survivors')								
121	<b>Occupational scheme</b>								
122	<b>Private scheme</b>								
123	Mandatory private scheme								
124	Non-mandatory private scheme								
125	<b>Total pension contributions</b>								
<b>7 — NUMBER OF CONTRIBUTORS ('000 employees)</b>									
126	<b>Public pensions</b>								
127	Old-age and early pensions								
128	<i>Of which: earnings-related pensions</i>								
129	<i>Private sector employees</i>								
130	<i>Public sector employees</i>								
131	Disability								
132	Other pensions (survivors')								
133	<b>Occupational scheme</b>								
134	Average contribution period, years								
135	<b>Private scheme</b>								
136	Mandatory private scheme								
137	Average contribution period, years								
138	Non-mandatory private scheme								
139	Average contribution period, years								
140	<b>All pensions</b>								
<b>8 — ASSETS OF PENSION FUNDS AND RESERVES (EUR million)</b>									
141	<b>Public pensions</b>								
142	Liquid assets (Non-consolidated)								

		2000	...	2009	2010	2020	...	2060	Control variable (1-0)
		Out-turn data in current prices			Base year				
143	Liquid assets (Consolidated)								
144	Other assets								
145	Savings to the funds								
146	Payments from the funds								
147	Occupational scheme								
148	Private mandatory scheme								
149	Private non-mandatory scheme								
150	All pensions								
<b>9 — DISAGGREGATION OF NEW PUBLIC PENSIONS EXPENDITURES, EARNINGS RELATED (Refer to line 16)</b>									
<b>Defined-benefit schemes (BE BG CZ DK EE EL ES FR IE LT LU HU MT NL AT PT SI FI UK)</b>									
151	Number of new pensions ('000)								
152	Average contributory period (years)								
153	Average accrual rate								
154	Average pensionable earning								
155	Sustainability/adjustment factors								
156	Average number of months paid the first year								
<b>Point schemes (DE FR CY RO SK)</b>									
151	Number of new pensions ('000)								
152	Average contributory period (years)								
153	Average accrual rate (= V/K)								
a	Point value (V)								
b	Point cost (K)								
154	Average pensionable earning								
155	Sustainability/adjustment factors								
156	Average number of months paid the first year								
<b>National defined contribution (IT LV PL SE NO)</b>									
151	Number of new pensions ('000)								
152	Average contributory period (years)								
153	Average accrual rate (= c/A)								
a	Notional-accounts contribution rate (c)								
b	Annuity factor (A)								
154	Average pensionable earning								
155	Sustainability/adjustment factors								
156	Average number of months of pension paid the first year								

**B. ADDITIONAL INFORMATION**

Source: Commission services

## 7. HEALTHCARE

### 7.1. INTRODUCTION

This chapter presents the methodology for projecting public expenditure on healthcare in the 27 Member States of the EU and Norway up to 2060. Healthcare services represent a high and growing share of government spending and of total age-related expenditure. The ageing of the EU population may entail additional government expenditure. This puts the issue of public spending on healthcare and long-term care at the centre of the debates on the long-term sustainability of public finances.

The projections for public expenditure on healthcare are made on the basis of the baseline assumptions on population projections provided by Eurostat (EUROPOP2010) and the assumptions on labour force, labour productivity, GDP and interest rates agreed by the EPC: these are outlined in Chapters 1 to 4 of this report. The sensitivity tests described in Chapter 5 are also reflected in the projections of public expenditure on healthcare. Note that separate projections will be made for public expenditure on long-term care: these are described in Chapter 8.

In preparation for the 2012 Ageing Report, Commission services (Directorate-General for Economic and Financial Affairs) issued two notes describing the methodology and the different scenarios used to project public expenditure on healthcare. Notes were circulated to the delegates of the AWG and subsequently discussed at AWG meetings. The general methodology and the various scenarios are explained below.

### 7.2. GENERAL METHODOLOGY FOR PROJECTING PUBLIC EXPENDITURE ON HEALTHCARE

The methodology and scenarios to be used in the forthcoming 2012 Ageing Report are similar to those in the previous 2009 EPC-EC projection exercise<sup>(86)</sup>. As in 2009, macro-simulation models are used to project health expenditure. The exception is when the effect of technology and other non-demographic determinants of expenditure is estimated using econometric analysis. Some small refinements and additional sensitivity tests have been added to the 2009 methodology and an additional scenario is considered. This approach ensures comparability of the results over time, while allowing for some innovation.

Macro-simulation models assume that the whole population is divided into groups with certain characteristics (e.g. age, gender, per capita expenditure, health status). Changes in the size and features of these groups lead to expenditure changes over time. These types of models are widely used in long-term expenditure projections. Note that such methodology tries to identify the impact of each quantifiable determinant separately on the basis of hypothetical assumptions (an estimated guess, or a ‘what if’ situation). Therefore, the results of the projections should not be interpreted as forecasts of expenditure.

The general methodology used to project public expenditure on healthcare is articulated as follows and schematically presented in Graph 7.1:

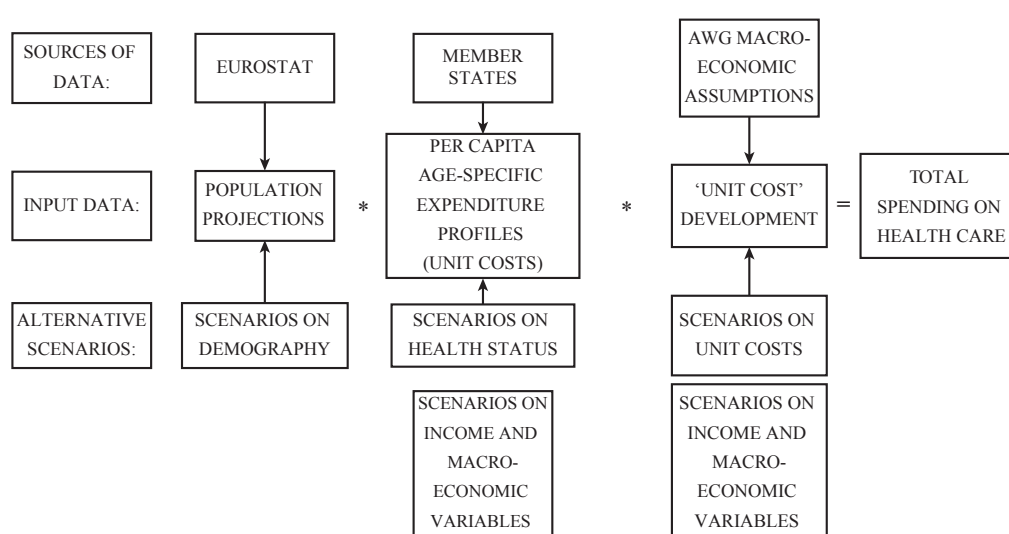
- STEP 1: take baseline population projection (i.e. number of individuals) by age and gender provided by Eurostat for each year up to 2060;

---

<sup>(86)</sup> The previous projection exercise is described in the 2009 Ageing Report and the associated report on underlying assumptions and projection methodologies ([http://ec.europa.eu/economy\\_finance/publications/publication\\_summary14911\\_en.htm](http://ec.europa.eu/economy_finance/publications/publication_summary14911_en.htm)).

- STEP 2: take age/gender-specific public expenditure per capita on healthcare, i.e. the so-called age/gender-specific expenditure profiles provided by Member States;
- STEP 3: calculate age/gender expenditure profiles for each projection year up to 2060 on the basis of various assumptions, i.e. the projection scenarios;
- STEP 4: for each projection year, multiply the projected number of people in each age/gender group by the respective age/gender expenditure profiles;
- STEP 5: for each projection year, sum all the groups' expenditure to obtain total projected public expenditure on healthcare.

Graph 7.1: Schematic presentation of the projection methodology



Source: Commission services

### 7.3. MAIN DRIVERS OF HEALTHCARE EXPENDITURE AND PROJECTION SCENARIOS

To understand the various scenarios used and, therefore, the assumptions made in relation to the long-term evolution of age/gender expenditure profiles, it is important to understand the determinants of public expenditure on healthcare. Public expenditure on healthcare is determined by a complex set of demand and supply side factors. These include:

- the population size, age and, more importantly, population health status;
- economic growth and development (national income);
- new technologies and medical progress;
- the organisation, financing and delivery of the healthcare services (institutional features of the health system);
- healthcare resource inputs, both human and capital.

Building on the 2009 EPC-EC projections exercise, this projection exercise considers a number of different projection scenarios, thus enabling the analysis of the possible impact of each



factor separately and in a quantifiable way. These scenarios try to capture the above mentioned demand and supply-side factors and, therefore, demographic and non-demographic variables. Nevertheless, the methodology and the scenarios used in the Ageing Report reflect mainly demand-side factors such as demographic structure, health status and income of the population. A couple of scenarios (labour intensity, sector-specific composite indexation and non-age-related costs/technology scenario) attempt to identify the impact of supply-side and non-demographic factors. The econometric analysis tries to estimate the effects of technology and institutional settings, while controlling for income and the demographic structure of the population.

In fact, the methodology and the choice of the scenarios to apply to all 27 Member States and Norway depend on the availability, comparability and quality of healthcare data. Many of the determinants of expenditure described are either not quantifiable or depend on ad hoc policy decisions. Therefore, the methodology and scenarios used to project public expenditure on healthcare may not capture all the relevant factors identified as determinants of public expenditure on

healthcare. Data availability, comparability and quality have, nevertheless, improved since the last round of projections. Moreover, the EC and the AWG delegates will ensure the highest possible consistency through the use of common databases to the largest possible extent.

As in past projection exercises, most scenarios for long-term budgetary projections illustrate the policy-neutral situation. This is the situation where future, not yet legislated, changes in government policy are not considered. In other words, potential future institutional or legal changes to the financing and organisation of healthcare systems are not reflected in the methodology used for projecting expenditure. Instead, the only changes modelled in these projections are those deemed automatic responses to new needs resulting directly from changes in population structure, health status or income. Therefore, the determinants of expenditure considered in the projections can be seen as mostly independent of potential future changes in government activity or public policy.

An overview of the scenarios is presented in Table 7.1. The various scenarios are explained in the following sections.

**Table 7.1:** Overview of different scenarios to project public expenditure on healthcare

	Pure demographic scenario	High life expectancy scenario	Non-demographic determinants scenario	Constant health scenario	Death-related costs scenario	Income elasticity scenario	EU-27 average cost convergence scenario	Labour intensity scenario	Disaggregation indexation scenario
	I	II	III	IV	V	VI	VII	VIII	IX
Population projection	EUROPOP-2010	Alternative higher life expectancy scenario (+ 1 year)	EUROPOP-2010	EUROPOP-2010	EUROPOP-2010	EUROPOP-2010	EUROPOP-2010	EUROPOP-2010	EUROPOP-2010
Age-related expenditure profiles	2010 profiles held constant over projection period	2010 profiles held constant over projection period	2010 profiles held constant over projection period	2010 profiles shift in line with changes in age-specific life expectancy	2010 profiles held constant but split into profiles of decedents and survivors	2010 profiles held constant over projection period	Individual EU-27 profiles converging to the EU-27 average age profiles over the projection period	2010 profiles held constant over projection period	2010 profiles held constant over projection period
Unit cost development	GDP per capita	GDP per capita	GDP per capita	GDP per capita	GDP per capita	GDP per capita	GDP per capita	GDP per hours worked	Input-specific indexation
Income elasticity of demand	1	1	econometric estimates	1	1	1.1 in 2010 converging to 1 by 2060	1	1	1

Source: Commission services

### 7.3.1. PURE DEMOGRAPHIC SCENARIO

The *pure demographic* scenario aims to isolate the effect of an ageing population on future public expenditure on healthcare. It assumes that age/gender-specific health status (i.e. morbidity rates, disability) and the provision of health services do not change over time. Morbidity and disability rates and the health services provision are the same as today. Only mortality rates and life expectancy change over time and, therefore, the number of people in each age/gender group. As a result, this scenario assumes that if there is a gradual increase in life expectancy on the basis of underlying population projections, such gains in life expectancy are implicitly assumed to be spent in bad health. The number of years spent in good health remains constant. In other words, a higher proportion of people with health problems survive to an older age<sup>(87)</sup>. As such, this scenario is in line with the *expansion of morbidity* hypothesis, which postulates that falling mortality is accompanied by an increase in morbidity and disability<sup>(88)</sup>.

To calculate future public expenditure on healthcare, the population in each age/gender group is multiplied by the respective age/gender-specific public expenditure per capita in each projection year. Age/gender groups change each year in line with the population projections up to 2060. This scenario assumes that the age/

gender-specific public expenditure per capita in each projection year evolves in line with GDP per capita growth but otherwise remains constant over the whole projection period. In other words, the age/gender profile of a 50-year-old person in 2060 is still the same as a 50-year-old person today, only adjusted for GDP per capita growth. Such development, when applied to the baseline age/gender-specific expenditure profiles, can be considered to be neutral in macroeconomic terms (e.g. if no change in the age structure of the population occurred, the share of public expenditure on healthcare to GDP would remain the same over the projection period).

#### Formal illustration

Firstly, over the time horizon of the projection exercise, the age/gender-specific public expenditure profiles (showing the average public spending on healthcare per capita for each year of age (from 0 to 100, according to data availability) are assumed to grow in line with income (i.e. GDP per capita). Therefore, the per capita cost (expenditure) in a projected year  $t$  is:

$$c_{g,a,t}^{pd} = c_{g,a,t-1} \Delta Ypc_t \quad [1]$$

where:

$pd$  stands for *pure demographic* scenario;

$c_{g,a,t-1}$  is the cost per capita of a person of a given gender  $g$  and age  $a$  in period  $t-1$ ;

$\Delta Ypc_t$  is GDP per capita growth rate in year  $t$ :

$$Ypc_t = \left( \frac{Y_t}{\sum p_{g,a,t}} - \frac{Y_{t-1}}{\sum p_{g,a,t-1}} \right) \bigg/ \frac{Y_{t-1}}{\sum p_{g,a,t-1}} \quad [2]$$

with  $Y_t$  representing GDP in projection year  $t$ ; and  $p_{g,a,t}$  is the projected population of a given gender  $g$  and age  $a$  in year  $t$ .

Hence, this 'adjusted' per capita cost ( $c_{g,a,t}^{pd}$ ) is the cost per capita of a person of gender  $g$  and age  $a$  in year  $t$  of the projection period, following the adjustment to GDP per capita growth.

Secondly, in each year, the respective unit cost is multiplied by the projected population of each age group (using the baseline population

(87) This relationship works mainly through three mechanisms: (i) due to medical interventions, the prolonged survival of chronically ill people increases their lifespan but it does not improve their health state so, consequently, extra years of life expectancy are, at least partially, spent in bad health; (ii) increased survival means that a larger part of population is elderly and more vulnerable to chronic diseases (moreover, the causes of disability are shifting from fatal to non-fatal diseases which are more prevalent in older age cohorts); (iii) chronic disease can act as a risk factor for other illnesses — for example a disease earlier in a lifetime can have negative consequences later on, and a non-fatal disease may not translate directly into higher mortality but into higher morbidity and disability.

(88) The 'expansion of morbidity' hypothesis was first developed by Gruenberg (1977), followed by Verbrugge (1984) and Olshansky et al. (1991). It claims that the decline in mortality is largely due to a decreasing fatality rate of diseases, rather than reduction in their prevalence/incidence. Consequently, falling mortality is accompanied by an increase in morbidity and disability. Robine and Michel (2004) and Robine et al. (2003a, 2003b) present an overview of the main theories on population ageing based on data on life expectancy, morbidity changes, disability trends and mortality.

projections) to obtain the total public spending for each age/gender group:

$$S_{g,a,t}^{pd} = c_{g,a,t}^{pd} p_{g,a,t} \quad [3]$$

where:

$S_{g,a,t}^{pd}$  is public spending on healthcare for all persons of gender  $g$  and age  $a$  in year  $t$ .

Next, the resulting total public spending on healthcare is divided by the projected GDP in order to obtain the public healthcare expenditure as a percentage of GDP:

$$T_t^{pd} = \frac{\sum S_{g,a,t}^{pd}}{Y_t} \quad [4]$$

where:

$T_t^{pd}$  is the ratio of total public spending on healthcare to GDP in year  $t$  computed according to the *pure demographic* scenario.

### 7.3.2. HIGH LIFE EXPECTANCY

The *high life expectancy* scenario is a variant and, indeed, a sensitivity test to the *pure demographic* scenario. It tries to measure the impact of alternative assumptions on mortality rates. This scenario assumes, as in the sensitivity tests used for pension projections, that life expectancy at birth in 2060 is higher (by one year) than the projected life expectancy used in the *pure demographic* scenario. This scenario is methodologically identical to the *pure demographic* scenario, but alternative demography data and GDP data are used. Indeed, this scenario assumes a slightly different structure of the population over the projection period with consequences for several macroeconomic variables and, therefore, GDP <sup>(89)</sup>.

#### Formal illustration

The mathematical formula used in the previous scenario still applies, except that the number of individuals in each age/gender group up to 2060 is replaced by the new population

assumptions and so is the value for several macroeconomic variables as a consequence.

### 7.3.3. ESTIMATING THE IMPACT OF NON-DEMOGRAPHIC DRIVERS ON HEALTHCARE EXPENDITURE

Since the second half of the 20th century, healthcare expenditure has been growing faster than income. Econometric studies show that demographic factors (e.g. the age distribution of the population) have only a secondary role in explaining this development when compared with other drivers, such as income, technology, institutional settings and individual behaviour <sup>(90)</sup>.

In the 2009 Ageing Report, a first attempt to estimate the impact of non-demographic drivers (NDD) on healthcare expenditure <sup>(91)</sup> was reported in Annex 2: Quantifying the impact of technology on healthcare expenditure: econometric analysis of past trends and projections. In the 2012 Ageing Report, the methodology to assess the impact of NDD on healthcare expenditure has been refined and due prominence will be given to healthcare expenditure projections based on the econometric analysis, alongside the other (demographic) scenarios.

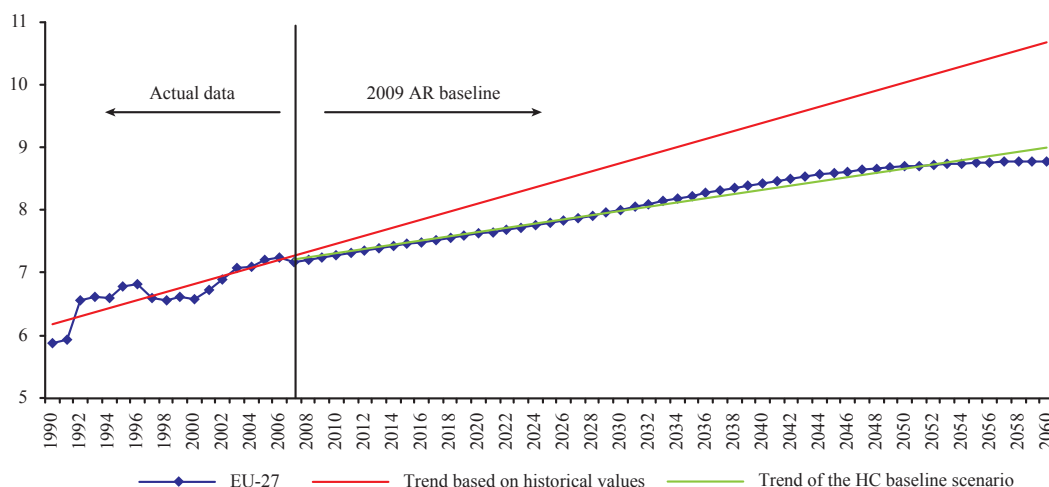
Ignoring the effect of on healthcare expenditure corresponds to making the very strong assumption that past trends of healthcare expenditure will shift downwards and flatten out in future (Graph 7.2).

<sup>(89)</sup> Since GDP data also captures the life expectancy change through its impact on the labour force projections.

<sup>(90)</sup> OECD (2006), 'Projecting OECD health and long-term care expenditures: What are the main drivers?', *OECD Economics Department Working Papers* No 447; IMF (2010), Jenkner, E., Karpowicz, I., Kashiwase, K., Shang, B., Soto, M., Tyson, J., 'Macro-Fiscal Implications of Healthcare in Advanced and Emerging Economies', prepared by the IMF Fiscal Affairs Department.

<sup>(91)</sup> Then named 'technological effects'.

**Graph 7.2:** Public expenditure on healthcare as % of GDP in the EU-27 (baseline scenario of the 2009 AR) and trends, 1990–2060



Source: Commission services

### Formal illustration

In order to address this critical aspect of past projection exercises, and following analytical work carried out for the 2009 Ageing Report <sup>(92)</sup>, Commission services (Directorate-General for Economic and Financial Affairs) carried out some additional work on the NDD of healthcare <sup>(93)</sup>. It uses the *residual approach* to identify the impact of NDD on healthcare expenditure. In practice, the effect of demographic changes is subtracted from the total increase in expenditure and the remaining part (i.e. the residual) is attributed to the impact of NDD <sup>(94)</sup>.

Based on recent IMF work, Commission services used panel regression techniques to estimate country-specific indicators of the NDD of healthcare <sup>(95)</sup>. The impact of NDD on healthcare can be equivalently expressed as

either the excessive growth in real per capita health expenditure over the growth in real per capita GDP  $c$ , after controlling for demographic change; or equivalently, as the country-specific income elasticity of healthcare expenditure  $\eta$ .

The two (equivalent) indicators ( $c$  and  $h$ ) are derived from the estimates of the following regression equation:

$$\log h_{i,t} = \alpha + \mu_i + \beta * \log g_{i,t} + \gamma * \log x_{i,t} + \Delta_{1995} + \varepsilon_{i,t} \quad [1]$$

where:

$\Delta$  is the first difference operator (i.e.  $y_t = y_t - y_{t-1}$ );

$h_{i,t}$  is real per capita (public) healthcare spending for country  $i$  in year  $t$ ;

$g_{i,t}$  is real per capita GDP;

$x_{i,t}$  represents demographic composition;

$\mu_i$  denotes country-fixed effects; and

$\varepsilon_{i,t}$  is a random term error.

<sup>(92)</sup> Dybczak, K., Przywara, B. (2010), *The role of technology in health care expenditure in the EU*, European Economy, Economic Papers 400, February 2010.

<sup>(93)</sup> 'Alternative scenarios for assessing the impact of non-demographic factors on healthcare expenditure', ECFIN/C2/Ares save (2011)720472.

<sup>(94)</sup> Ideally, in order to identify the impact of NDD on healthcare expenditure, one should also control for other variables, such as the health status, relative prices, and institutional variables. However, limitations on data coverage (and collinearity problems) prevent in practice the use a broader set of regressors.

<sup>(95)</sup> In the IMF paper, this is called excess cost growth (ECG).

Equation [1] assumes that real per capita growth in (public) healthcare expenditure is a function of a common growth rate across all countries ( $\alpha$ ), a country-specific growth rate differential ( $\mu$ ), real per capita GDP ( $g$ ), the change in the demographic composition ( $x$ ), and a dummy variable ( $D_{1995}$ ) that could capture a shift in the common trend after 1995 <sup>(96)</sup> <sup>(97)</sup>.

Using estimates of equation [1], the indicators of interest ( $c$ ,  $\eta$ ) are calculated as:

$$\begin{aligned} c_i &= \frac{\sum_{t=1}^{T_i} \frac{\Delta h_{i,t}}{h_{i,t}} \Big|_{x_{i,t}=0}}{T_i} - \frac{\sum_{t=1}^{T_i} \frac{\Delta g_{i,t}}{g_{i,t}}}{T_i} \approx \\ &\approx \frac{\sum_{t=1}^{T_i} \Delta \log h_{i,t} \Big|_{x_{i,t}=0}}{T_i} - \frac{\sum_{t=1}^{T_i} \Delta \log g_{i,t}}{T_i} \end{aligned} \quad [2a]$$

where  $T_i$  denotes the number of years of data available for country  $i$ .

In equation [2a], the excessive growth in real per capita healthcare expenditure over the growth in real per capita GDP  $c$  is calculated as the difference between the (geometric) average growth rate of estimated real per capita (public) healthcare spending, after controlling for the impact of demographic composition, minus the (geometric) average growth rate of real per capita GDP.

Alternatively, results can be expressed in terms of country-specific income elasticities of healthcare expenditure  $\eta$ :

$$\eta_i = \frac{\frac{\sum_{t=1}^{T_i} \frac{\Delta h_{i,t}}{h_{i,t}} \Big|_{x_{i,t}=0}}{T_i}}{\frac{\sum_{t=1}^{T_i} \frac{\Delta g_{i,t}}{g_{i,t}}}{T_i}} \approx \frac{\frac{\sum_{t=1}^{T_i} \Delta \log h_{i,t} \Big|_{x_{i,t}=0}}{T_i}}{\frac{\sum_{t=1}^{T_i} \Delta \log g_{i,t}}{T_i}} \quad [2b]$$

Extensive robustness checks were carried out. First, two datasets were explored: the OECD Healthcare database and COFOG (Classification of the functions of government) data. Second, multiple model specifications were tried using the two datasets, namely estimates including and excluding country-fixed effects and a period dummy.

Econometric results obtained in preparation for the 2012 Ageing Report are at the lower end of other recent estimates (IMF, 2010; Dybczak and Przywara, 2010). In addition, results suggest a slight deceleration in the pace of expenditure growth after 1995.

As regards the implementation of the NDD scenario, and based on the technical work carried out by Commission services for the 2012 Ageing Report, the AWG decided to use a common expenditure-to-income elasticity ( $\eta$ ) of 1.3 <sup>(98)</sup> throughout the projection period, which will be reduced to 1 in 2060.

<sup>(96)</sup> For the 2009 Ageing Report, Dybczak and Przywara (2010) estimated equation [1] in **levels**. A number of reasons can be listed for preferring a specification in **first differences**:

- healthcare expenditure is non-stationary, which could lead to spurious and unreliable results (Dybczak and Przywara (2010) assume co-integration);
- however, co-integration tests are unreliable for short series (Hewartz and Theilen, 2002) and frequent structural breaks in the data lower the power of those tests (Clemente et al., 2004);
- in addition, using data in first-differences facilitates addressing the issue of frequent breaks in the OECD's Health Database.

<sup>(97)</sup> The finding of a significant negative dummy after 1995 could be identifying a deceleration in expenditure growth following an initial acceleration associated with the setting up and expansion in coverage of healthcare systems.

#### 7.3.4. CONSTANT HEALTH SCENARIO: CONSIDERING IMPROVEMENTS IN THE HEALTH STATUS OF ELDERLY CITIZENS

The *pure demographic* scenario may be pessimistic in that it implicitly assumes that all gains in life expectancy up to 2060 would be spent in bad health. The *constant health* scenario is inspired by the *dynamic equilibrium* hypothesis and aims to capture the potential impact of improvements in the health status

<sup>(98)</sup> Corresponding to the weighted average of country-specific estimates.



(i.e. reduction in morbidity and disability) that may accompany projected declines in mortality rates and consequent increases in life expectancy<sup>(99)</sup>. It assumes that the number of years spent in bad health during a lifetime remains constant over the whole projection period (i.e. all future gains in life expectancy are spent in good health). The health status (i.e. morbidity rates) and the age/gender-specific expenditure profiles are realigned with the decline in the mortality rate.

As before, to calculate future public expenditure on healthcare, the population in each age/gender group is multiplied by the respective age/gender-specific public expenditure per capita in each projection year. The size of each age/gender group changes each year in line with the population projections up to 2060. The difference in the *pure demographic* scenario lies in the way we assume age/gender-specific public expenditure per capita evolves over time. As before, we assume that age/gender-specific expenditure profiles grow in line with GDP per capita growth. However, and contrary to the previous scenarios, for each projection year and for relevant age/gender groups<sup>(100)</sup>, the age/gender-specific expenditure profiles<sup>(101)</sup> are progressively shifted to older age groups in direct proportion to the projected gains in age/gender-specific life expectancy.

Given the lack of quantifiable measures of health status (morbidity), this approach is feasible only with an assumption that age-related expenditure profile is a proxy for the morbidity profile (i.e. higher per capita spending at the higher ages is proportional to

the increased frailty and worse health status at the end of a person's lifespan).

### Formal illustration

In practical terms, one starts by calculating, for each projection year, the change in life expectancy in relation to the base year. For example, the life expectancy of a 50-year-old man is expected to increase by, say, four years (from 30 years in year  $t$  to 34 years in year  $t+20$ ) in a specific Member State. Then, the scenario assumes that in  $t+20$ , in that same Member State, a 50-year-old man will have a per capita public expenditure profile of a  $(50 - 4) = 46$ -year-old man in year  $t$ , adjusted to annual GDP per capita growth rate over the last 20 years.

In mathematical terms, the change in life expectancy of a person of gender  $g$  and age  $a$  in relation to the base year (say, 2010) for each year of the projections, using the Eurostat population projections (EUROPOP2010)<sup>(102)</sup> is given by:

$$\Delta LE_{g,a,t,2010} = LE_{g,a,t} - LE_{g,a,2010} \quad [5]$$

where:

$\Delta LE_{g,a,t,2010}$  is the additional life expectancy of a person of gender  $g$  and age  $a$  in year  $t$  compared to a person of gender  $g$  and age  $a$  in 2010;

$LE_{g,a,t}$  is the life expectancy of a person of gender  $g$  and age  $a$  in year  $t$ ; and

$LE_{g,a,2010}$  is the life expectancy of an average person of gender  $g$  and age  $a$  in 2010.

Then, for each year  $t$  of the projections we find, for a person of gender  $g$  and age  $a$ , the 2010 per

<sup>(99)</sup> The 'dynamic equilibrium' hypothesis was first developed by Manton (1982) and suggests counterbalancing the effects of two phenomena: decreasing prevalence/incidence of chronic diseases on the one hand, and decreasing fatality rates of diseases leading to longer prevalence of disability, on the other. More recent papers looking at whether people live longer and healthier include Dolbhammer and Kytir (2001), Nusselder (2003), Mor (2005), Fries (1980, 1989, 2005), Jagger et al. (2007), Laforune and Balestat (2007) and Suhreke et al. (2010). Evidence is mixed regarding trends in healthy life expectancy.

<sup>(100)</sup> The method is applied to those age/gender groups where expenditure per capita is growing. For the young and the oldest old, the reference age/gender and, therefore, age/gender per capita public expenditure profile remains the same over the whole projection period.

<sup>(101)</sup> As in the previous scenarios and in practical terms, it is assumed that age/gender specific expenditure profiles proxy health status (i.e. morbidity). In other words, higher expenditure captures higher morbidity.

<sup>(102)</sup> In the *constant health* scenario, the total number of years spent in bad health during a person's lifetime is assumed to remain the same while life expectancy increases, so the morbidity rate must evolve in line with mortality rate for each age cohort. Thus, if between time  $t$  and  $t+1$ , total life expectancy increases by  $n$  years for a cohort of age  $a$ , healthy life expectancy for that very same age cohort must also increase by  $n$  years in order for the dynamic equilibrium hypothesis to be valid. If healthy life expectancy increases by  $n$  years, then the health status (and consequently healthcare spending) of this cohort of age  $a$  at time  $t+1$  will be the same as the health status (and healthcare spending) of cohort of age  $a-n$  at time  $t$ .

capita cost of a person of gender  $g$  but of the age which corresponds to the age in year  $t$  minus the years gained in life expectancy<sup>(103)</sup>. This is done only for those sections of the age-profile where the cost per capita is growing<sup>(104)</sup>. The precise value of cost per capita assigned to person of gender  $g$  and age  $a$  in time  $t$  is therefore:

$$c_{g,a,t}^{ch} = c_{g,a-\Delta LE_{g,a,t,2010}} \quad [6]$$

where:

$ch$  stands for *constant health* scenario;

$c_{g,a,t}$  is cost per capita assigned to a person of gender  $g$  and age  $a$  in year  $t$  of the projection period; and

$c_{g,a-\Delta LE_{g,a,t,2010}}$  is the 2010 cost per capita assigned to a person of gender  $g$  and of age  $a$  minus the years gained in life expectancy by a person of gender  $g$  and age  $a$  between year  $t$  and year 2010, as defined in equation [5] and specified with a precision to a decimal part of a year in the base year 2010.

This cost per capita is further adjusted to reflect changes in income per capita over the years using the same indexation system as in the previous scenario (i.e. cost per capita grows in line with GDP per capita growth).

$$c_{g,a,t}^{ch} = c_{g,a,t-1}^{ch} \Delta Ypc_t \quad [7]$$

$\Delta Ypc_t$  is GDP per capita growth rate in year  $t$ .

As before, in each year, the respective unit cost is multiplied by the projected population in each age group age (using the baseline population projections) to obtain the total public spending for each age/gender group:

$$S_{g,a,t}^{ch} = c_{g,a,t}^{ch} P_{g,a,t} \quad [8]$$

<sup>(103)</sup> Changes in life expectancy and, therefore, shifts in the age profile from one year to another are sometimes very small (in a range of a tenth of a year). However, the data gathered by the Member States does not provide detailed information on costs per capita by single year of age (the most detailed item available is a five-year average), so an additional calculation needs to be performed. To solve this problem, the intermediate values can be obtained by simple extrapolation/trend-smoothing method from the existing average figures. In this way, it is possible to assign a concrete value of cost per capita to each tenth part of a year of age.

<sup>(104)</sup> For the young and the oldest old, the reference age remains the same over the whole projection period.

where  $S_{g,a,t}^{ch}$  is public spending on healthcare for all persons of gender  $g$  and age  $a$  in year  $t$ .

Next, the resulting total public spending on healthcare is divided by the projected GDP in order to obtain the public healthcare expenditure as a percentage of GDP:

$$T_t^{ch} = \frac{\sum S_{g,a,t}^{ch}}{Y_t} \quad [9]$$

where  $T_t^{ch}$  is the ratio of total public spending on healthcare to GDP in year  $t$ .

### 7.3.5. DEATH-RELATED COSTS SCENARIO

The *death-related costs* scenario employs an alternative method to project public expenditure on healthcare. The methodology links per capita public expenditure on healthcare to the number of remaining years of life. Indeed, there is empirical evidence that a large share of the total expenditure on healthcare during a person's life is concentrated in the final years of life<sup>(105)</sup>. In practical terms, an average profile of *death-related costs by age* is constructed based on available empirical data supplied by Member States in a similar manner to that used in the 2009 Ageing Report<sup>(106)</sup> as follows:

<sup>(105)</sup> For an overview of empirical studies, see Raitano (2006). Specific country examples include: Gabriele, S. et al. (2005) for Italy; Ahn, N. et al. (2005) for Spain; Polder et al. (2006) for the Netherlands; and Cypionka et al. (2007) for Austria. More recently, van Elk et al. (2009) used this method to model healthcare expenditure.

<sup>(106)</sup> In the 2009 Ageing Report, the average death-related costs profile used for all the countries was constructed as a simple average of the profiles provided by nine Member States (Belgium, Czech Republic, Spain, France, Italy, the Netherlands, Austria, Poland and Finland) and completed with data from academic sources covering four other countries (see Madsen (2004) for Denmark; Busse, Krauth and Schwartz (2002) for Germany; Batljan and Lagergren (2004) for Sweden; and Seshamani and Gray (2004) for the United Kingdom). The profiles were expressed as the ratio between the costs borne by a decedent (a person who is going to die within a certain amount of time) and a survivor (a person who is going to survive that amount of time). The reported individual country-specific profiles differed significantly (due to different samples, methodologies, definition of 'time close to death', etc.) so that using them instead of an average would have negatively affected comparability of the results.

- using age/gender-specific mortality rates as probabilities, each age group is split into the two subgroups according to the number of remaining years of life: (i) that of decedents (i.e. those who are expected to die within a certain number of years, e.g. two years); and (ii) that of survivors (i.e. those who are not expected to die within those years, e.g. two years);
- each subgroup of decedents and survivors within each age/gender group is assigned a specific and different per capita public expenditure profile — the *death-related costs* profiles on the basis of data provided by national authorities;
- then the number of individuals in each subgroup of decedents and survivors is multiplied by its respective per capita public expenditure profile: this gives the total public expenditure of each age group in each year;
- summing the total expenditure of each age group in a given year corresponds to the total public expenditure on healthcare in that year;
- the *death-related costs* profiles are, as usual, indexed to GDP per capita growth as in the previous scenarios.

#### Formal illustration

In the *death-related costs* scenario, the population of each gender-age group is divided into subgroups according to the number of remaining years of life using mortality rate as a weighting factor (e.g. number of people aged  $a$  expected to die within two years from year  $t$  is calculated as population aged  $a$  in year  $t$  multiplied by the probability of dying within two years which is expressed as the probability of surviving year  $t$  by persons aged  $a$  times the probability of surviving year  $t+1$  by persons aged  $a+1$  times the probability of dying in year  $t+2$  by persons aged  $a+2$ ).

Each subgroup is assigned a different unit cost, being an adjustment of the ‘normal’ unit cost with the ratio of healthcare expenditure borne by a person of a given age and gender who is in their terminal phase of life to healthcare expenditure borne by a survivor. The number of people in each subgroup is thus multiplied

by its respective cost per capita to get the total spending of each subgroup. The sum of total spending borne by the two subgroups is the total spending on healthcare in a given year.

Mathematically, we have the following formula.

Firstly, the total population of each gender and age is divided into subgroups, according to the number of remaining years of life. Consequently, there are  $z$  subgroups of decedents (those who are going to die within 0, 1, 2, ..., or  $z$  years) and one group of survivors (those who are going to survive the  $z^{\text{th}}$  year). In order to obtain the size of each subgroup, the probability of dying in each gender, age and year of projection period is calculated.

The probability that a person of gender  $g$  and age  $a$  in a given year  $t$  will die in the  $x^{\text{th}}$  year after a given year  $t$  can be expressed by the following equation:

$$d_{g,a,t,x} = \left[ \prod_{i=0}^{x-1} (1 - M_{g,a+i,t+i}) \right] \cdot M_{g,a+x,t+x} \quad [10]$$

where:

$M_{g,a+i,t+i}$  is the mortality rate of people of gender  $g$ , aged  $a+i$  in the  $i^{\text{th}}$  year after given year  $t$  and:  $x \in (0, 1, 2, \dots, z)$ ; and

$z$  is the highest number of years considered as time ‘close to death’ and for which data on costs is available.

The probability that a person of gender  $g$  and age  $a$  in a given year  $t$  will survive  $z^{\text{th}}$  year can be expressed in a following way:

$$s_{g,a,t} = \prod_{i=0}^z (1 - M_{g,a+i,t+i}) \quad [11]$$

So, the number of persons of gender  $g$  and age  $a$  who are going to die in  $x^{\text{th}}$  year from a given year  $t$  can be expressed in the following way:

$$Nd_{g,a,t,x} = d_{g,a,t,x} \cdot p_{g,a,t} \quad [12]$$

where  $p_{g,a,t}$  is projected population of gender  $g$  and age  $a$  in a given year  $t$ .



The number of those who are going to survive  $x^{th}$  year is:

$$Ns_{g,a,t} = s_{g,a,t} \cdot p_{g,a,t} \quad [13]$$

Secondly, the unit healthcare cost of each person in a population is calculated. Contrary to the general approach, per capita cost is not the same for all the individuals, but varies depending on whether a person is in their terminal phase of life or not. One must find the cost per capita of a person of gender  $g$  and age  $a$ , who is going to die within  $x$  years from year  $n$ , as well as the cost per capita of a person of the same gender  $g$  and age  $a$  surviving the  $x^{th}$  year.

The ratio between the two costs is taken as the input data from the country-specific information and background studies and may be expressed as:

$$f_{g,a,x} = \frac{cd_{g,a,x}}{cs_{g,a}} \quad [14]$$

where:

$cd_{g,a,x}$  is healthcare cost per capita of a person of gender  $g$  and age  $a$  dying in the  $x^{th}$  year from the current year; and

$cs_{g,a}$  is healthcare cost per capita of a person of the same gender  $g$  and age  $a$  surviving the period considered as time ‘close to death’ from the current year.

To obtain the two costs, one must use the average cost per capita of a person of a given gender  $g$  and age  $a$  as given in the *age-related expenditure* profiles provided by the AWG delegates. It may be defined as an average of the per capita costs borne by all the subgroups of decedents and survivors, weighted by the size of each subgroup:

$$c_{g,a} = \frac{\sum_{x=0}^z cd_{g,a,x} \cdot Nd_{g,a,x,2010} + cs_{g,a} \cdot Ns_{g,a,2010}}{P_{g,a,2010}} \quad [15]$$

It must be borne in mind that the unit costs of decedents and survivors are calculated for the base year 2010 (thus index 2010 used in the equations) and are kept constant over the whole projection period.

Substituting for  $cd_{g,a,x}$  using [11], one gets:

$$c_{g,a} = \frac{\sum_{x=0}^z f_{g,a,x} \cdot cs_{g,a} \cdot Nd_{g,a,x,2010} + cs_{g,a} \cdot Ns_{g,a,2010}}{P_{g,a,2010}} \quad [16]$$

or:

$$c_{g,a} = \frac{cs_{g,a} \left( \sum_{x=0}^z f_{g,a,x} \cdot Nd_{g,a,x,2010} + Ns_{g,a,2010} \right)}{P_{g,a,2010}} \quad [17]$$

This way, both  $cs_{g,a}$  and — referring back to equation [12] —  $cd_{g,a,x}$  can be calculated:

$$cs_{g,a} = \frac{c_{g,a} \cdot P_{g,a,2010}}{\sum_{x=0}^z f_{g,a,x} \cdot Nd_{g,a,x,2010} + Ns_{g,a,2010}} \quad [18]$$

$$cd_{g,a,x} = f_{g,a,x} \cdot \frac{c_{g,a} \cdot P_{g,a,2010}}{\sum_{x=0}^z f_{g,a,x} \cdot Nd_{g,a,x,2010} + Ns_{g,a,2010}} \quad [19]$$

As in the *pure demographic* scenario and in the scenarios on health status, for the time horizon of the projection exercise (2008–60) the *age-related expenditure* profiles — showing the average healthcare spending per capita for each year of age (from 0 to 100 or less, according to data availability) — are assumed to grow in line with the same cost assumption (i.e. GDP per capita). Therefore:

$$cd_{g,a,x,t}^{drc} = cd_{g,a,x,t-1} \cdot \Delta Ypc_t \quad [20a]$$

and

$$cs_{g,a,t}^{drc} = cs_{g,a,t-1} \cdot \Delta Ypc_t \quad [20b]$$

where:

drc stands for *death-related costs* scenario;

$cd_{g,a,x,t}^{drc}$  is the cost per capita of a person of gender  $g$  and age  $a$  who is going to die within  $x$  years, in year  $t$  of the projection period, adjusted to the GDP per capita growth;

$CS_{g,a,t}^{drc}$  the per capita cost in year  $t$  of a person of gender  $g$  and age  $a$  who survives the  $z^{th}$  year (i.e. the per capita cost of the subgroup of survivors); and

$\Delta Ypc_t$  is GDP per capita rate growth in year  $t$ , as in equation [2].

Thirdly, by multiplying the size of each subgroup by its respective cost per capita, the total cost can be calculated. Total public expenditure on healthcare borne by those of a given gender  $g$  and age  $a$ , who are going to die within  $x$  years from a given year  $t$  can be expressed in the following way:

$$ed_{g,a,x,t} = Nd_{g,a,x,t} \cdot cd_{g,a,x,t} \quad [21]$$

and total expenditure of those of gender  $g$  and age  $a$  who are going to survive  $z^{th}$  year:

$$es_{g,a,t} = Ns_{g,a,t} \cdot cs_{g,a,t} \quad [22]$$

Adding total expenditures of all the subgroups (those dying within 0, 1, 2, ...,  $z$  years plus those surviving  $z^{th}$  year) gives total expenditure on healthcare borne by the entire population of gender  $g$  and age  $a$  in year  $t$ :

$$E_{g,a,t} = \sum_{x=1}^z ed_{g,a,n,x} + es_{g,a,n} \quad [23]$$

Finally, total expenditure on healthcare  $T_t$  borne by the entire population in a given year  $t$ , expressed as a share of the country's GDP, is calculated as follows:

$$T_t = \frac{\sum_g \sum_a E_{g,a,t}}{Y_t} \quad [24]$$

### 7.3.6. INCOME ELASTICITY SCENARIO

This scenario attempts to capture the effect of changes in national income on demand for healthcare goods and services. This effect is the result of a number of factors: higher living standards, the fulfilment of basic needs and, therefore, growing expectations and social pressure to catch up with the healthcare quality

and coverage provided in richer neighbouring countries <sup>(107)</sup>.

To calculate the possible effect of income, one can use different levels of income elasticities to the basic GDP per capita evolution path. More specifically, the *income elasticity* scenario shows the effect of an income elasticity of demand higher than 1 (i.e.  $\varepsilon = 1.1$ ), on the evolution of public expenditure on healthcare. An income elasticity exceeding 1 is an indicator that healthcare is considered by society as a 'luxury good'. An elasticity of 1.1 at the beginning of the period is chosen on the basis of existing reviews of empirical evidence gathered over the recent decades <sup>(108)</sup>. It is the same as in the 2009 Ageing Report. It is also assumed that economic growth and the process of real convergence between countries in the long term drive elasticity down towards common unity level by 2060 <sup>(109)</sup>.

In practical terms, this scenario is identical to the *pure demographic* scenario except that the income elasticity of demand is set equal to 1.1 in the base year (rather than 1 in the case of the *pure demographic* scenario), converging in a linear manner to 1 by the end of projection horizon in 2060.

### Formal illustration

The methodology used to project healthcare spending is the same as for the *pure demographic* scenario, except in the way per capita public expenditure on healthcare is evolving over the projection period. Income elasticity is taken into account by replacing equation [1] by the following equation [25], so that the per capita cost of a person of gender  $g$  and age  $a$  in year  $t$  of the projection period,  $c_{g,a,t}^{ie}$ , is adjusted to the GDP per capita growth with an elasticity that goes from 1.1 to 1 in 2060:

<sup>(107)</sup> The demand for higher quality care may translate into demand for the most modern medical knowledge and technologies. In this context, the impact of income could, to a certain extent, capture the impact of technology. The impact of technological development is assessed in a separate scenario, using econometric analysis of past trends in public expenditure on healthcare, demographic, income and non-income variables.

<sup>(108)</sup> Getzen (2000).

<sup>(109)</sup> This is also a common technical assumption in many long-term projection models, to avoid the 'explosive' path of some of the variables used in the exercise.

$$c_{g,a,t}^{ie} = c_{g,a,t-1} Ypc_t \varepsilon_t \quad [25]$$

where:

*ie* stands for *income elasticity* scenario;

$c_{g,a,t-1}$  is the cost per capita of a person of gender *g* and age *a* in year *t*–1;

$\Delta Ypc_t$  is GDP per capita growth rate in year *t*; and

$\varepsilon_t$  is income elasticity of demand, assumed to converge from  $\varepsilon_{2010}$  to  $\varepsilon_{2060}$  in 2060 according to the following formula:

$$\varepsilon_t = \varepsilon_{2010} - (t - 2010) \cdot \frac{\varepsilon_{2010} - \varepsilon_{2060}}{2060 - 2010} \quad [26]$$

In the specific case where income elasticity of demand converges from 1.1 in 2010 to 1 in 2060, the value will be the following:

$$\varepsilon_t = 1.1 - (t - 2010) \cdot \frac{0.1}{50} \quad [26a]$$

The other steps of the projections are the same as in equations [3] and [4] (or [8] and [9]).

### 7.3.7. EU-27 AVERAGE COST CONVERGENCE SCENARIO

The *cost convergence* scenario is meant to capture the possible effect of a convergence in real living standards across EU countries on public expenditure on healthcare. In other words, this scenario takes into account the convergence of citizens' expectations (and per capita income) towards a similar basket of (health) goods.

The 2012 Ageing Report considers a slightly different *cost convergence* scenario than that in the 2009 Ageing Report. Indeed, the 2009 EU-12 *cost convergence* scenario concerned only the most recently acceded Member States (EU-12) in which spending on healthcare (as per cent of GDP and per capita) was then below the levels observed in the EU-15 countries. The scenario started with the EU-12 lower and flatter age/gender-specific per capita public expenditure profiles observed in the base year. It then assumed that these age/

gender-specific per capita public expenditure profiles, *as a share of GDP per capita*, would progressively increase to the average age/gender-specific per capita public expenditure profiles, *as a share of GDP per capita*, of the EU-15 countries by 2060.

The current socio-economic situation is more diversified and some convergence has taken place. Therefore, the 2009 scenario is adjusted to consider the convergence of all countries (be it EU-15 or EU-12) that are below the EU-27 average per capita public expenditure (*as a share of GDP per capita*) to that same EU-27 average. This can be illustrated as follows: the relative age/gender per capita public expenditure profiles below the corresponding (calculated) EU-27 average age/gender per capita public expenditure *as a share of GDP per capita* in the base year would be assumed to progressively increase to this EU-27 average. The convergence will be achieved by 2060. As a result, the convergence speed for all the countries below the EU-27 average would take into account the differences in the initial situation (i.e. the extent of the initial gap between country-specific and EU-27 average profile).

### Formal illustration

To project public spending on healthcare, we build on the methodology used for the *pure demographic* scenario. Indeed, for those countries where the age/gender per capita public expenditure *as a share of GDP per capita* (relative per capita spending) is equal to or above the EU-27 average (relative per capita spending), equations [1] to [4] from the *pure demographic* scenario to project public spending on healthcare are used.

For those countries where the age/gender per capita public expenditure *as a share of GDP per capita* is below the EU-27 average in the baseline year of 2010, we assume a different evolution path for this variable. We assume it evolves over the projection period so as to reach the EU-27 average in 2060. The real convergence to EU-27 average is assumed to follow the following path, based on an adjustment of equation [1] of the *pure demographic* scenario:

$$c_{g,a,t,i}^{cc} = c_{g,a,t-1,i} (\Delta Ypc_{t,i} + g_{t,i}) \quad [27]$$

where:

$cc$  stands for cost convergence:

$c_{g,a,t,i}^{cc}$  is cost per capita of a person of gender  $g$  and age  $a$  in year  $t$  of the projection period, in country  $i$ , adjusted to the GDP per capita growth and a catch-up effect if country  $i$  is below the EU-27 average;

$c_{g,a,t-1,i}$  is cost per capita of a person of gender  $g$  and age  $a$  in year  $t-1$  in country  $i$ ;

$\Delta Ypc_{t,i}$  is GDP per capita rate growth in year  $t$  of country  $i$ ; and

$g_{t,i}$  is a hypothetical rate of growth of per capita costs which is higher than zero for those countries below the EU-27 average and equal to zero for those countries at or above the EU-27 average.

To close the gap,  $g_{t,i}$  evolves according to the following mechanism <sup>(110)</sup>:

$$g_{t,i} = \left[ \left( \frac{\overline{rc}_{g,a,EU27,2010}}{rc_{g,a,i,2010}} \right)^{\frac{1}{2060-2010}} \right] - 1 \quad [28]$$

where:

$\overline{rc}_{g,a,EU27,2010}$  is the weighted EU-27 average relative cost per capita of gender  $g$  and age  $a$  calculated in the baseline year of 2010; and

$rc_{g,a,i,2010}$  is the relative cost per capita of gender  $g$  and age  $a$  for country  $i$  (if below the EU-27 average cost per capita) calculated in the baseline year of 2010 defined as:

$$rc_{g,a,i,2010} = \left( \frac{c_{g,a,i,2010}}{Ypc_{g,a,i,2010}} \right)$$

and

$$\overline{rc}_{g,a,EU27,2010} = \left( \frac{\overline{c}_{g,a,EU27,2010}}{\overline{Ypc}_{g,a,EU27,2010}} \right)$$

where:

$\overline{c}_{g,a,EU27,2010}$  is the weighted EU-27 average cost per capita of gender  $g$  and age  $a$  calculated in the baseline year of 2010; and

$\overline{Ypc}_{g,a,EU27,2010}$  is the average GDP per capita in the EU-27 calculated in the baseline year of 2010.

After country-specific per capita cost has been calculated, corresponding equations [3] and [4] are used to obtain total age/gender group expenditure and total public expenditure on healthcare in each projection year.

### 7.3.8. LABOUR INTENSITY SCENARIO

This scenario tries to capture the role of labour costs in the evolution of public expenditure on healthcare. The *labour intensity* scenario is an attempt to estimate the evolution of public expenditure on healthcare taking into account that the health sector is and will remain a highly labour-intensive sector. Consequently, in this scenario, unit costs in the healthcare sector are seen as strongly driven by increases in wages and salaries. In practical terms, unit costs (and therefore the age/gender-specific per capita public expenditure profiles) are assumed to evolve in accordance to changes in wages which, in turn, are assumed to evolve in line with labour productivity, rather than growth in GDP per capita. In technical terms, this scenario is similar to the *pure demographic* scenario except that unit costs are assumed to evolve in line with the evolution of GDP per hours worked (which is usually higher than GDP per capita) <sup>(111)</sup>.

Note that this scenario assumes that wages in the health sector grow at the same rate as wages in the whole economy, and that wages in the whole economy generally follow the trend of economy-wide productivity. Hence, expenditures per head are assumed to grow at the same rate as productivity in the whole economy.

<sup>(110)</sup> Assumptions for different convergence paths according to the initial country-specific situation — compared to the EU-27 average age profile — will be explored further as soon as data are available to calculate the new age profiles.

<sup>(111)</sup> Note that the *labour intensity* scenario in the 2009 Ageing Report used GDP per worker.

### Formal illustration

The only difference between this scenario and *pure demographic* scenario is the change in the development pattern of unit costs. The growth in GDP per capita is replaced by the growth in GDP per hours worked, so that equation [1] becomes:

$$c_{g,a,t}^{li} = c_{g,a,t-1} \Delta Yphw_t \quad [29]$$

where:

*li* stands for *labour intensity* scenario; and

$\Delta Yphw_t$  is the rate of growth of GDP per hours worked in year  $t$ .

$$\Delta Yphw_t = \left( \frac{Y_t}{\sum hw_t} - \frac{Y_{t-1}}{\sum hw_{t-1}} \right) / \left( \frac{Y_{t-1}}{\sum hw_{t-1}} \right) \quad [30]$$

Corresponding equations [3] and [4] are then used to calculate total age/gender group expenditure and total public expenditure on healthcare in each projection year.

#### 7.3.9. SECTOR-SPECIFIC COMPOSITE INDEXATION SCENARIO

Given the special character of the healthcare sector (high level of government regulation, investment in new technologies, high labour intensity) it might be more appropriate to use sector-specific rather than economy-wide elements as determinants of unit costs in the model. While a significant share of public expenditure on health corresponds to expenditure on staff (wages), we would consider other inputs and, therefore, components of public expenditure on healthcare thereby enhance the quality of the projections exercised to better reflect reality. These components have usually evolved at a different pace to that of wages. The *sector-specific composite indexation* scenario tries to capture the importance and evolution of various inputs to healthcare provision. The *sector-specific composite indexation* scenario looks at each of these different components separately and indexes each of them in a separate/different way, creating a sort of composite indexation for ‘unit cost development’.

In order to capture the importance and evolution of various inputs, a set of such inputs is chosen — mostly on the basis of data availability — and their respective share in public expenditure on healthcare is calculated. Expenditure on healthcare can be disaggregated into different inputs: (i) staff, which corresponds to expenditure on wages; (ii) pharmaceuticals; (iii) therapeutic appliances; (iv) capital investment; and (v) other factors. For each of these inputs, the share of total public expenditure on healthcare is calculated and applied to the age-specific per capita expenditure. In doing this, each age-specific per capita expenditure is divided into five sub-items of expenditure.

The past evolution of public expenditure on each of those inputs is used to calculate the average annual growth of the expenditure associated with each of those inputs for the past 10 years. The ratio of each of these growth rates to the growth rate of GDP per capita is calculated and multiplied by each sub-item of the age-specific per capita expenditure <sup>(112)</sup>. This allows for different evolution patterns for each component of expenditure so that, in the future, the share of each of these components is allowed to change, something which was not captured by previous scenarios. It is also assumed that the growth ratio multiplying each sub-item of expenditure converges to 1 in a certain year in the future (i.e. grows at the same pace as productivity or GDP per capita).

To provide an example, assume that per capita public expenditure on healthcare for 20-year-old men is EUR 2 000 in year  $t$ . Assume too, that, in line with total public expenditure on healthcare, 40 % is wages, 5 % capital investment, 15 % pharmaceuticals, 2 % therapeutic appliances and 38 % other inputs. Therefore, per capita public expenditure is divided into five sub-items: EUR 800 in wages; EUR 100 capital investment; EUR 300 in pharmaceuticals; EUR 40 in therapeutic appliances; EUR 760 in other inputs. Then, in year  $t+1$  expenditure increases as follows (numbers are just illustrative): (EUR 800 x 1.2) + (EUR 100 x 1.4) + (EUR 300 x 1.3) + (EUR 40 x 1.1) + (EUR 760 x 1), where 1.2, 1.4, 1.3, 1.1 and 1 are the (past observed) growth ratios of each component.

<sup>(112)</sup> The data are available from Eurostat, WHO, OECD/SHA (see details in tables).



As to the pattern of convergence, past observations are used to determine the convergence pattern of the growth ratios. It is assumed that for all components, the ratio converges to 1 in 2060. Different convergence patterns for each component can also be assumed <sup>(113)</sup>.

#### Formal illustration

In mathematical terms, the different steps of the projection exercise are as follows.

The share of each component in total public expenditure on healthcare in each year  $t$  of available data, up to the baseline year of 2010 is calculated as follows.

Assuming five inputs:

$$S_{i,t} = \frac{PE_{i,t}}{\sum_{i=1}^5 PE_{i,t}} \quad [34]$$

where:

$S_{i,t}$  is the share of public expenditure on component or input  $i$  at each time  $t$  to total public expenditure on healthcare;

$PE_{i,t}$  is total public expenditure on component or input  $i$  at each time  $t$ ; and

$\sum_{i=1}^5 PE_{i,t}$  is total public expenditure on healthcare expressed as the sum of the public expenditure on each of the five components or inputs.

The average share of the 10 past observations, up to 2010,  $S_{i,t}$  of each component is calculated as:

$$\bar{S}_i = \frac{\sum_{t=1}^{10} S_{i,t}}{10} \quad [35]$$

<sup>(113)</sup> When extrapolating past trends, caution is called for in interpretation as there may be methodological breaks in the series or policy changes, affecting, for example, pharmaceuticals.

These average shares are combined with the age/gender-specific per capita expenditure in 2010 so that this is the sum of the expenditure on the above five components:

$$C_{g,a,2010} = \sum_{i=1}^5 \bar{S}_i C_{g,a,2010} \quad [36]$$

To calculate the annual growth rate of public expenditure for each of the five components or inputs, the growth rate of public expenditure for component  $i$  at time  $t$  of available data up to the baseline year of 2010 included is:

$$\Delta PE_{i,t} = \left( \frac{PE_{i,t} - PE_{i,t-1}}{PE_{i,t-1}} \right) \quad [37]$$

and the average annual growth rate of public expenditure for component  $i$  for the last past 10 years up 2010, which is:

$$\overline{\Delta PE}_i = \frac{\sum_{t=1}^{10} \Delta PE_{i,t}}{10} \quad [38]$$

Now, recall that the annual growth rate of GDP per capita is  $\Delta Ypc_t$  as defined in equation [2]. We then calculate the average annual growth rate of GDP per capita for the past 10 years of available data (up to 2010 inclusive) as:

$$\overline{\Delta Ypc} = \frac{\sum_{t=1}^{10} \Delta Ypc_t}{10} \quad [39]$$

The ratio of average annual growth rate of expenditure on each component to the average annual growth rate of GDP per capita is calculated by dividing equation [38] by equation [39].

Following these calculations, the per capita cost is assumed to evolve in the following manner:

$$C_{g,a,t}^{di} = \sum_{i=1}^5 \left( \bar{S}_i C_{g,a,t-1} \right) \frac{\overline{\Delta PE}_i}{\overline{\Delta Ypc}} \Delta Ypc_t \quad [40]$$

where:

$di$  stands for *disaggregated indexation* scenario; and

$\Delta Ypc_t$  is the GDP per capita rate of growth in year  $t$  for each country.

$$\overline{\Delta PE_i}$$

Each of the five ratios of growth rates ( $\Delta Y_{pc}$ ) converges to 1 by a specified date, 2060. Again, corresponding equations [3] and [4] are then used to calculate total age/gender group expenditure and total public expenditure on healthcare in each projection year.

## 7.4. DATA SOURCES

### 7.4.1. DATA COLLECTION

The data required to run long-term public expenditure projections in the field of healthcare includes:

- public expenditure on healthcare;
- per capita public expenditure on healthcare by gender and age cohorts (i.e. age/gender-specific expenditure profiles);
- per capita public expenditure on healthcare disaggregated by the number of remaining years of life required to run the *death-related costs* scenario.

The data collection procedure involved two steps. First, Commission services (Directorate-General for Economic and Financial Affairs) pre-filled data on the basis of existing international databases managed by international organisations (Eurostat, OECD, WHO, AMECO). The questionnaire was then circulated to the Member States to endorse the pre-filled figures and complement them with data from national sources if no data was available from international sources. The completed data questionnaires were used to produce the projections.

Note that age/gender-specific per capita public expenditure on healthcare and per capita public expenditure on healthcare disaggregated by the number of remaining years of life were not available in any common international databases. Therefore, they were provided exclusively by AWG delegates.

### 7.4.2. COMPUTING PUBLIC EXPENDITURE ON HEALTHCARE

For the Member States and Norway, for which health accounts data are available on the basis of

the joint OECD/Eurostat/WHO System of Health Accounts (SHA) questionnaire, public expenditure on healthcare is computed as the sum of all ‘core’ healthcare SHA categories (HC.1 to HC.9), excluding long-term nursing care category (HC.3), and adding capital investment in health (HC.R.1). Data are available on both the OECD Health Data and Eurostat Cronos. More specifically, the SHA categories used are:

- services of curative care (HC.1);
- services of rehabilitative care (HC.2);
- ancillary services to healthcare (HC.4);
- medical goods dispensed to outpatients (HC.5);
- prevention and public health services (HC.6);
- health administration and health insurance (HC.7);
- on services not allocated by function (HC.9), and
- investment in medical facilities (HC.R.1).

For the EU countries for which data on the basis of joint SHA questionnaire is not available, ESSPROS is used to compute a proxy for public expenditure on healthcare. This is computed as the sum of:

- expenditure on benefits in kind in the sickness/healthcare function (i.e. the sum of public expenditure on inpatient healthcare and outpatient healthcare including pharmaceutical products);
- expenditure on other benefits in kind in the family/children function;
- expenditure on rehabilitation of alcohol and drug abusers in the social exclusion function;
- expenditure on capital formation either from the OECD Health Data or from a national source is added.

Expenditure on health-related cash benefits from ESSPROS taken from the sickness/healthcare function is added to this aggregate computed on the basis of SHA or ESSPROS data. These health-related cash benefits consist of periodic sick leave benefits, other periodic cash benefits and lump sum cash benefits related to sickness/healthcare.

## 8. LONG-TERM CARE

### 8.1. SHORT OVERVIEW OF THE PROJECTION METHODOLOGY

The methodology for projecting long-term care (LTC) expenditure is based on a simple macro-simulation model. This is the same procedure used in previous projection exercises conducted jointly by the European Commission (EC) and the Ageing Working Group (AWG). Such a macro-simulation model assumes that the whole population is divided into groups which are assigned certain characteristics (e.g. age, gender, per capita expenditure, health status, type of care/support). Changes in the (relative) size or features of these groups lead to expenditure changes over time. These types of models are widely used in long-term expenditure projections, especially when the precise micro-information on the individuals and their transition rates from one health status to another is missing or not reliable.

The choice of methodology and various scenarios is heavily constrained by the availability, accessibility and quality of long-term care data. The set of data to be used in the projection exercise is the SHA data when available — complemented with some proxies calculated on the basis of ESSPROS categories <sup>(114)</sup> <sup>(115)</sup>. Therefore, the models may not include all the relevant factors identified as affecting health and long-term care spending.

The 2006 projection exercise model, based on a proposal by Comas-Herrera et al. (2005), will continue to be used. The approach aims to maximise the numbers of factors affecting future LTC expenditure that can be examined. At the same time, it has to make sure that a large number of Member States can provide the data necessary to run the projections. A schematic presentation can be found in Graph 8.1. Specifically, the methodology aims to analyse the impact of changes in the assumptions made about:

- the future numbers of elderly people (through changes in the population projections used);
- the future numbers of dependent elderly people (changes to the prevalence rates of dependency);
- the balance between formal and informal care provision (assuming a given shift in demand or exogenous changes in the availability of informal carers);
- the balance between home care and institutional care within the formal care system;
- the unit costs of care.

The methodology allows the future need for long-term services in terms of numbers of people who are assumed to need long-term care services to be projected. This is done by using dependency rates to estimate the fraction of the elderly population which is dependent (i.e. have some disability which requires the provision of a care service).

Firstly, a projection is made of the dependent population, on the basis of the baseline population projection and disability rates. Secondly, the dependent elderly population is split, by age and gender, following the type of care received (informal, formal at home, formal in institutions). Thirdly, average expenditure (i.e. age-gender profiles) are calculated for both types of formal care, and then multiplied by the projected number of recipients to obtain the projected public expenditure. More specifically, the necessary steps are:

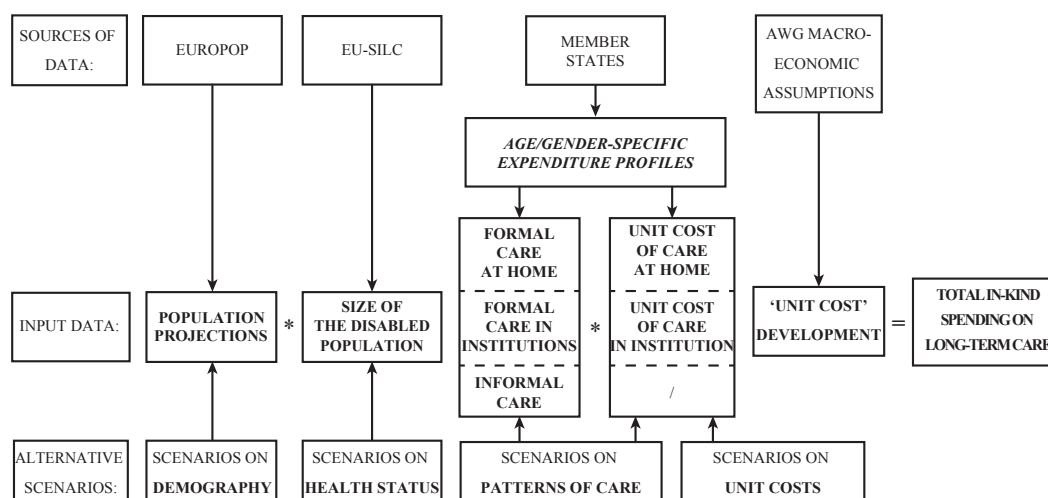
**Step 1:** By taking the baseline population projection (by age and gender), a projection is made of the dependent population, who are assumed to need some form of long-term care service, and the non-dependent population who are assumed not to be in need of long-term care services. This is made by taking age and gender-specific dependency ratios at the value observed in the base year estimated using existing indicators of disability from comparable sources) and applying them to the baseline population projection. More specifically, dependency rates refer to the

<sup>(114)</sup> Annex 8.2.

<sup>(115)</sup> For disability rates, the measure relies on the European Union Statistics on Income and Living Conditions (EU-SILC) ([http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/eu\\_silc](http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/eu_silc)).



**Graph 8.1:** Schematic presentation of the projection methodology/LTC benefits in kind



Source: Commission services

*Note 1:* As in 2009, the projections need to be viewed in the context of the overall projection exercise. Consequently, the common elements of all scenarios will be the population projections provided by Eurostat (EUROPOP2010) and the baseline assumptions on labour force and macroeconomic variables agreed by the EC and the AWG-EPC. The age and gender-specific per capita public expenditure (on long-term care) profiles are provided by Member States. They are applied to the demographic projections provided by Eurostat to calculate nominal spending on long-term care.

*Note 2:* This schematic representation shows the methodology for projecting benefits in kind. Total public expenditure on long-term care is the sum of public expenditure on long-term care in kind plus public expenditure on long-term care in cash benefits: therefore, the projected cash benefits calculation must be added to the projections of long-term care expenditure on benefits in kind.

concept of ADL-dependency which refers to difficulties in performing at least one Activity of Daily Living (ADL) (Katz et al., 1963) <sup>(116)</sup>. EU-SILC data are used to obtain a proxy of ‘ADL-dependency’ rates.

**Step 2:** The projected dependent elderly population is split by age and gender into three groups depending on the type of care they receive, namely (i) informal care, which is assumed to have no impact on public spending; (ii) formal care at home; and (iii) formal care in institutions (the last two of which impact on public spending but their unit costs may differ). The model implicitly assumes that all those receiving home care or institutional care

have difficulties with one or more ADLs, and that all persons deemed ADL-dependent either receive informal care, home care or institutional care. The split by type of care received is made by calculating the ‘probability of receiving different types of long-term care by age and gender’. This is calculated for a base year using data on the numbers of people with dependency (projected in Step 1), and the numbers of people receiving formal care at home and in institutions (provided by Member States). It is assumed that the difference between the total number of dependent people and the total number of people receiving formal care (at home or in institutions) is the number of people who rely exclusively on informal care.

**Step 3:** Average expenditure (i.e. ‘age-gender profiles of expenditure’) are calculated for a base year using data on total public expenditure in home care and institutional care and the numbers of people receiving formal care at home and in long-term care institutions (provided by Member States): two assumptions are required:

<sup>(116)</sup> *Activities of Daily Living* (ADL) are the things people normally do in daily living including any daily activity they perform for self-care (such as eating, bathing, dressing, grooming), work, homemaking and leisure (Webster’s New World Medical Dictionary, Wiley Publishing, 2008). If a person has difficulty in performing at least one of them, they are considered as ADL-dependent.

- it is implicitly assumed that current expenditure in services divided by the number of users equals the long-term unit costs of services;
- it is assumed that average expenditure per user increases with the age of the user <sup>(117)</sup>.

**Step 4:** Involves the calculation of public spending for the two types of formal long-term care services, by multiplying the number of people receiving formal care (at home and in institutions) by the average age-specific public expenditure (respectively at home and in institutions) per year and per user. By adding up the expenditure on formal care at home and in institutions, **total public expenditure on long-term care services** (benefits in kind) is obtained.

**Step 5:** Public expenditure on cash benefits for people with ADL-dependency is added to the expenditure on services, in order to obtain **total public expenditure on long-term care**. Note that cash benefits are assumed to grow in line with the numbers of people with dependency <sup>(118)</sup>.

Overall, given the availability of a numerical measure of disability, the projection methodology described above is more precise than that used for healthcare expenditure where there is no direct indicator of health status and the age-related expenditure profile is used as a proxy. However, an important caveat to note is that while dependency rates are an indicator of the need for care, those needs may not necessarily translate into actual public expenditure, for at least two reasons.

Firstly, the links between disability levels and demand/use of long-term care are not straightforward. Each step involves some

uncertainty. There are many people with some form of disability who can lead completely independent lives without the need for care services. Further, disability also depends on a person's perception of their ability to perform activities associated with daily living. On the one hand, survey data can underestimate some forms of disability. People may not report certain socially stigmatised conditions, such as alcohol and drug-related conditions, schizophrenia, and mental degeneration. On the other hand, disability data can be too inclusive and measure minor difficulties in functioning that do not require provision of community care <sup>(119)</sup>. In order to clarify the situation and to follow the usual eligibility conditions of public schemes, it is commonly accepted that the disability levels accounted for are those categorised as 'severe' <sup>(120)</sup>.

Secondly, most long-term care is still provided by unpaid informal carers. Expenditure profiles contain information about the propensity to receive paid formal care, which depends on a number of factors other than dependency that affect demand for paid care such as household type, availability of informal carers, income or housing situation. Most of these factors, in turn, are also correlated with age.

## 8.2. SCENARIOS CARRIED OUT IN THE PROJECTION EXERCISE

The advantage of the methodology described above is that it allows the examination of different scenarios regarding the evolution of dependency rates, unit costs and policy settings. Consequently, a series of scenarios and sensitivity tests assess the potential impact of each of the determinants of long-term care expenditure on future public expenditure on long-term care. Building on the 2009 EPC-EC projections exercise <sup>(121)</sup>, the present exercise maintains most of the existing scenarios and sensitivity tests

<sup>(117)</sup> In practice, average expenditure (aged 15 and above), for each type of service, is disaggregated into average expenditure by age group, by assuming the same rate of increase in spending by age as in the age-related expenditure profile. It is important to note that the age-related expenditure profile provides information on spending in formal care by age, without distinction between care provided at home and in institutions (unless newly provided by Member States). The model uses average public expenditure in formal care and in institutional care to project future expenditure in both types of services.

<sup>(118)</sup> More details on the cash benefits data are given in Section 8.3.2.

<sup>(119)</sup> Australian Productivity Commission (2005).

<sup>(120)</sup> As these people are in most need of income support and services, such as long-term care.

<sup>(121)</sup> Economic Policy Committee and European Commission (EPC-EC) (2009), *The 2009 Ageing Report: economic and budgetary projections for the EU-27 Member States (2008–60)*, European Economy, No 2, April 2009, Directorate-General for Economic and Financial Affairs, European Commission, 2009 ([http://ec.europa.eu/economy\\_finance/publications/publication14992\\_en.pdf](http://ec.europa.eu/economy_finance/publications/publication14992_en.pdf)).

while attempting to improve the specification of some of the scenarios, and runs one new scenario. An overview of the scenarios is presented in Table 8.1. The analysis tries to identify the impact of each quantifiable determinant separately on the basis of hypothetical assumptions such as an estimated guess or a ‘what if’ situation. Therefore, the results of the projections should not be interpreted as forecast of expenditure as, for example, particular policy/institutional settings

in Member States or policy reforms are not taken into account.

The AWG and EPC will choose a baseline/reference scenario for long-term care expenditure in connection with the release of the final 2012 Ageing Report, containing the budgetary projections, as was the case in the 2006 and 2009 Ageing Reports.

**Table 8.1:**  
Overview of the different scenarios to project long-term care expenditure

	Pure demographic scenario	Base case scenario	High life expectancy scenario	Constant disability scenario	Shift from informal to formal care	Coverage-convergence scenario	Cost-convergence scenario
	I	II	III	IV	V	VI	VII
<b>Population projection</b>	EUROPOP-2010	EUROPOP-2010	alternative higher life expectancy scenario	EUROPOP-2010	EUROPOP-2010	EUROPOP-2010	EUROPOP-2010
<b>Age-related expenditure profiles/dependency status</b>	2010 profiles/ disability rates held constant over projection period	2010 profiles/ disability rates held constant over projection period	2010 profiles/ disability rates held constant over projection period	2010 disability rates change in line with changes in age-specific life expectancy	2010 profiles/ disability rates held constant over projection period	2010 profiles/ disability rates held constant over projection period	individual EU-27 profiles converging to the EU-27 average age profiles over the projection period
<b>Policy setting/care mix</b>	Probability of receiving each type of care held constant at 2010 level	Probability of receiving each type of care held constant at 2010 level	Probability of receiving each type of care held constant at 2010 level	Probability of receiving each type of care held constant at 2010 level	Gradual decrease of the number of persons receiving informal care for the first 10 years; correspondent increase in the number of persons receiving formal care at home and/or in institutions probability of receiving formal care converging to the EU-27 average		Probability of receiving each type of care held constant at 2010 level
<b>Unit cost development</b>	GDP per capita	In-kind: GDP per hours worked; cash benefits: GDP per capita	In-kind: GDP per hours worked; cash benefits: GDP per capita	In-kind: GDP per hours worked; cash benefits: GDP per capita	In-kind: GDP per hours worked; cash benefits: GDP per capita	In-kind: GDP per hours worked; cash benefits: GDP per capita	In-kind: GDP per hours worked; cash benefits: GDP per capita

Source: Commission services

### 8.2.1. PURE DEMOGRAPHIC SCENARIO

The *pure demographic* scenario assumes that the shares of the older disabled population who receive either informal care, formal care at home or institutional care are kept constant over the projection period. Those constant shares are then applied to the projected changes in the dependent population. Since the prevalence of ADL-dependency is also kept constant over the projection horizon, the dependent population

evolves precisely in line with the total elderly population. This implies that, in practice, all gains in life expectancy are spent in bad health/with disability. Arguably, it is a pessimistic scenario with respect to disability status, since it assumes that average lifetime consumption of long-term care services will increase over time. It is a ‘no policy change’ scenario as the probability of receiving care (either at home or in an institution) is assumed to remain constant at the 2010 (base year) level. The scenario is

similar to the analogous scenario for healthcare expenditure, and costs are also assumed to evolve in line with GDP per capita growth (for all types of long-term care expenditure).

#### 8.2.2. BASE CASE SCENARIO

While in the above mentioned elements, the scenario is similar to the analogous scenario for healthcare expenditure, the actual *base case* scenario is slightly different, as it was previously agreed in the 2009 exercise to link long-term care unit cost to GDP per worker, rather than to GDP per capita. Indeed, there exists a current imbalance of care mix, with a relative deficit of formal care provision. Furthermore, this sector is highly labour-intensive and productivity gains can be expected to be particularly slow in this sector. Therefore, public expenditure on long-term care is expected to be rather more supply than demand-driven. For that reason, GDP per worker (which is also assumed to reflect wage evolution in all sectors, including in the care sector), rather than GDP per capita had been chosen as the main driver of unit costs. In this sense, it is more similar to the *labour intensity* scenario run for the healthcare expenditure projections.

For the 2012 projections exercise, it has been agreed to differentiate two kinds of unit costs. The projections will link unit cost to GDP per hours worked <sup>(122)</sup> for benefits in kind (services), while the unit cost of cash benefits will evolve in line with GDP per capita growth (as cash benefits are more related to a form of income support). This was also the assumption of the 2009 AWG reference scenario.

#### 8.2.3. HIGH LIFE EXPECTANCY SCENARIO

The *high life expectancy* scenario presents the budgetary effects of an alternative demographic scenario which assumes life expectancy to be higher for all ages than in the baseline scenario. In terms of methodology, the scenario does not differ from the *base case* scenario, apart from the fact that the baseline demographic projections (structure of the

population evolving over the projection period as well as the consequent evolution in the macroeconomic assumptions) used as input data are replaced with the alternative, high life expectancy, variant (the same used to assess the sensitivity of pension spending). The rationale is twofold. Firstly, the marked increase in public expenditure with older age (i.e. 80 and over). In fact, the age profile for long-term care expenditure is much steeper than that for health expenditure, partly because the costs related to long-term care are very high for institutionalised individuals, and the share of institutionalised individuals increases sharply among persons aged over 80. Secondly, the higher age groups are also the part of the demographic projections which are likely to be the most uncertain.

#### 8.2.4. CONSTANT DISABILITY SCENARIO

This scenario reflects an alternative assumption about trends in age-specific ADL-dependency rates. Being inspired by the so-called dynamic equilibrium hypothesis, it is analogous to the ‘constant health’ scenario performed in the framework of healthcare expenditure projections. The profile of age-specific disability rates shifts in line with changes in life expectancy (disability rate in the future is equal to that of a younger — by the same number of years as the change in age-specific life expectancy — age cohort today), resulting in a gradual decrease over time in disability prevalence for each age cohort.

#### 8.2.5. SCENARIO ASSESSING THE EFFECT OF A SHIFT FROM INFORMAL TO FORMAL CARE

Ultimately, the public funding of long-term care — and the policy orientation — will determine whether future needs for long-term care translate into (direct) public expenditure or not, as neither informal care provision nor private expenditure on long-term care are formally part of public expenditure on long-term care.

Indeed, pressure for increased public provision and financing of long-term care services may grow substantially in coming decades, especially in Member States where the bulk of long-term care is currently provided informally. To illustrate the impact of possible future policy changes, such as Member States deciding to

---

<sup>(122)</sup> GDP per hours worked are proposed, whereas the 2009 exercise used GDP per worker, to stay in line with the macroeconomic assumptions and the other parts of the projections.

provide more formal care services to the elderly, additional scenarios have been prepared.

This policy-change scenario is run to assess the impact of a given — demand-driven — increase in the (public) provision of formal care replacing care provided in informal setting. In particular, this sensitivity test examines the budgetary impact of a progressive shift into the formal sector of care of 1 % per year of disabled elderly who have so far received only informal care. This extra shift takes place during the first 10 years of the projection period only, thus it adds up to about a 10.5 % shift from informal to formal care. Only one of the three alternative options considered in the 2009 Ageing Report will be analysed: 50 % of the ‘new’ beneficiaries will be considered to have moved into institutional care, while the other 50 % will be assumed to be receiving formal care at home.

#### 8.2.6. COVERAGE CONVERGENCE SCENARIO

This scenario assumes that the exchange of best practices and growing expectations of the populations will drive an expansion of publicly financed formal care provision into the groups of population that have not been covered by the public programmes so far. Note that ‘formal coverage’ covers any of the three types of formal long-term care: institutional care, formal home care, and cash benefits. The remaining number of ‘dependent’ people is assumed to receive informal care. As for the scenario assessing the effect of a shift from informal to formal care, this scenario should also be considered as a policy-change scenario, as it assumes a considerable shift in the current long-term care provision policy, while aiming to take into account the high diversity of country-specific current care mix. It assumes a coverage convergence to the EU-27 average by 2060. More specifically, the Member States where the formal coverage rate (i.e. referring to any of the three types of formal care described above) is below the EU-27 average in the starting year are assumed to converge to this average by 2060.

#### 8.2.7. COST CONVERGENCE TO EU-27 AVERAGE SCENARIO

This new scenario is run in parallel with the analogous scenario on healthcare expenditure

projections. For those Member States with high levels of informal care and, therefore, relatively low costs for long-term care, an increase in public expectations for more formal care (and, therefore, an increase in the average cost of long-term care) might be expected. For example, an increase in the costs of care (as per cent of GDP per capita) towards the average for EU Member States could perhaps be expected. The *cost convergence* scenario is meant to capture the possible effect of a convergence in real living standards on long-term care spending. It assumes an upward convergence of the relative age-gender-specific per beneficiary expenditure profiles (as per cent of GDP per capita) of all countries below the corresponding EU-27 average to the EU-27 average. This is done for each type of formal care coverage (i.e. formal care in institutions, formal care at home, cash benefits).

### 8.3. DATA SOURCES

As in the case of healthcare, in order to assure the best possible comparability of data used in the projections, it was previously agreed in the 2009 projections exercise <sup>(123)</sup> to use as much as possible, the definitions agreed at the international level and the figures available in the databases constructed on the basis of those definitions and classifications. To build the basic set of data, it was agreed in the previous projections exercise to rely, to the greatest extent possible, on:

- common methodologies and definitions (i.e. the System of Health Accounts (SHA)) agreed by international institutions (Eurostat, OECD and WHO); and
- the data gathered through the joint data collection exercise (i.e. joint OECD-Eurostat-WHO questionnaire) and reported in Eurostat (Cronos) and OECD (Health Data) databases <sup>(124)</sup>.

<sup>(123)</sup> Economic Policy Committee and European Commission (EPC/EC) (2009), *The 2009 Ageing Report*.

<sup>(124)</sup> SHA Manual — System of Health Accounts 1.0: the manual contains guidelines for reporting health expenditure according to an international standard. It proposes a common boundary of healthcare as well as a comprehensive and detailed structure for classifying the components of total expenditure on health.



For the 2012 exercise, the aim is to improve further the level of consistency compared to that of the 2006 and even 2009 rounds of projections. Nevertheless, the choice of the best option is still dependent on the availability of data in the international databases. When information is missing in the international databases, it has to be provided by each Member State individually. The detailed analysis of available data and classifications carried out <sup>(125)</sup> led to the following agreement. The definitions and data sources should remain very similar to those used in the 2009 Ageing Report but for this exercise, data availability and comparability are improved. Indeed, SHA data are provided in more detail and cover a greater number of countries. Annex 8.2 gives an overview of the combinations of data sources for the 2012 projections exercise.

The data collecting procedure covers the same steps as for healthcare (Section 7.4.1), with the same questionnaire being used to report the data required for both health and long-term care expenditure projections.

For Commission services (Directorate-General for Economic and Financial Affairs) to be able to calculate the proposed scenarios and run the relevant sensitivity tests, the AWG delegates provide the following information in the framework of the long-term care expenditure projections:

- total numbers of dependent people receiving long-term care in institutions and at home, by gender and single age or five-year cohorts;
- total numbers of recipients of long-term care-related cash benefits, by gender and single age or five-year cohorts, and the eligibility conditions;
- possible overlaps between the recipients of cash benefits and the recipients of LTC services (legal possibility and numbers, if available);
- public expenditure per user (patient) of long-term care, by gender and single age

or five-year cohorts (so-called age-related expenditure profiles).

In addition, Commission services (Directorate-General for Economic and Financial Affairs) pre-filled (according to data availability) the following items, which the AWG delegates had to verify/confirm:

- total public spending on long-term care, disaggregated, if possible, into services of long-term nursing care (classified as HC.3 in the System of Health Accounts) and social services of long-term care (classified as HC.R.6.1);
- further disaggregation of total public spending on long-term care into spending on services in kind and spending on long-term care-related cash benefits, by gender and single age or five-year cohorts;
- further disaggregation of total public spending on services in kind into spending on services provided in the institutions (HC.3.1 + HC.3.2) and services provided at home (HC.3.3), by gender and single age or five-year cohorts;
- disability rates by gender and five-year cohorts (based on EU-SILC data).

The following sections briefly describe the data available in the common databases (public expenditure on long-term care, split between services in kind and cash benefits, split between institutional and home care, disability rates), which are used to pre-fill the questionnaires circulated to Member States for validation and integration where necessary. The remaining items (age profiles of long-term care, number of LTC beneficiaries and cash benefits recipients) are provided directly and exclusively by the Member States.

### 8.3.1. PUBLIC EXPENDITURE ON LONG-TERM CARE

According to the System of Health Accounts classification, public expenditure on long-term care is defined as the sum of the following publicly financed items:

- services of long-term nursing care (HC.3) (which is also called ‘the medical component of long-term care’ or ‘long-term

<sup>(125)</sup> See the note for the attention of the Ageing Working Group of the EPC: European Commission, Directorate-General for Economic and Financial Affairs (2011a), ‘Health and long-term care expenditure projections: availability/collection of data’, ECFIN/C2(2011)128176.

healthcare’, and includes both nursing care and personal care services); and

- social services of long-term care (HC.R.6.1), which is the ‘assistance services’ part, relating primarily to assistance with IADL tasks.

These mainly represent the **benefits in kind** allocated to dependent people.

The medical component of *long-term care* (HC.3) is a range of services required by persons with a reduced degree of functional capacity, physical or cognitive, and who are consequently dependent on help with basic activities of daily living (ADL) (e.g. bathing, dressing, eating, getting in and out of bed or a chair, moving around and using the bathroom). The underlying physical or mental disability can be the consequence of chronic illness, frailty in old age, mental retardation or other limitations of mental functioning and/or cognitive capacity. In addition, it comprises help with monitoring status of patients in order to avoid further worsening of ADL status.

This main personal care component is frequently provided in combination with help with basic medical services such as wound dressing, pain management, medication, health monitoring, prevention, rehabilitation or services of palliative care. Depending on the setting in which long-term care is provided and/or the national programme design, long-term care services can include a lower level care of home help or help with instrumental activities of daily living (IADL) more generally, such as help with housework activities, meals, shopping, transport and social activities.

The notion of long-term healthcare services usually refers to services delivered over a sustained period of time, sometimes defined as lasting at least six months.

*Social services of long-term care* (HC.R.6.1) comprise services of home help and residential care services: care assistance which is predominantly aimed at providing help with IADL restrictions to persons with functional limitations and a limited ability to perform these tasks on their own without substantial assistance, including supporting residential services (e.g. in assisted living facilities).

As in the case of healthcare, the figures on public expenditure on long-term care are available

in two separate databases: the Eurostat New Cronos database (available online) and a parallel OECD database, OECD Health Data. SHA data on HC.3 and HC.R.6 is available for 16 Member States. For six other Member States and Norway, SHA data on HC.3 is available, but data on HC.R.6 is missing. As a proxy to HC.R.6 data, the agreement is to use ESSPROS items, comprising the benefits in kind from three ESSPROS functions:

- the sickness function;
- the disability function;
- and the old-age function <sup>(126)</sup>.

For the four remaining countries, there is no SHA data available <sup>(127)</sup>. In this case, it has been agreed to fully rely on a proxy for HC.R.6 based on the ESSPROS items, in parallel to the data on healthcare expenditure (Section 7.4.2). The proxy for public expenditure on long-term care is therefore calculated as the sum of:

- (a) the *sickness/healthcare* function — ‘other benefits in kind’;
- (b) the *disability* function — ‘benefits in kind’ (‘accommodation’ + ‘rehabilitation’ + ‘home help/assistance in carrying out daily tasks’ + ‘other benefits in kind’); and
- (c) *old-age* function — ‘benefits in kind’ (‘accommodation’ + ‘home help/assistance in carrying out daily tasks’ + ‘other benefits in kind’).

### 8.3.2. PUBLIC SPENDING ON CASH BENEFITS

Public spending on cash benefits is projected separately from expenditure on long-term care services, or ‘benefits in kind’, provided at home or in an institution: cash benefits include social programmes offering care allowances. Care allowances were introduced in a number of countries in order to allow households more choice over care decisions, and to support care provided

<sup>(126)</sup> It is possible that the proxy for HC.R.6 includes some data which corresponds to HC.3.3 in the SHA joint questionnaire. Therefore, whenever the ESSPROS proxy for expenditure on LTC home care is higher than that reported in HC.3.3, we deduct HC.3.3 expenditure from the ESSPROS measure.

<sup>(127)</sup> Note that SHA data for Italy should be available soon.

at home. They are mainly addressed to persons with long-term care needs who live in their own homes. However, the design of these programmes varies widely across countries, which reduces comparability between them. Illustrating this variety of systems, it is noteworthy that some countries account for nursing allowances in the HC.3 category.

At least three types of cash-benefit programmes and/or consumer-choice programmes can be distinguished:

- personal budgets and consumer-directed employment of care assistants;
- payments to the person needing care who can spend it as they like, but has to acquire sufficient care;
- payments to informal caregivers as income support.

Data from two databases are combined. Indeed, the HC.R.7 SHA category (health-related cash benefits) does not allow for a clear differentiation between healthcare-related and long-term care-related cash benefits. Moreover, the relevant data are missing for many countries. LTC-related cash benefits as per cent of GDP are available for the same year as SHA joint questionnaire data (or for the latest year available) within two ESSPROS functions: *disability* and *old age*. Both periodic and lump-sum parts of care allowances and economic integration in the *disability* function, as well as periodic care allowance in the *old age* function, are added as cash benefits to the HC.3 + HC.R.6 sum or to the correspondent ESSPROS sum in order to get total spending on long-term care.

### 8.3.3. HOME CARE AND INSTITUTIONAL CARE SPENDING

Long-term care is provided in a variety of settings. It can be provided at home and in the community, or in various types of institutions, including nursing homes and long-stay hospitals. Mixed forms of residential care and (internally or externally provided) care services exist in the form of assisted living facilities, sheltered housing, etc., for which a wide range of national arrangements and national labels exist.

Services at home include services provided by external home care providers, both public and private, in a person's private home on a long-lasting basis. This includes living arrangements in specially designed or adapted flats for persons who require help on a regular basis, but where this living arrangement still guarantees a high degree of autonomy and self-control over other aspects of the person's private life. Also included are services received on a day-case basis or in the form of short-term stays in institutions, for example in the form of respite care. During these stays, persons are not considered as 'institutionalised', but rather receiving temporarily services, which support their continued stay at home.

Services in institutions include services provided to people with moderate to severe functional restrictions who live permanently or for an extended period of time (usually for six months or longer) in specially designed institutions, or in a hospital-like setting where the predominant service component is long-term care, although this may frequently be combined with other services (basic medical services, help with getting meals, social activities, etc.). In these cases, eligibility is often explicitly assessed and defined by level (severity) of dependency and level of care needs.

A necessary step for the purpose of the long-term projections is therefore to calculate the amount of long-term care expenditure associated with institutional care and that associated with home care. This requires some further data reclassification. For all the countries (except the Netherlands and Portugal) reporting expenditure using the SHA joint questionnaire data, information on HC.3 (Services of long-term nursing care) is available for: HC.3.1 (In-patient long-term nursing care); HC.3.2 (Day-cases of long-term nursing care) and HC.3.3 (Long-term nursing care: home care). As in the 2009 projections exercise, categories HC.3.1 and HC.3.2 are classified as care in institutions while HC.3.3 is classified as home care. On this basis, the part of HC.3 which is home care expenditure and the part which is expenditure on institutional care can be readily computed <sup>(128)</sup>.

<sup>(128)</sup> Whenever the ESSPROS proxy for expenditure on institutional care was higher than reported in (HC.3.1 + HC.3.2), the (HC.3.1 + HC.3.2) expenditure was deducted from the ESSPROS measure. This is because some long-term nursing care in institutions may be included in the accommodation categories of ESSPROS. The procedure may not be fully accurate but it removes any possibility of double counting.



For the two countries which do not report HC.3 in disaggregated terms, a more indirect method is needed. One way is to look at expenditure on HC.3 (Services of long-term nursing care) for certain providers. Indeed, summing HC.3 expenditure for hospitals (HP.1), nursing and residential care facilities (HP.2) and providers of ambulatory healthcare except providers of home healthcare services (HP.3 – HP.3.6) is another way of computing HC.3.1 + HC.3.2, expenditure on institutional care. Summing HC.3 expenditure for providers of home healthcare services (HP.3.6) and private households as providers of home care (HP.7.2) then gives a measure of HC.3.3, expenditure on home care.

As regards the part of HC.R.6 which constitutes home care and the part which constitutes institutional care, countries fall into one of two categories. For the countries which did not report HC.R.6 using the SHA joint questionnaire, a HC.R.6-proxy has already been calculated using ESSPROS. The mere process also provides an approximation for both amounts: expenditure on home care and expenditure on institutional care.

For the other countries — reporting HC.R.6 — a more indirect step is followed. A proxy for HC.R.6 is calculated as described in detail in Section 8.3.2 and then the respective shares of home care and institutional care are calculated in that proxy. These shares are then applied to the information provided by the countries according to the SHA joint questionnaire for HC.R.6. While not fully accurate, it is the best way currently available to divide HC.R.6 expenditure into home and institutional care.

For the countries not reporting SHA joint questionnaire data at all, ESSPROS data readily allows an allocation of LTC expenditure to home care or institutional care. As in the previous exercise, it is assumed that ‘home help/assistance in carrying daily tasks’ was provided at home, while ‘accommodation’ referred to the institutional care. The other items remain unclear, such as ‘rehabilitation’ (disability function) and ‘other benefits in kind’ (all three functions) which can be provided either at home or in institutions. Given the relatively small share of those items in total LTC expenditure, a simplified assumption on the split between the two types of care is used (e.g. allocating ‘rehabilitation’ to ‘institutional care’ and ‘other kinds of benefits’ to ‘home care’).

#### 8.3.4. DISABILITY RATES

Compared to the previous exercise, the use of the EU-SILC database information on disability rates should substantially improve the accuracy of the projections. Indeed, some weaknesses of the 2009 exercise will be removed. Firstly, the coverage is extended to young and prime-aged groups and secondly, comparability is improved by using only a single data source. Finally, the measure of dependency given by EU-SILC is fully adequate and the results of the survey are official and endorsed by Member States.

EU-SILC currently covers the 27 EU countries and Norway and is implemented on a legal basis<sup>(129)</sup>. The EU-SILC is based on the idea of a common framework consisting in common procedures, concepts and classifications and harmonised lists of target variables to be transmitted to Eurostat.

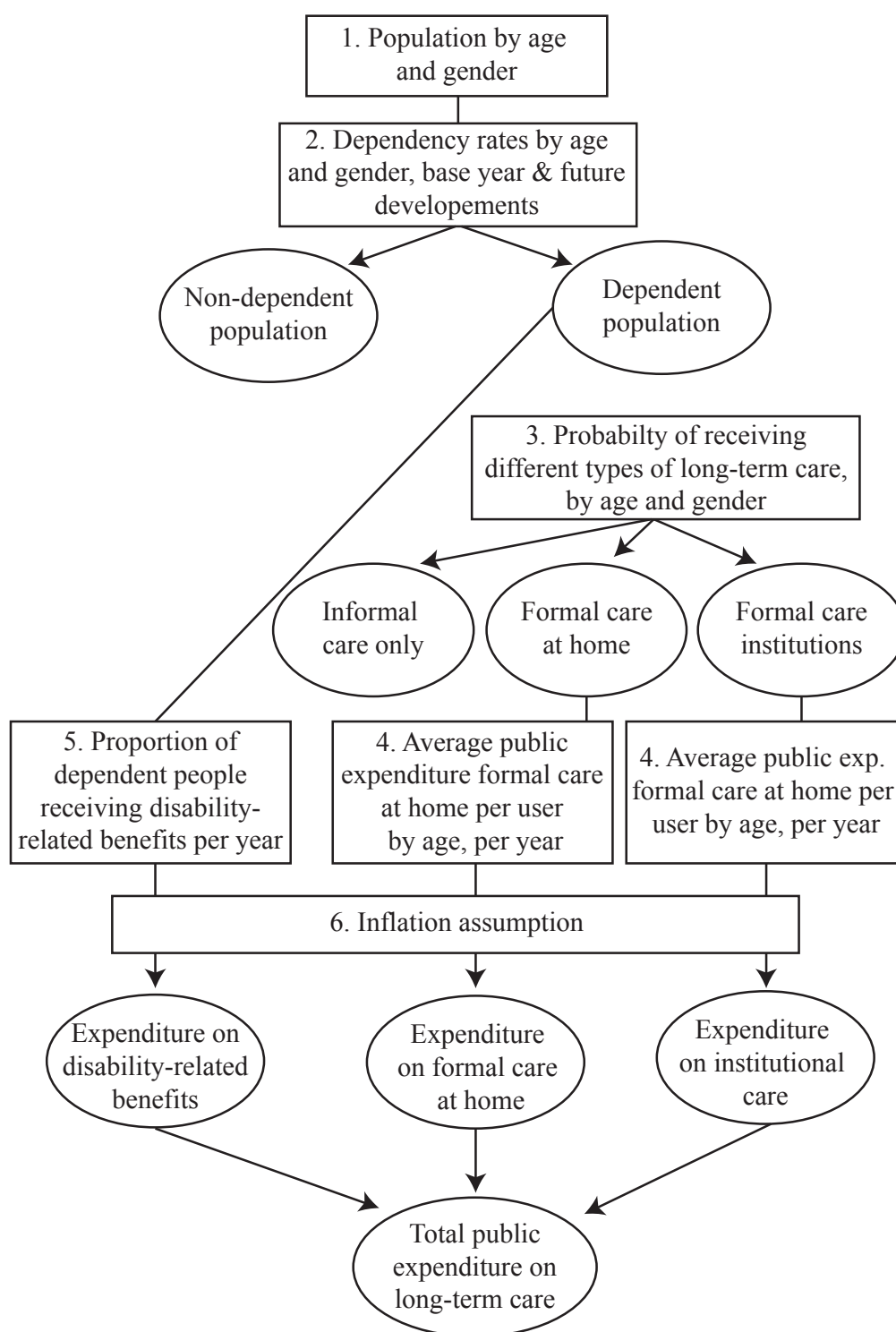
It measures, inter alia, the number of people who have ‘Limitation in activities because of health problems (for at least the last six months)’<sup>(130)</sup>. The latter is consequently an adequate measure of dependency and is available up to 2009 for people aged 15+. The AWG decided to use this measure in order to calculate the base year disability/dependency rates for the 2012 projection exercise.

<sup>(129)</sup> Regulation (EC) No 1177/2003 of the European Parliament and of the Council of 16 June 2003 concerning Community statistics on income and living conditions (EU-SILC).

<sup>(130)</sup> This is the individual’s self-assessment of whether they are hampered in their daily activity by any ongoing physical or mental health problem, illness or disability. An activity is defined as ‘the performance of a task or action by an individual’ and, thus, activity limitations are defined as ‘the difficulties the individual experiences in performing an activity’. Limitations should be due to a health condition. The activity limitations are assessed against a generally accepted population standard, relative to cultural and social expectations by referring only to activities people usually do. This is a self-perceived health question and gives no restrictions by culture, age, gender or the subject’s own ambition. The purpose of the instrument is to measure the presence of long-standing limitations, as the consequences of these limitations (e.g. care, dependency) are more serious. A six-month period is often used to define chronic or long-standing diseases in surveys.

## ANNEX 8.1. LONG-TERM CARE MODEL STRUCTURE

The figure below provides an overview of the model structure. The square boxes indicate data used in the model, while the round boxes indicate calculations that are performed for each year of the projection period.



## ANNEX 8.2. SOURCES OF DATA TO COMPUTE HEALTHCARE AND LONG-TERM CARE ACCORDING TO DATA AVAILABILITY

**Preferred solution:** SHA, when data are available (CZ, DE, EE, ES, FR, CY, LV, LT, LU, PL, RO, SI, SK, FI, SE)

HC	LTC: 'medical' component	LTC: 'social' component	LTC: institutional care	LTC: home care	LTC: cash benefits
SHA: HC.1 – HC.2 + HC.4 – H C.9 + HC.R.1 + ESSPROS: Health-related cash benefits	SHA: HC.3	SHA: HC.R.6	SHA: HC.3.1 + HC.3.2 + HC.R.6 divided according to the split in benefits in kind in ESSPROS data	SHA: HC.3.3 + HC.R.6 divided according to the split in benefits in kind in ESSPROS data	ESSPROS: cash benefits from <b>disability</b> and <b>old-age</b> functions

**Alternative 1:** When data on HC.R.6 ('social' component of LTC is not available in SHA) (AT, BE, BG, DK, HU, NO)

	LTC: 'social' component
	ESSPROS: benefits in kind from <b>sickness</b> , <b>disability</b> , and <b>old-age</b> functions

**Alternative 2:** When SHA lacks data on institutional/home care, i.e. subcategories of HC.3 (NL, PT)

	LTC: institutional care	LTC: home care
	SHA health providers classification: HP.1, HP.2 and HP.3, except for HP.3.6	SHA health providers classification: HP.3.6 and HP.7.2

**Alternative 3:** When SHA data are not available (IE, EL, MT, UK)

HC	LTC: 'medical' component AND 'social' component	LTC: institutional care	LTC: home care
ESSPROS: benefits in kind (inpatient and outpatient) and cash benefits in <b>sickness</b> function and other benefits in kind in <b>family</b> function and expenditure on rehabilitation in <b>social exclusion</b> function	Estimated on the basis of ESSPROS data: benefits in kind from <b>sickness</b> , <b>disability</b> and <b>old-age</b> functions and cash benefits in <b>disability</b> and <b>old-age</b> functions	Estimated on the basis of ESSPROS data	Estimated on the basis of ESSPROS data

Note: SHA data should be available soon for Italy.

## ANNEX 8.3. MATHEMATICAL ILLUSTRATION OF THE LONG-TERM CARE SCENARIOS

### GENERAL DEFINITIONS

Given  $N_{g,a,t}$  is the population of a given gender  $g$  and age  $a$  in year  $t$ , and following the main steps of the general methodology process presented in Section 8.1, the following definitions are derived.

#### STEP 1: dependent/non-dependent population

The ratio of dependent (respectively non-dependent) persons in the base year  $t=b$  (e.g. 2010) is derived from EU-SILC data for each age — actually, five-year age groups (15+) — and gender group:  $d_{g,a,b}$  (respectively  $1 - d_{g,a,b}$ ). Therefore, the projected dependent population of a given gender  $g$  and age  $a$  in a projected year  $t$  is:

$$D_{g,a,t} = d_{g,a,b} N_{g,a,t} \quad [1]$$

#### STEP 2: split into types of care

To be able to differentiate the impact of different scenarios according to the respective behaviour of the different types of care, it is necessary to split the projected dependent population into three groups: those receiving formal care at home, those receiving formal care in institutions, and those receiving only informal care. The category of those receiving cash benefits will be considered at a later stage, given that age profiles for this category of long-term care benefits are not available.

Therefore,  $DFh_{g,a,t}$ ,  $DFi_{g,a,t}$ ,  $DI_{g,a,t}$  the projected dependent population of a given gender  $g$  and age  $a$  in a projected year  $t$  receiving respectively formal care at home ( $DFh$ ), formal care in institutions ( $DFi$ ), and informal care ( $DI$ ), can be defined as:

$$DFh_{g,a,t} = D_{g,a,t} p_{g,a,b}^{Fh} \quad [2]$$

$$DFi_{g,a,t} = D_{g,a,t} p_{g,a,b}^{Fi} \quad [3]$$

$$DI_{g,a,t} = D_{g,a,t} (1 - p_{g,a,b}^{Fh} - p_{g,a,b}^{Fi}) \quad [4]$$

where:

$p_{g,a,b}^{Fh}$  is the probability of a dependent person of gender  $g$  and age  $a$  receiving formal care at home, in the base year  $b$  (e.g. 2010); similarly,

$p_{g,a,b}^{Fi}$  is the correspondent probability of being taken care of formally in institutions; and

$p_{g,a,b}^I$  (the probability of being take care of informally) is defined as not receiving any formal care service.

#### STEP 3: age-gender profiles of expenditure

Average expenditure is calculated for a base year  $b$ , to define the long-term unit costs of services. If the data are available (through the SHA joint questionnaire and/or provided by Member States), unit costs for formal care at home and formal care in institutions are calculated separately <sup>(131)</sup>:

$$c_{g,a,b}^{Fh} = \frac{S_b^{Fh}}{N_{g,a,b}^{Fh}} \quad [5]$$

where:

$S_b^{Fh}$  is public spending on formal care at home in the base year  $b$  (e.g. 2010); and

$N_{g,a,b}^{Fh}$  is the number of recipients of a given gender  $g$  and age  $a$  of formal care at home, for the same year.

Similarly, the unit cost per beneficiary of a given gender  $g$  and age  $a$  of formal care in institution is:

$$c_{g,a,b}^{Fi} = \frac{S_b^{Fi}}{N_{g,a,b}^{Fi}} \quad [5b]$$

Note that two adjustments are made to the derived unit costs. The first applies when age profiles are not provided separately for the two types of formal care. The age profiles provided by Member States for public expenditure on formal care

<sup>(131)</sup> Otherwise, an average is used.

services are then used in order to ‘recalibrate’ the unit costs. In other words, the relative size of the amounts provided for each gender/age group is applied to the respective ‘total’ public expenditure aggregates of formal care at home ( $S_b^{Fh}$ ) and formal care in institutions ( $S_b^{Fi}$ ).

In other words, adjusted unit costs follow the actual gender-age structure of unit costs, as provided by Member States in country-specific age profiles. For a country  $i$ , age profiles provide the relative size of unit cost per beneficiary of a given gender  $g$  and age  $a$  of formal care as a proportion  $x^{PF}$  (where  $P$  stands for ‘profiles’ and  $F$  for ‘formal’) such as:

$$x_{g,a,b}^{PF} = \frac{C_{g,a,b}^{PF}}{S_b^{PF}/N_b} \text{ and } \sum_{g,a} x_{g,a,b}^{PF} = 1$$

The unit costs adjusted to the age profiles are therefore calculated as:

$$C_{g,a,b}^{AFh} = x_{g,a,b}^{PF} \frac{S_b^{Fh}}{N_{g,a,b}^{Fh}} \text{ and:}$$

$$C_{g,a,b}^{AFi} = x_{g,a,b}^{PF} \frac{S_b^{Fi}}{N_{g,a,b}^{Fi}}$$

In the second adjustment, the unit costs evolve in time with the GDP growth, as will be explained in the next section of this annex (equation [9]).

**STEP 4: total public expenditure on long-term care services**

For a projected year  $t$ , public spending on both types of formal care is then computed as:

$$TS_{g,a,t}^{Fh} = C_{g,a,t}^{AFh} DFh_{g,a,t} \quad [6]$$

where  $TS_{g,a,t}^{Fh}$  (respectively  $TS_{g,a,t}^{Fi}$ ) is public spending on formal care at home (respectively in an institution) for all persons of gender  $g$  and age  $a$  in year  $t$ .

Hence, for all age and gender groups:

$$TS_t^{Fh} = \sum TS_{g,a,t}^{Fh}$$

and

$$TS_t^{Fi} = \sum TS_{g,a,t}^{Fi} \quad [7]$$

**STEP 5: total public expenditure on long-term care (services and cash)**

Therefore, total public expenditure on both types of formal long-term care services are added to long-term care-related cash benefits, so as to obtain  $TS^{LTC}_t$  for a projected year  $t$ :

$$TS_t^{LTC} = TS_t^{Fh} + TS_t^{Fi} + TS_t^C \quad [8]$$

These general definitions apply to the general, ‘basic’ model structure. In order to run more accurate scenarios, general and scenario-specific assumptions are being applied. These assumptions are illustrated in the following section.

## ASSUMPTIONS FOR THE DIFFERENT SCENARIOS

### PURE DEMOGRAPHIC SCENARIO

As mentioned previously, the first assumption added to the general model is the following: for the time horizon of the projection exercise, the age-gender-specific public expenditure profiles (showing the average public spending on long-term care per beneficiary for each year of age — or five-year age group, from 15 to 85 and over, according to data availability) are assumed to grow in line with income, i.e. with GDP per capita.

Therefore, the adjusted per beneficiary cost (expenditure) in a projected year  $t$  is:

$$C_{g,a,t}^{\prime F} = C_{g,a,t-1}^{AF} \Delta Ypc_t \quad [9]$$

where:

$C_{g,a,t}^{\prime F}$  is the cost per beneficiary of a given gender  $g$  and age group  $a$  in period  $t$  of formal care  $F - Fh$  for formal care at home,  $Fi$  for formal care in institution;

$\Delta Ypc_t$  is GDP per capita growth rate in year  $t$ , that is:

$$Ypc_t = \left( \frac{Y_t}{\sum N_{g,a,t}} - \frac{Y_{t-1}}{\sum N_{g,a,t-1}} \right) / \frac{Y_{t-1}}{\sum N_{g,a,t-1}} \quad [10]$$

where:

$Y_t$  represents the GDP in projection year  $t$ ; and

$N_{g,a,t}$  the projected population of a given gender  $g$  and age  $a$  in year  $t$ .

Hence, the adjusted per beneficiary cost,  $c_{g,a,t}^{Fh}$  is the formal care cost per beneficiary of a person of gender  $g$  and age  $a$  in year  $t$  of the projection period, following the adjustment to GDP per capita growth.

Equation [6] above becomes [6'] as the adjusted unit cost  $c'$  is considered, that is:

$$TS_{g,a,t}^{Fh} = c_{g,a,t}'^{Fh} DFh_{g,a,t} \quad [6']$$

and, of course, for formal care in institution:

$$TS_{g,a,t}^{Fi} = c_{g,a,t}'^{Fi} DFi_{g,a,t} \quad [6b']$$

Similarly for cash benefits, total public spending becomes  $TS_t'^c$ , and an adapted equation [8] gives adjusted total public spending on long-term care, that is:

$$TS_t'^{LTC} = TS_t'^{Fh} + TS_t'^{Fi} + TS_t'^c \quad [8']$$

#### BASE CASE SCENARIO

For the *base case* scenario, the assumption on unit cost development is slightly different from the *pure demographic* scenario. Indeed, it has been agreed to differentiate the two kinds of unit costs. The projections will link unit cost to GDP per hours worked <sup>(132)</sup> for benefits in kind (services), while unit cost of cash benefits will evolve in line with GDP per capita growth. Therefore, the age-gender-specific public expenditure profiles are assumed to grow in line with:

1. GDP per capita for cash benefits;
2. GDP per hours worked for benefits in kind.

<sup>(132)</sup> GDP per hours worked are proposed, whereas the 2009 exercise used GDP per worker, to stay in line with the macroeconomic assumptions and the other parts of the projections.

The situation is unchanged for cash benefits ( $TS_t'^c$ ) whereas GDP per hours worked will be used to adjust total public spending on formal care services. Equation [9] becomes:

$$c_{g,a,t}''^{Fc} = c_{g,a,t-1}^{Fc} \Delta Yphw_t \quad [9']$$

where  $\Delta Yphw_t$  is the rate of growth of GDP per hours worked in year  $t$ ,

$$\Delta Yphw_t = \left( \frac{Y_t}{\sum hw_t} - \frac{Y_{t-1}}{\sum hw_{t-1}} \right) / \left( \frac{Y_{t-1}}{\sum hw_{t-1}} \right) \quad [11]$$

Corresponding equations [6'] and [6'b] are then used and coupled with  $TS_t'^c$  as calculated in the *pure demographic* scenario to calculate total age/gender group expenditure and total public expenditure on long-term care in each projection year.

$$TS_t''^{LTC} = TS_t''^{Fh} + TS_t''^{Fi} + TS_t'^c \quad [8'']$$

#### HIGH LIFE EXPECTANCY SCENARIO

The *high life expectancy* scenario presents the budgetary effects of an alternative demographic scenario which assumes life expectancy to be higher for all ages than in the *pure demographic* and in the *base case* scenarios. In terms of methodology, the scenario does not differ from the *base case* scenario, apart from the fact that the baseline demographic projections used as input data are replaced with the alternative, high life expectancy, variant (the same used to assess the sensitivity of pension spending). Therefore, the mathematical illustration of the previous scenario only changes in  $N_{g,a,t}$ , i.e. the number of individuals in each age/gender group up to 2060 (replaced by the new population assumptions in equation [1] and [10]).

#### CONSTANT DISABILITY SCENARIO

This scenario reflects an alternative assumption on trends in age-specific ADL-dependency rates. The profile of age-specific disability rates shifts in line with changes in life expectancy (disability rate in the future is equal to that of a younger — by the same number of years as the change in age-specific life expectancy — age



cohort today) resulting in a gradual decrease over time in disability prevalence for each age cohort (i.e. affecting the variable  $D_{g,a,t}$ ).

In practical terms, it follows the same reasoning as for the similar healthcare *constant health* scenario. It's necessary to start by calculating, for each projection year, the change in life expectancy in relation to the base year. For example, life expectancy for a 50-year-old man is expected to increase by, say, four years: from 30 years in year  $t$  to 34 years in year  $t+20$  in a specific Member State. Then, the scenario assumes that in  $t+20$ , in that same Member State, a 50-year-old man will have a disability prevalence of a  $(50 - 4) = 46$ -year-old man in year  $t$ .

Hence, the change in life expectancy of a person of gender  $g$  and age  $a$  in relation to the base year  $b$  (say, 2010) is first calculated for each year of the projections, using the Eurostat population projections (EUROPOP2010) <sup>(133)</sup>:

$$\Delta LE_{g,a,t,b} = LE_{g,a,t} - LE_{g,a,b}$$

where:

$\Delta LE_{g,a,t,b}$  is the additional life expectancy of a person of gender  $g$  and age  $a$  in year  $t$  compared to a person of gender  $g$  and age  $a$  in the base year  $b$ ;

$LE_{g,a,t}$  is the life expectancy of a person of gender  $g$  and age  $a$  in year  $t$ ; and

$LE_{g,a,b}$  is life expectancy of an average person of gender  $g$  and age  $a$  in the base year  $b$ .

For year  $t$  of the projections, the 'adjusted' disability prevalence for the cohort of gender  $g$  and age  $a$  is then based on equation [1] adjusted such as:

$$D'_{g,a,t} = d_{g,a-\Delta LE_{g,a,t,b}} N_{g,a,t} \quad [1']$$

And the adjusted projected dependent population  $D'_{g,a,t}$  will therefore replace former  $D_{g,a,t}$  in the subsequent equations [2] to [4], and then [9'] and [8''], to follow the subsequent steps of the *base case* scenario.

#### SCENARIO ASSESSING THE EFFECT OF A SHIFT FROM INFORMAL TO FORMAL CARE

Building on the *base case* scenario, this policy-change scenario is a sensitivity test that examines the budgetary impact of a progressive shift into the formal sector of care of 1 % per year of disabled elderly who have so far received only informal care. This extra shift takes place during the first 10 years of the projection period, thus it sums up to about 10.5 % shift from informal to formal care. One of the three alternative options considered in the 2009 Ageing Report will be analysed: 50 % of the 'new' beneficiaries will be considered to move into institutional care, while the other 50 % will be assumed to receive formal care at home. The variables  $DFh_{g,a,t}$ ,  $DFi_{g,a,t}$ , and  $DI_{g,a,t}$  will be adjusted to the new assumptions.

The projected dependent population of a given gender  $g$  and age  $a$  in a projected year  $t$  receiving respectively formal care at home ( $DFh$ ), formal care in institutions ( $DFi$ ), and informal care ( $DI$ ), calculated in equations [2] to [4], will be changed as follows. For  $t \in [b+1, b+10]$  — say, for the first 10 years of the projection period (i.e. 2011–20):

$$DI'_{g,a,t} = DI_{g,a,t-1} - 0.1 \times DI_{g,a,t-1} = 0.9 \times DI_{g,a,t-1}$$

$$DFh'_{g,a,t} = DFh_{g,a,t-1} + 0.5 \times 0.1 \times DI_{g,a,t-1}$$

$$DFi'_{g,a,t} = DFi_{g,a,t-1} + 0.5 \times 0.1 \times DI_{g,a,t-1}$$

These adapted projected numbers of dependents/recipients of formal care are then input to equations [6'], [6b'] and [8''] to calculate the total public spending on long-term care, as was done in the *base case* scenario. For the rest of the projection period (2021–60), the baseline equations are used as above.

<sup>(133)</sup> In the *constant disability* scenario, the total number of years spent with disability during a person's lifetime is assumed to remain the same while life expectancy increases. Thus, if between time  $t$  and  $t+1$ , total life expectancy increases by  $n$  years for a cohort of age  $a$ , 'disability-free' life expectancy for that very same age cohort must also increase by  $n$  years in order for the dynamic equilibrium hypothesis to be valid. If 'disability-free' life expectancy increases by  $n$  years, then the disability prevalence of this cohort of age  $a$  at time  $t+1$  will be the same as the disability prevalence of cohort of age  $a-n$  at time  $t$ .

## COVERAGE CONVERGENCE SCENARIO

This policy-change scenario assumes an expansion of publicly financed formal care provision into the groups of population that have not been covered by the public programmes so far. ‘Formal coverage’ covers any of the three types of formal long-term care: institutional care, formal home care, and cash benefits. In order to illustrate this scenario, a ‘new’ probability of being ‘formally taken care of’ through cash benefits (i.e.  $p^{Cg,a,b}$ ) has to be introduced. Alternatively, the number of persons receiving long-term care-related cash benefits is available <sup>(134)</sup>. The assumption is that all recipients of long-term care are dependent. It means that the equations [2] to [4] become four equations, with probabilities now changing over time (i.e. depending on  $t$ , but also country-specific, for a country  $i$ ). Further,  $D'_{g,a,t,i}$  the projected dependent population of a given gender  $g$  and age group  $a$  in a projected year  $t$  receiving informal care ( $DI$ ) is simply ‘converted’ into  $DN^F_{g,a,t,i}$  (i.e. the probability of not being covered by formal long-term care coverage).

$$DFh_{g,a,t,i} = D_{g,a,t,i} p^{Fh}_{g,a,t,i} \quad [12]$$

$$DFi_{g,a,t,i} = D_{g,a,t,i} p^{Fi}_{g,a,t,i}$$

$$DC_{g,a,t,i} = D_{g,a,t,i} p^C_{g,a,t,i}$$

$$DN^F_{g,a,t,i} = D_{g,a,t,i} (1 - p^F_{g,a,t,i})$$

where:

$DC_{g,a,t,i}$  is the projected dependent population of a given gender  $g$  and age group  $a$  in a projected year  $t$  receiving cash benefits; and

$p^F_{g,a,t,i}$  is the probability of receiving any type of formal care, defined as:

$$p^F_{g,a,t,i} = p^{Fh}_{g,a,t,i} + p^{Fi}_{g,a,t,i} + p^C_{g,a,t,i}$$

<sup>(134)</sup> Hopefully, provided by Member States. The issue of double counting is taken care of as much as possible given the availability of detailed data.

The scenario envisaged is a coverage convergence to the EU-27 average. It is meant to take into account the high diversity of country-specific current care mix. The Member States where the formal coverage rate is below the EU-27 average in the starting year are assumed to converge to this average by 2060.

The *base case* scenario steps are used for those countries where the formal coverage (i.e.  $p^F_{g,a,t,i}$ ) is the same or greater than the EU-27 average  $\bar{p}^F_{g,a,2010,EU27}$  in the base year  $b$  (2010). For those countries where the formal coverage is below the EU-27 average,  $p^F_{g,a,t,i}$  is assumed to converge to  $\bar{p}^F_{g,a,2060,EU27}$ . It, therefore, implies that each type of formal care converges at a different pace, making up for the respective relative gaps to the EU-27 average. This scenario allows a country to grow faster the relatively less-developed type of formal care.

## COST CONVERGENCE TO EU-27 AVERAGE SCENARIO

This new scenario is run in parallel with the analogous scenario on healthcare expenditure projections. The *cost convergence* scenario is meant to capture the possible effect of a convergence in real living standards on long-term care spending. It assumes an upward convergence of the relative age-gender-specific per beneficiary expenditure profiles (as per cent of GDP per capita) of all countries below the corresponding EU-27 average to the EU-27 average. This is done for each type of formal care coverage (i.e. formal care in institutions, formal care at home, cash benefits).

To run this scenario, it is necessary to build on the methodology used for the *base case* scenario. For those countries where per beneficiary costs are equal to or above the EU-27 average, the steps illustrated above are followed.

For those countries below the EU-27 average per beneficiary costs in the baseline year  $b$  (2010), a further change in the way cost per beneficiary is evolving over the projection period is assumed, so as to reach the EU-27 average of per beneficiary costs. Building on the equations [9] — for cash benefits — and [9'] — for benefits in kind — the real convergence to EU-27 average is assumed to follow the adjusted equations:



$$c'_{g,a,t,i} = c_{g,a,t-1,i}^C (\Delta Ypc_{t,i} + g_{t,i}) \quad [\text{alt. 9}]$$

$$c''_{g,a,t,i} = c_{g,a,t-1,i}^{AF} (\Delta Yphw_{t,i} + g_{t,i}) \quad [\text{alt. 9}']$$

where:

$c''_{g,a,t,i}$  is the country  $i$ -specific cost of benefits in kind per beneficiary of a given gender  $g$  and age  $a$  in period  $t$  —  $Fh$  for formal care at home,  $Fi$  for formal care in institution — adjusted to the GDP per hours worked growth and a catch-up effect if country  $i$  is below the EU-27 average;

$\Delta Yphw_{t,i}$  is GDP per hours worked growth rate in year  $t$ , for country  $i$ ; and

$g_{t,i}$  is a hypothetical rate of growth of per beneficiary costs; it is higher than zero for countries where per beneficiary costs are below the EU-27 average and equal to zero for those countries where per beneficiary costs are equal or above the EU-27 average — if the base year  $b$  is 2010, it evolves according to the following mechanism <sup>(135)</sup>:

$$g_{t,i} = \left[ \left( \frac{\overline{rc}_{g,a,EU27,2010}}{rc_{g,a,i,2010}} \right)^{\frac{1}{2060-2010}} \right] - 1 \quad [13]$$

where:

$\overline{rc}_{g,a,EU27,2010}$  is the weighted EU-27 average relative cost per beneficiary of gender  $g$  and age  $a$  calculated in the baseline year of 2010; and

$rc_{g,a,i,2010}$  is the relative cost per beneficiary of gender  $g$  and age  $a$  for country  $i$  (if below the EU-27 average cost per beneficiary) calculated in the baseline year of 2010 defined as:

$$rc_{g,a,i,2010} = \left( \frac{c_{g,a,i,2010}}{Yphw_{g,a,i,2010}} \right)$$

and

$$\overline{rc}_{g,a,EU27,2010} = \left( \frac{\overline{c}_{g,a,EU27,2010}}{\overline{Yphw}_{g,a,EU27,2010}} \right)$$

where:

$\overline{c}_{g,a,EU27,2010}$  is the weighted EU-27 average cost per beneficiary of gender  $g$  and age  $a$  calculated in the baseline year (2010); and

$\overline{Yphw}_{g,a,EU27,2010}$  is the average GDP per hours worked in the EU-27 calculated in the baseline year (2010).

The same type of reasoning can be followed with the corresponding equations for cash benefits, adjusted to GDP per capita growth instead of GDP per hours worked growth.

Then, after the country-specific per beneficiary cost has been calculated, subsequent corresponding equations are used to obtain the total age-gender group expenditure and then the total public expenditure on long-term care in each projection year, as in equation [8"].

<sup>(135)</sup> Assumptions for different convergence paths according to the initial country-specific situation — compared to the EU-27 average age profile — could be explored further when data are available.

## 9. EDUCATION

### 9.1. INTRODUCTION

On average, over 2002–08, education expenditure represented 5.3 % of GDP in the EU-27 (or 11.3 % of total general government expenditure) <sup>(136)</sup>. Expenditure-to-GDP ratios vary considerably across Member States, from a minimum of 3.8 % in Greece to a maximum of 7.3 % in Denmark (Table 9.1).

A comprehensive assessment of long-term budgetary prospects also requires careful consideration of expenditure on education. A common view seems to be that the effects of demographic changes on education expenditure are not as clear-cut as those on pensions and healthcare, and could even be (slightly) favourable. On the one hand, the expected decline in the number of young people is likely to allow for savings but, on the other hand, the trend of higher enrolment rates and longer periods spent in education might put upward pressure on expenditure. A careful quantitative assessment is therefore necessary to evaluate net effects of ongoing and prospective trends, and eventually validate (or not) the common-sense conjecture that the costs of ageing due to higher expenditure on pensions, health and long-term care can be partly offset (even if only to a very limited extent) by lower expenditure on education.

Projection of education expenditure requires consideration of a number of important issues: namely (i) the definition (or perimeter) of education activities; (ii) that studying can take place on a part-time basis after compulsory education; and (iii) that there are various outlays for public spending on education.

Firstly, it is necessary to define the perimeter of education activities. As in the 2009 Ageing Report, this projection exercise will cover public expenditure for schooling and tertiary education. Secondly, for individuals older than a minimum legal age for compulsory education, time will be divided between schooling, the labour market and leisure activities. Aggregate constraints on the use of time (by age) link AWG's participation rate assumptions with enrolment rates, meaning that all else being equal, changes in participation rates affect enrolment rates in the opposite direction. Thirdly, public education expenditure mainly takes three forms: (i) direct purchases by the government of education resources to be used by educational institutions (e.g. direct payment of teachers' wages by the education ministry); (ii) payments by the government to educational institutions that have the responsibility for purchasing educational resources themselves (e.g. a block grant to a university); and (iii) transfers to students and their families through scholarships or public loans.

### 9.2. METHODOLOGY USED TO PROJECT EXPENDITURE ON EDUCATION

This round of long-term budgetary projections basically uses the 2009 Ageing Report's methodology with minor adjustments. The methodology is 'quasi-demographic', in the sense that not only demographic data (i.e. EUROPOP2010) but also participation rate projections are used. A strong point of this methodology is the use of the UOE <sup>(137)</sup> Data Collection, which covers enrolment rates, staff levels, the labour force status of students (i.e. part-time v full-time), and detailed data on total public expenditure. Data are disaggregated by single age and ISCED levels.

<sup>(136)</sup> The projection of education expenditure uses the UNESCO-UIS/OECD/Eurostat (UOE) Data Collection on Education Statistics, while COFOG (Classification of the functions of government) data are only used to compare the relative size of government outlays. Over 2002–08, health expenditure represented 6.5 % of GDP (and 14 % of total general government expenditure), while 'social protection' represented 18.3 % (and 39.3 % of total general government expenditure). 'Social protection' includes the 'old age' (pensions) function.

<sup>(137)</sup> UNESCO-UIS/OECD/Eurostat Data Collection on Education Statistics.

Projections are run separately for four ISCED groupings <sup>(138)</sup>, representing primary education (ISCED 1), lower secondary education (ISCED 2), upper secondary education (ISCED 3 and 4), and tertiary education (ISCED 5 and 6). In order to simplify, it is assumed that enrolment in

primary and lower secondary education levels is compulsory (ISCED 1 and 2), while enrolment in upper secondary and tertiary education levels depends on labour market outcomes, as changes in participation rates affect enrolment rates in the opposite direction <sup>(139)</sup>.

**Table 9.1:**  
Education expenditure-to-GDP ratios (%)

	2002	2003	2004	2005	2006	2007	2008	Average 2002–08
BE	5.9	6.0	5.8	5.9	5.8	5.8	6.0	5.9
BG	3.8	4.2	4.1	4.4	3.7	3.8	4.1	4.0
CZ	5.2	5.2	4.8	4.8	4.9	4.7	4.7	4.9
DK	7.7	7.7	7.6	7.3	7.0	6.7	7.0	7.3
DE	4.3	4.3	4.3	4.2	4.1	4.0	4.1	4.2
EE	6.8	6.5	6.3	6.0	6.0	5.9	6.7	6.3
IE	4.5	4.6	4.6	4.6	4.6	4.8	5.4	4.7
EL	2.9	4.0	3.9	3.9	4.0	4.0	4.1	3.8
ES	4.4	4.4	4.4	4.3	4.3	4.4	4.6	4.4
FR	6.4	6.3	6.2	6.1	6.0	5.9	5.8	6.1
IT	4.7	4.9	4.6	4.7	4.6	4.6	4.5	4.7
CY	6.0	6.8	6.5	6.4	6.4	6.3	6.7	6.4
LV	5.7	5.5	6.1	5.6	6.0	5.8	6.5	5.9
LT	6.1	5.7	5.8	5.5	5.4	5.2	5.8	5.6
LU	4.8	4.9	4.9	4.7	4.4	4.2	4.4	4.6
HU	5.6	6.2	5.8	5.9	5.7	5.3	5.2	5.7
MT	6.0	6.2	5.8	5.7	5.7	5.4	5.3	5.7
NL	5.0	5.2	5.2	5.1	5.1	5.2	5.2	5.1
AT	5.9	6.0	5.8	5.8	5.2	5.2	5.3	5.6
PL	6.1	6.1	5.7	6.1	6.0	5.7	5.7	5.9
PT	6.7	6.6	6.8	6.9	6.6	6.2	6.3	6.6
RO	4.0	3.5	3.6	3.6	4.1	3.9	4.5	3.9
SL	6.5	6.5	6.5	6.6	6.4	5.9	6.1	6.4
SK	3.6	4.3	3.9	4.0	3.9	3.9	3.5	3.9
FI	6.1	6.4	6.3	6.2	6.0	5.7	5.9	6.1
SV	7.3	7.2	7.1	7.0	6.9	6.7	6.8	7.0
UK	5.6	5.8	5.9	6.2	6.1	6.2	6.4	6.0
NO	6.3	6.7	6.2	5.7	5.4	5.4	5.3	5.9
EU-27	5.3	5.3	5.3	5.3	5.2	5.2	5.2	5.3

Source: Eurostat, COFOG data

<sup>(138)</sup> The formal definitions of the levels of education covered by this exercise are: Level 1 is the start of compulsory education (the first stage of basic education), with a legal age of entry usually not less than five years old or more than seven years old. This level covers, in principle, six years of full-time schooling. Level 2 is lower secondary school (or the second stage of basic education). This stage usually ends after the ninth year of schooling, often coinciding with the end of compulsory education. It includes general education (as well as pre-vocational or pre-technical education and vocational and technical education). Level 3 is upper secondary school and the entry age is typically 15 or 16 years. It also includes vocational and technical education. Level 4 is post-secondary, non-tertiary education, which programmes are typically designed to prepare students to the following level (university). Level 5 covers at least two years of education and the minimal access requirement is the completion of levels 3 or 4. Level 6 is a cycle of at least three full-time years of education leading to the award of an advanced research qualification. However, a Masters course that implies up to six years of tertiary education is included in Level 5.

<sup>(139)</sup> In the baseline scenario, enrolment rates for the two compulsory groupings are fixed at their respective historical levels. However, in practical terms, the borders between compulsory and non-compulsory education are not as clear-cut as the simple rule of thumb above suggests. See Annex 9.1, for an overview of the legal age limits of compulsory education and their overlap with ISCED levels in all Member States.

Projections are broken down into three components: (i) number of students; (ii) direct expenditure per student; and (iii) public transfers to households.

### 9.2.1. NUMBER OF STUDENTS

#### *Compulsory levels*

For the compulsory levels considered (ISCED 1 and 2), enrolment rates per single age are assumed to remain constant at the level observed in a base period/year<sup>(140)</sup>. In order to obtain the projected number of students enrolled in ISCED levels 1 and 2, demographic projections are multiplied by enrolment rates.

#### *Non-compulsory levels*

Enrolment rates for ISCED groupings 3–4 and 5–6 take into account labour market developments according to the formula (see Annex 9.1 for the derivation):

$$e_{i,t} = \frac{1 - p_{i,t} - i_{i,t}^*}{1 - \alpha_{i,t}} \quad [1]$$

where:

$e_{i,t}$  is the total enrolment rate (both full and part-time students) for the single age cohort  $i$  in period  $t$ ;

$p_{i,t}$  is the participation rate;

$\alpha_{i,t}$  is the fraction of part-time students in the total; and

$i_{i,t}^*$  is the fraction of inactive minus full-time students over the total population.

In practice, equation [1] will be implemented in terms of differences to a base period ( $b$ ):

$$e_{i,t} - e_{i,b} = -\frac{\bar{\kappa}_{i,b}}{1 - \bar{\alpha}_{i,b}} * (p_{i,t} - p_{i,b})$$

where  $0 \leq \bar{\kappa}_{i,b}, \bar{\alpha}_{i,b} \leq 1$  [2]

<sup>(140)</sup> This corresponds to the baseline projection.

where:

$\bar{\kappa}_{i,b}$  is the ratio between full-time students and total inactive individuals; and

$\bar{\alpha}_{i,b}$  is the fraction of part-time students in the total number of students.

These ratios are assumed to remain constant throughout the projection period.

All else being equal, an increase in the participation rate leads to a decrease in the enrolment rate<sup>(141)</sup>.

Enrolment rates per age are then broken down by ISCED groupings (3–4 and 5–6), based on student shares in the base period/year.

### 9.2.2. DIRECT EXPENDITURE PER STUDENT

Annual expenditure per student on public educational institutions varies significantly across education level and country (Table 9.2). In 2007, spending per student ranged from EUR 1 807 (in PPS) for secondary education (ISCED 2–4) in Romania to EUR 17 412 (in PPS) for tertiary education in Cyprus. This variability reflects a number of factors, such as labour costs of teachers and non-teaching staff, different class sizes, differences in capital expenditure, as well as particular national circumstances<sup>(142)</sup>.

<sup>(141)</sup> To the extent that individuals entering the labour force are likely to have been previously involved in education activities: the LFS variable MAINSTAT, which describes the main labour status, was used to assess the distribution of inactive individuals by age, distinguishing between schooling and other forms of inactivity, such as retirement and domestic tasks. Given that MAINSTAT is an optional variable, there are no data for Germany and the United Kingdom.

<sup>(142)</sup> For example, small EU Member States tend to send a higher proportion of their tertiary students abroad: all other things being equal, this tends to raise government expenditure.

**Table 9.2:**  
Annual expenditure on public educational institutions per pupil (EUR PPS) <sup>(a)</sup> in 2007

	ISCED 1	ISCED 2-4	ISCED 5-6	Total
BE	6 851	8 332	12 120	8 015
BG	1 892	1 816	3 838	2 247
CZ	2 775	4 557	7 402	4 550
DK	7 991	8 227	13 689	8 512
DE	4 590	5 237	11 991	6 252
EE	3 378	4 168	5 270	3 579
IE	5 715	7 404	10 991	7 211
EL	na	na	na	na
ES	6 203	8 542	10 886	7 872
FR	5 302	8 454	10 997	7 240
IT	6 138	6 654	7 160	6 569
CY	6 763	9 953	17 412	8 740
LV	3 413	3 473	3 451	3 445
LT	2 351	2 935	4 740	3 173
LU	11 599	15 256	na	13 054
HU	3 775	3 485	5 583	4 093
MT	3 543	5 829	8 689	6 371
NL	5 434	7 650	13 134	7 418
AT	na	na	na	na
PL	3 378	3 000	4 635	3 481
PT	4 166	5 673	8 645	5 279
RO	2 195	1 807	5 436	2 566
SL	6 505	4 885	6 027	6 077
SK	2 850	2 675	4 769	3 133
FI	5 179	6 581	11 635	6 722
SV	6 886	7 434	15 466	7 904
UK	6 138	6 856	na	6 526
NO	8 368	9 801	15 270	9 941
EU-27	5 114	5 849	9 032	6 024

Source: Commission services, based on UOE data

<sup>(a)</sup> Based on full-time equivalents.

As in the 2009 Ageing Report, the direct costs of education per student are modelled as <sup>(143)</sup>:

$$UC_j = \frac{T_j}{ST_j} * W_j + \frac{O_j}{ST_j}$$

where:

$T_j$  is the total number of teachers and non-teaching staff;

$ST_j$  is the total number of students;

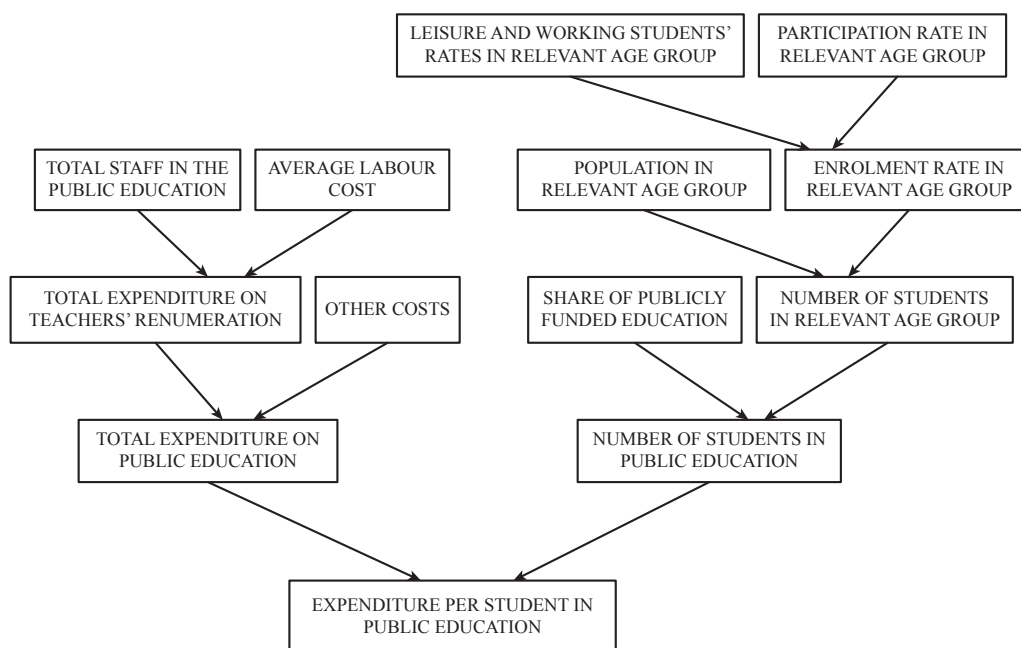
$W_j$  are average gross wages (i.e. including social contributions);

$O_j$  are other current and capital costs; and

$j$  refers to an ISCED grouping (Graph 9.1 shows a schematic breakdown of expenditure per student).

<sup>(143)</sup> These modelling assumptions involve a considerable simplification of the determinants of unit costs. A key variable missing is class size. Research suggests that costs change discontinuously with the creation/destruction of classes. Given the difficulty in obtaining comprehensive data on class sizes, a reasonable approximation may be obtained using the student-to-staff ratio.

Graph 9.1: Implicit disaggregation of expenditure per student



Source: Commission services, EPC

As in the 2009 Ageing Report, the following assumptions are made in the baseline scenario:

- the staff-to-student ratio will remain constant over the projection period (i.e. staff adjusts instantaneously and fully to demographic changes);
- average wages of workers in the education sector are assumed to grow in line with GDP per worker in the whole economy (i.e. labour productivity);
- the 'other-costs' per student ratio remains a constant share of total expenditure per student, implying that 'other-costs' grow also in line with labour productivity <sup>(144)</sup>.

### 9.2.3. TRANSFERS TO HOUSEHOLDS

Public expenditure on education is mainly carried out directly by government institutions. However, part of the total expenditure on education results from transfers to households. The share of transfers over total public

expenditure on education is calculated using OECD data (*Education at a Glance*). This share is assumed to remain constant over the projection horizon. The sum of direct expenditure and transfers to households gives total public expenditure on education.

### 9.3. DATA

Eurostat will be the main provider of data, with use made of the UOE data collection <sup>(145)</sup>. The average of years 2007–08 is used as the base period for the projections. In most Member States, enrolment, personnel and financial data are all available for the period 2007–08. For those countries where data are missing, data from earlier years or from national sources will be used. In the latter case, Members of the EPC/AWG will provide the relevant data to Commission services.

<sup>(144)</sup> Assuming that per student costs grow in line with labour productivity secures consistency of the education expenditure-to-GDP ratio in the long term.

<sup>(145)</sup> The objective of the UNESCO-UIS/OECD/Eurostat (UOE) data collection on education statistics is to provide internationally comparable data on key aspects of education systems, specifically on the participation and completion of education programmes, as well as the cost and type of resources dedicated to education (<http://www.oecd.org/dataoecd/32/53/33712760.pdf>)

Specifically, by country, year, and ISCED groupings (1, 2, 3–4, 5–6), the following information from the UOE dataset will be used:

- total number of students by single age;
- number of working students by single age;
- number of teachers and non-teaching staff;
- total expenditure in public wages;
- other current (excluding wages) and capital expenditure;
- share of transfers over total public education expenditure <sup>(146)</sup>; and
- share of public funded education.

Furthermore, and to secure full consistency of the long-term budgetary exercise, the common AWG macroeconomic assumptions for the following variables will be used:

- total population per single age;
- labour force per single age;
- GDP per worker; and
- GDP.

#### 9.4. SENSITIVITY ANALYSIS

In addition to the baseline scenario described above, the following two sensitivity tests will be run.

- *Inertia scenario* — checks the robustness of the baseline scenario to the potential key assumption on the students to teacher ratio. The baseline scenario assumes a constant students-to-teacher ratio, implying an instantaneous adjustment in the number of teaching staff to student levels, while the ‘inertia scenario’ assumes a lagged adjustment.
- *EU2020 scenario* — this scenario is strictly defined in terms of the two education-related objectives of the EU2020 strategy (Council

conclusions on the role of education and training in the implementation of the ‘Europe 2020 strategy’ (2011/C 70/01)) to be achieved by 2020, namely:

- the share of early leavers from education and training should be less than 10 %;
- the share of 30 to 34-year-olds with tertiary or equivalent education attainment should be at least 40 %.

#### DERIVATION OF THE ENROLMENT RATE FORMULA

Starting with the labour market identity:

$$E_{i,t} + U_{i,t} + I_{i,t} \equiv P_{i,t} \quad [1]$$

where  $E_{i,t}$ ,  $U_{i,t}$ ,  $I_{i,t}$  and  $P_{i,t}$  are respectively employment, unemployment, inactive and the population for age cohort  $i$  in period  $t$ .

After adding and subtracting the number of full-time students ( $SF_{i,t}$ ), and of part-time students ( $SP_{i,t}$ ):

$$SF_{i,t} + SP_{i,t} - SP_{i,t} + E_{i,t} + U_{i,t} + I_{i,t} - SF_{i,t} \equiv P_{i,t} \quad [2]$$

Using the definitions of total students ( $ST_{i,t} = SF_{i,t} + SP_{i,t}$ ), labour force ( $LF_{i,t} \equiv E_{i,t} + U_{i,t}$ ), and inactive minus full-time students ( $I_{i,t}^* = I_{i,t} - SF_{i,t}$ ):

$$ST_{i,t} - SP_{i,t} + LF_{i,t} + I_{i,t}^* \equiv P_{i,t} \quad [3]$$

Dividing equation [3] by the population ( $P_{i,t}$ ), and defining

$$\alpha_{i,t} \equiv \frac{SP_{i,t}}{SF_{i,t} + SP_{i,t}}$$

as the fraction of part-time students in the total number of students, the following identity is obtained:

$$\frac{ST_{i,t}}{P_{i,t}} - \frac{SP_{i,t}}{ST_{i,t}} * \frac{ST_{i,t}}{P_{i,t}} + \frac{LF_{i,t}}{P_{i,t}} + \frac{I_{i,t}^*}{P_{i,t}} \equiv 1 \quad [4]$$

<sup>(146)</sup> From OECD (2011), *Education at a Glance 2011: OECD Indicators*, OED Publishing.



Equation [4] can be rearranged as:

$$e_{i,t} = \frac{1 - p_{i,t} - i_{i,t}^*}{1 - \alpha_{i,t}} \quad [5]$$

where:

$$e_{i,t} = \frac{ST_{i,t}}{P_{i,t}} \quad \text{is the enrolment rate for total students;}$$

$$p_{i,t} = \frac{LF_{i,t}}{P_{i,t}} \quad \text{is the participation rate; and}$$

$$i_{i,t}^* = \frac{I_{i,t}^*}{P_{i,t}} \quad \text{is the fraction of inactive minus full-time students over the population.}$$

In most EU Member States, the LFS MAINSTAT variable can be used to assess the distribution of inactivity by age, distinguishing between schooling and other forms of inactivity <sup>(147)</sup>.

Assuming that the ratio between full-time students and the total inactive ( $\bar{\kappa}_{i,b}$ ) is constant at the value in the base period (b):

$$\frac{SF_{i,t}}{I_{i,t}} = \frac{SF_{i,b}}{I_{i,b}} = \bar{\kappa}_{i,b} \Rightarrow i_{i,t}^* - i_{i,b}^* = (1 - \bar{\kappa}_{i,b}) * (i_{i,t} - i_{i,b})$$

where  $\bar{\kappa}_{i,b} \leq 1$

where:

$$i_{i,t} \equiv \frac{I_{i,t}}{P_{i,t}} \quad \text{is the inactivity rate.}$$

<sup>(147)</sup> However, given that the MAINSTAT variable, which describes the main labour status, is an optional LFS variable, there are no data for Germany or the United Kingdom.

A bar over a variable indicates that it is constant (i.e. time invariant).

Let us insert back into equation [5] the value observed for the fraction of part-time students ( $\bar{\alpha}_{i,b}$ ) in the base period/year. Throughout the projection period, enrolment rates become a function of the participation and the (adjusted) inactivity rates:

$$e_{i,t} = \frac{1 - p_{i,t} - i_{i,t}^*}{1 - \bar{\alpha}_{i,b}} \quad [7]$$

In equation [7], enrolment rates are inversely related to the participation and the (adjusted) inactivity rates.

*How equation [7] is used to project enrolment rates*

Expressing equation [7] in terms of differences to the base period, substituting equation [6], and using the identity  $(p_{i,t} - p_{i,b}) + (i_{i,t} - i_{i,b}) \equiv 0$ :

$$e_{i,t} - e_{i,b} = -\frac{\bar{\kappa}_{i,b}}{1 - \bar{\alpha}_{i,b}} * (p_{i,t} - p_{i,b})$$

where:

$$\bar{\kappa}_{i,b} = \frac{SF_{i,b}}{I_{i,b}}$$

$$\bar{\alpha}_{i,b} = \frac{SP_{i,b}}{SF_{i,b} + SP_{i,b}}$$

$$0 \leq \bar{\kappa}_{i,b}, \bar{\alpha}_{i,b} \leq 1 \quad [8]$$

In the 2009 Ageing Report,  $\bar{\kappa}_{i,b}$  values were set uniformly to one, thereby any change in the participation rate was fully offset by an opposite change in the enrolment rate. In the 2012 Ageing Report,  $\bar{\kappa}_{i,b}$  values will be estimated using LFS data.

A value for  $\bar{\kappa}_{i,b}$  less than one means that changes in the labour force do not imply a one to one change in enrolment rates, because some people coming from inactivity were not involved in education activities.



## ANNEX 9.1. ORGANISATIONAL STRUCTURE OF SECONDARY EDUCATION

### THE END OF LOWER SECONDARY EDUCATION OFTEN COINCIDES WITH THAT OF FULL-TIME COMPULSORY EDUCATION <sup>(148)</sup>

Three different organisational models can be distinguished: (i) a single structure; (ii) a compulsory integrated secondary education corresponding to a ‘common core’; and (iii) distinct types of education. In some new Member States (the Czech Republic, Latvia, Lithuania, Hungary and Slovakia), combinations of these three models coexist.

In all countries where the **single structure** is the only type of structure (Bulgaria, Denmark, Estonia, Finland, Norway, Portugal, Slovenia and Sweden), the end of secondary education coincides with the end of compulsory education, except in Bulgaria where compulsory education ends one year later.

In almost half of all European countries, all pupils follow the same general curriculum **common core** during lower secondary education. In seven of these countries, the end of lower secondary education coincides with the end of full-time compulsory education.

In Belgium, Bulgaria, Ireland, France, Italy, Hungary, Austria, Slovakia, and the United Kingdom (England, Wales and Northern Ireland), the end of full-time compulsory education does not coincide with the end of lower secondary education. Instead, one or more final years of compulsory education are part of upper secondary education. Thus, pupils in these countries — with the exception

of Ireland and the United Kingdom (England, Wales and Northern Ireland) — have to choose between general, technical or vocational education one or two years (or four in Hungary) before the end of full-time compulsory education.

In Austria, the French and German-speaking Belgian communities, Germany, Latvia, Liechtenstein, Lithuania, Luxembourg, and the Netherlands, pupils may select or be streamed into **different types of provision or school** from the beginning or before the end of lower secondary education.

Even though pupils in Germany attend different schools, they follow entirely compatible curricula for the first two years so that the selection of an appropriate course of study can be deferred.

In the Netherlands, pupils usually follow a common core curriculum for the first two years at VMBO and three years at HAVO and VWO (VMBO, HAVO and VWO are choices of secondary education). While the level varies depending on the type of school concerned, minimum skills that should be acquired by all pupils are specified.

The three types of lower secondary school in Liechtenstein offer the same basic common curriculum, which is supplemented by certain kinds of provision in the Realschule or Gymnasium.

<sup>(148)</sup> *Key Data on Education in Europe 2005*, European Commission, Eurydice, Eurostat, 2005.

## 10. UNEMPLOYMENT BENEFITS

### 10.1. APPLYING THE METHODOLOGY USED IN PREVIOUS ROUNDS

In order to preserve the comprehensive nature of the budgetary exercise, the AWG also decided to project expenditure on unemployment benefits (UB), although these are more affected by (short and medium-term) cyclical fluctuations than by (long-term) demographic waves. Besides being consistent with past practice, projection of UB expenditure could highlight the direct budgetary costs of persistently high structural unemployment.

In order to project expenditure on UB, the 2012 Ageing Report applies the same simple methodology used in the previous three projection rounds (2003, 2006, and 2009). The main assumption is one of unchanged policies, namely of constant replacement and coverage rates of unemployment benefit systems throughout the projection period. The number of individuals receiving UB is derived from the commonly agreed AWG's labour market assumptions, while the wage share in income is endogenously determined. UB expenditure is calculated for the sum of full and partial unemployment benefits using ESSPROS data <sup>(149)</sup>.

### 10.2. METHODOLOGY USED TO PROJECT EXPENDITURE ON UNEMPLOYMENT BENEFITS

The methodology is derived from the following identity:

$$UB \equiv UB_{pb} * B \quad [1]$$

where total expenditure in unemployment benefits (UB) is broken down in expenditure per beneficiary ( $UB_{pb}$ ) and the number of beneficiaries (B).

Unemployment expenditure per beneficiary is a fraction of average wages in the economy:

$$UB_{pb} = RR * \frac{W}{E} \quad [2]$$

where:

RR is the replacement rate;

W is the wage bill; and

E is employment.

Substituting equation [2] into equation [1]:

$$UB = RR * \frac{W}{E} * \frac{B}{U} * U \quad [3]$$

where U is unemployment.

Dividing equation [3] by GDP and rearranging:

$$\frac{UB}{GDP} = RR * CR * WS * \frac{u}{1-u} \quad [4]$$

where:

$CR \equiv \frac{B}{U}$  is the coverage rate or the take-up rate of unemployment benefits;

$WS \equiv \frac{W}{GDP}$  is the wage share in income; and

u is the unemployment rate <sup>(150)</sup>.

Equation [4] shows that the ratio between UB expenditure and GDP is determined by four parameters/variables: (i) the replacement rate of UB (RR); (ii) the coverage/take-up rate of UB (CR); (iii) the wage share in income (WS); and (iv) the unemployment rate (u).

<sup>(149)</sup> The European System of integrated Social PROtection Statistics (ESSPROS).

<sup>(150)</sup> Given that  $E = LF * (1-u)$  and  $U = LF * u$  then  $\frac{U}{E} = \frac{u}{1-u}$ ; where uppercase variables E, U, LF are respectively, employment, unemployment and the labour force; and lowercase u the unemployment rate.

The methodology used assumes that the replacement rate (RR) and the coverage rate (CR) are constant throughout the projection horizon at the level observed in a base period/year ( $b$ ).

$$\begin{aligned} RR_t &= RR_b \\ CR_t &= CR_b \end{aligned} \quad [5]$$

Using equation [4] and the assumption of unchanged policies (equation [5]). The UB-to-GDP ratio ( $\frac{UB_t}{GDP_t}$ ) is calculated as:

$$\frac{UB_t}{GDP_t} = \left[ \frac{UB_b}{GDP_b} * \frac{1}{WS_b} * \frac{1-u_b}{u_b} \right] * WS_t * \frac{u_t}{1-u_t} \quad [6]$$

‘Historical’ values (i.e. base period/year) are taken from the ESSPROS dataset for the

UB-to-GDP ratio ( $\frac{UB_b}{GDP_b}$ ), from AMECO

for the wage share ( $WS_b$ ) and from the Labour Force Survey for the unemployment rate ( $u_b$ ).

Unemployment rates ( $u_t$ ) in the projection period are derived from NAWRU values following the methodology agreed in the AWG. The wage share in income ( $WS_t$ ) during the projection period is endogenously calculated in the model.

The last year for which ESSPROS data are available is 2008. In order to avoid imposing an excessive weight on a particular year, and given that the last recession started in 2008, average expenditure (in total and part-time) UB in the period 2007–08 is used as the base period for the projection <sup>(151)</sup>.

Recall that the projection of UB expenditure (as a share of GDP) is made under the assumption of unchanged policies, namely replacement and coverage rates are kept constant throughout the projection period.

---

<sup>(151)</sup> In the 2009 Ageing Report, average expenditure in 2005 and 2006 was used as the base period. The labour market policy database could also be used for more recent data (i.e. 2009).



STATISTICAL ANNEX

## BELGIUM EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	0.0
<b>Life expectancy at birth</b>												
males	77.3	78.1	79.0	79.7	80.5	81.2	82.0	82.7	83.3	84.0	84.6	7.3
females	82.6	83.3	84.0	84.7	85.4	86.0	86.7	87.3	87.9	88.4	89.0	6.4
<b>Life expectancy at 65</b>												
males	17.4	17.9	18.4	18.9	19.4	19.9	20.4	20.9	21.4	21.8	22.3	4.9
females	20.9	21.4	21.9	22.4	22.9	23.4	23.9	24.3	24.8	25.2	25.7	4.8
<b>Net migration ('000)</b>	61.3	53.7	46.2	44.4	42.6	40.9	39.1	37.3	35.5	33.8	32.0	– 29.3
<b>Net migration as % of population</b>	0.6	0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.2	– 0.3
<b>Population (million)</b>	10.9	11.3	11.6	11.9	12.2	12.5	12.7	13.0	13.1	13.3	13.5	2.6
Children population (0–14) as % of total population	16.9	17.1	17.3	17.2	16.8	16.5	16.4	16.4	16.5	16.5	16.3	– 0.6
Prime-age population (25–54) as % of total population	41.5	40.3	38.9	37.6	36.8	36.5	36.2	36.1	35.8	35.8	35.9	– 5.6
Working-age population (15–64) as % of total population	65.9	64.7	63.3	62.0	60.7	59.8	59.3	59.0	58.6	58.4	58.2	– 7.7
Elderly population (65 and over) as % of total population	17.2	18.2	19.3	20.8	22.5	23.7	24.3	24.6	24.9	25.2	25.5	8.3
Very elderly population (80 and over) as % of total population	5.0	5.4	5.6	5.6	6.4	7.3	8.2	9.1	9.6	9.8	9.9	4.9
Very elderly population (80 and over) as % of elderly population	29.0	29.7	28.8	26.9	28.6	30.8	33.9	37.1	38.7	39.0	38.9	9.9
Very elderly population (80 and over) as % of working age population	7.6	8.4	8.8	9.0	10.6	12.2	13.9	15.5	16.4	16.8	17.1	9.5
<b>Macroeconomic assumptions*</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>AVG 2010–60</b>
<b>Potential GDP (growth rate)</b>	2.2	1.9	1.4	1.5	1.6	1.8	1.8	1.8	1.7	1.7	1.8	1.7
<b>Employment (growth rate)</b>	0.7	0.5	0.1	– 0.0	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2
<b>Labour input : hours worked (growth rate)</b>	0.9	0.5	0.1	– 0.0	0.1	0.2	0.2	0.2	0.1	0.2	0.2	0.2
<b>Labour productivity per hour (growth rate)</b>	1.2	1.4	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
TFP (growth rate)	1.1	1.0	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Capital deepening (contribution to labour productivity growth)	0.1	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<b>GDP per capita (growth rate)</b>	3.6	1.2	0.8	1.0	1.2	1.3	1.4	1.4	1.4	1.5	1.5	1.3
<b>GDP per worker (growth rate)</b>	1.5	1.4	1.2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
<b>GDP in 2010 prices (EUR million)</b>	352.3	389.5	419.2	449.9	486.2	528.9	577.1	629.4	685.2	744.8	812.3	
<b>Labour force assumptions</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Population (20–64) ('000)</b>	6 522	6 664	6 729	6 721	6 718	6 762	6 841	6 926	6 984	7 029	7 078	557
<b>Population growth (20–64)</b>	0.8	0.3	0.1	– 0.0	– 0.0	0.2	0.3	0.2	0.2	0.1	0.2	– 0.5
<b>Labour force 20–64 ('000)</b>	4 794	4 993	5 049	5 021	5 014	5 051	5 109	5 164	5 207	5 243	5 295	501
<b>Participation rate (20–64)</b>	73.5	74.9	75.0	74.7	74.6	74.7	74.7	74.6	74.6	74.6	74.8	1.3
<b>Participation rate (15–64)</b>	67.7	69.2	69.4	68.6	68.4	68.4	68.4	68.4	68.4	68.3	68.5	0.8
young (15–24)	32.7	34.5	33.7	32.7	33.2	33.5	33.7	33.8	33.6	33.3	33.3	0.6
prime age (25–54)	86.3	86.4	86.4	86.2	85.9	85.6	85.5	85.6	85.6	85.6	85.6	– 0.7
older (55–64)	39.1	46.8	49.2	49.0	49.4	49.6	49.6	49.0	48.8	48.3	48.7	9.6
<b>Participation rate (15–64) FEMALES</b>	61.9	64.2	64.8	64.4	64.4	64.3	64.2	64.1	64.0	63.9	64.0	2.1
young (15–24)	30.3	32.0	31.3	30.3	30.7	30.9	31.1	31.2	31.0	30.7	30.7	0.5
prime age (25–54)	80.4	81.1	81.5	81.4	80.9	80.5	80.2	80.2	80.3	80.3	80.2	– 0.1
older (55–64)	30.9	40.6	44.1	44.9	46.4	46.9	46.9	45.8	45.6	45.1	45.5	14.5
<b>Participation rate (15–64) MALES</b>	73.4	74.2	73.8	72.7	72.3	72.4	72.6	72.7	72.7	72.6	72.8	– 0.7
young (15–24)	35.2	36.9	36.1	35.0	35.5	35.9	36.1	36.2	36.0	35.7	35.8	0.6
prime age (25–54)	92.2	91.7	91.3	90.9	90.8	90.7	90.7	90.8	90.8	90.8	90.7	– 1.4
older (55–64)	47.5	53.1	54.4	53.2	52.3	52.2	52.3	52.2	52.1	51.5	52.0	4.5

<b>Employment rate (20–64)</b>	67.6	69.2	69.5	69.4	69.4	69.5	69.4	69.3	69.3	69.4	69.6	2.0
<b>Employment rate (15–74)</b>	55.3	56.2	55.6	54.7	54.0	54.0	54.3	54.6	54.5	54.3	54.4	– 0.9
<b>Unemployment rate (20–64)</b>	8.0	7.7	7.3	7.2	7.1	7.0	7.0	7.0	7.0	7.0	7.0	– 1.0
<b>Unemployment rate (15–74)</b>	8.3	7.9	7.6	7.4	7.3	7.2	7.2	7.2	7.2	7.2	7.2	– 1.1
<b>Employment (20–64) (million)</b>	4.4	4.6	4.7	4.7	4.7	4.7	4.8	4.8	4.8	4.9	4.9	0.5
<b>Employment (15–64) (million)</b>	4.4	4.6	4.7	4.7	4.7	4.7	4.8	4.8	4.9	4.9	5.0	0.5
Share of young (15–24) (%)	8	8	7	7	8	8	8	8	8	8	8	1
Share of prime age (25–54) (%)	81	79	77	77	77	77	77	77	77	78	78	– 3
Share of older (55–64) (%)	11	14	15	16	15	15	15	15	15	14	14	3
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	18.6	19.7	21.0	21.1	20.3	19.6	19.5	19.7	19.8	19.4	18.9	0.3
<b>Old-age dependency ratio (²)</b>	26	28	31	34	37	40	41	42	43	43	44	18
<b>Total dependency ratio (³)</b>	52	55	58	61	65	67	69	70	71	71	72	20
<b>Total economic dependency ratio (⁴)</b>	143	140	144	150	156	160	162	164	165	167	167	24
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	41	43	47	51	57	61	63	64	66	67	68	26
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	41	43	46	51	56	60	62	64	65	66	67	25

## LEGEND:

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB: = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## BULGARIA EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.56	1.57	1.58	1.59	1.60	1.61	1.63	1.64	1.65	1.66	1.67	0.1
<b>Life expectancy at birth</b>												
males	70.3	71.6	72.9	74.2	75.4	76.5	77.6	78.7	79.7	80.7	81.7	11.4
females	77.5	78.5	79.6	80.5	81.5	82.4	83.3	84.2	85.0	85.8	86.6	9.1
<b>Life expectancy at 65</b>												
males	13.8	14.5	15.3	15.9	16.6	17.3	18.0	18.7	19.3	19.9	20.6	6.7
females	17.0	17.7	18.4	19.1	19.7	20.4	21.1	21.7	22.4	23.0	23.6	6.6
<b>Net migration ('000)</b>	– 16.2	– 18.5	– 20.9	– 13.9	– 7.0	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	16.2
<b>Net migration as % of population</b>	– 0.2	– 0.3	– 0.3	– 0.2	– 0.1	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	0.2
<b>Population (million)</b>	7.5	7.3	7.1	6.8	6.6	6.4	6.2	6.1	5.9	5.7	5.5	– 2.0
Children population (0–14) as % of total population	13.7	14.6	14.9	14.2	13.2	12.8	13.0	13.4	13.5	13.3	13.1	– 0.6
Prime-age population (25–54) as % of total population	42.8	42.7	41.6	39.3	37.1	35.4	34.4	33.1	32.9	33.6	33.8	– 8.9
Working-age population (15–64) as % of total population	68.7	66.0	64.1	63.1	62.5	61.4	59.4	57.0	55.3	54.0	54.3	– 14.4
Elderly population (65 and over) as % of total population	17.6	19.4	21.0	22.8	24.3	25.8	27.6	29.6	31.2	32.6	32.6	15.0
Very elderly population (80 and over) as % of total population	3.9	4.5	4.8	5.4	6.7	7.7	8.5	9.2	10.1	11.4	12.9	9.0
Very elderly population (80 and over) as % of elderly population	22.0	23.5	23.0	23.6	27.4	29.8	30.8	31.0	32.3	35.0	39.6	17.6
Very elderly population (80 and over) as % of working age population	5.6	6.9	7.6	8.5	10.7	12.5	14.3	16.1	18.2	21.1	23.8	18.1
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	0.2	3.3	1.2	1.3	1.5	1.4	1.3	0.9	0.8	1.0	1.0	1.4
<b>Employment (growth rate)</b>	– 5.9	– 0.6	– 1.1	– 1.0	– 0.9	– 0.9	– 1.1	– 1.2	– 1.1	– 0.8	– 0.5	– 1.0
<b>Labour input: hours worked (growth rate)</b>	– 6.1	– 0.9	– 1.1	– 1.0	– 0.8	– 0.9	– 1.1	– 1.2	– 1.1	– 0.8	– 0.5	– 1.0
<b>Labour productivity per hour (growth rate)</b>	6.7	4.1	2.3	2.3	2.3	2.3	2.3	2.1	1.9	1.7	1.5	2.4
TFP (growth rate)	2.8	2.3	1.5	1.5	1.5	1.5	1.5	1.4	1.3	1.1	1.0	1.5
Capital deepening (contribution to labour productivity growth)	3.9	1.8	0.8	0.8	0.8	0.8	0.8	0.7	0.7	0.6	0.5	0.9
<b>GDP per capita (growth rate)</b>	0.2	3.9	2.0	2.1	2.2	2.0	1.8	1.5	1.4	1.6	1.7	2.0
<b>GDP per worker (growth rate)</b>	6.4	3.9	2.3	2.3	2.3	2.3	2.3	2.1	2.0	1.7	1.6	2.4
<b>GDP in 2010 prices (EUR million)</b>	36.0	42.2	46.0	48.9	52.6	56.5	60.4	63.6	66.2	69.2	72.7	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	4 781	4 528	4 215	3 947	3 760	3 605	3 410	3 181	2 980	2 806	2 725	– 2 056
<b>Population growth (20–64)</b>	3.5	– 1.4	– 1.4	– 1.2	– 0.8	– 1.0	– 1.3	– 1.4	– 1.3	– 1.1	– 0.3	– 3.8
<b>Labour force 20–64 ('000)</b>	3 448	3 325	3 105	2 921	2 791	2 657	2 509	2 355	2 215	2 112	2 062	– 1 386
<b>Participation rate (20–64)</b>	72.1	73.4	73.7	74.0	74.2	73.7	73.6	74.0	74.3	75.3	75.7	3.6
<b>Participation rate (15–64)</b>	67.1	69.0	68.8	68.3	68.3	68.2	68.4	68.8	68.7	69.1	69.4	2.4
young (15–24)	32.0	32.7	28.8	28.2	29.5	31.2	31.3	30.5	29.6	29.4	29.9	– 2.0
prime age (25–54)	82.7	83.1	83.5	84.0	84.0	83.7	83.6	83.9	84.2	84.2	84.0	1.3
older (55–64)	49.3	50.9	50.1	53.0	57.5	58.3	58.0	58.5	57.1	57.4	59.8	10.5
<b>Participation rate (15–64) FEMALES</b>	62.6	64.5	63.9	63.1	62.9	62.5	62.6	63.0	63.0	63.8	64.3	1.7
young (15–24)	27.1	27.5	24.2	23.7	24.8	26.3	26.4	25.7	24.9	24.7	25.1	– 2.0
prime age (25–54)	79.4	79.3	79.6	80.1	79.9	79.6	79.3	79.6	80.0	80.2	80.0	0.6
older (55–64)	42.7	45.5	43.6	44.7	49.0	49.2	48.5	49.1	47.3	47.8	50.6	7.9
<b>Participation rate (15–64) MALES</b>	71.6	73.6	73.6	73.5	73.7	73.9	74.2	74.4	74.1	74.2	74.5	2.9
young (15–24)	36.6	37.8	33.2	32.7	34.1	36.0	36.1	35.1	34.1	34.0	34.5	– 2.0
prime age (25–54)	86.1	86.7	87.3	87.7	87.9	87.7	87.7	88.1	88.3	88.2	88.0	2.0
older (55–64)	56.8	57.0	57.4	62.0	66.7	67.8	67.8	68.0	66.8	67.0	68.9	12.1



<b>Employment rate (20–64)</b>	64.8	66.9	67.8	68.5	68.8	68.4	68.3	68.8	69.1	69.9	70.3	5.6
<b>Employment rate (15–74)</b>	53.2	55.0	55.0	54.7	54.6	54.5	54.1	53.5	53.1	53.5	54.5	1.3
<b>Unemployment rate (20–64)</b>	10.2	8.9	8.0	7.5	7.3	7.2	7.1	7.1	7.1	7.1	7.1	– 3.1
<b>Unemployment rate (15–74)</b>	10.4	9.0	8.1	7.6	7.4	7.3	7.2	7.1	7.1	7.1	7.1	– 3.3
<b>Employment (20–64) (million)</b>	3.1	3.0	2.9	2.7	2.6	2.5	2.3	2.2	2.1	2.0	1.9	– 1.2
<b>Employment (15–64) (million)</b>	3.1	3.0	2.9	2.7	2.6	2.5	2.3	2.2	2.1	2.0	1.9	– 1.2
Share of young (15–24) (%)	7	6	5	6	7	7	7	6	6	7	7	– 0
Share of prime age (25–54) (%)	78	78	79	77	74	71	71	71	74	76	76	– 2
Share of older (55–64) (%)	15	15	15	17	20	22	22	22	20	17	17	2
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	20.1	20.5	21.0	21.6	23.2	25.1	25.7	25.8	23.8	20.0	19.5	– 0.6
<b>Old-age dependency ratio (²)</b>	26	29	33	36	39	42	47	52	56	60	60	34
<b>Total dependency ratio (³)</b>	46	51	56	59	60	63	68	76	81	85	84	39
<b>Total economic dependency ratio (⁴)</b>	140	136	138	142	144	147	153	161	169	174	173	33
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	42	44	48	53	58	62	68	76	83	88	88	47
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	41	43	46	51	56	60	65	72	78	84	84	43

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## CZECH REPUBLIC EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.49	1.51	1.52	1.53	1.55	1.56	1.57	1.58	1.60	1.61	1.62	0.1
<b>Life expectancy at birth</b>												
males	74.3	75.3	76.3	77.3	78.2	79.1	79.9	80.8	81.6	82.4	83.2	8.8
females	80.4	81.3	82.1	82.9	83.6	84.4	85.1	85.8	86.5	87.2	87.8	7.4
<b>Life expectancy at 65</b>												
males	15.3	15.9	16.5	17.1	17.7	18.4	18.9	19.5	20.1	20.7	21.2	5.9
females	18.7	19.3	19.9	20.5	21.1	21.7	22.3	22.8	23.4	23.9	24.5	5.8
<b>Net migration ('000)</b>	28.1	27.1	26.1	25.1	24.1	23.1	22.1	21.1	20.1	19.1	18.1	– 10.1
<b>Net migration as % of population</b>	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	– 0.1
<b>Population (million)</b>	10.5	10.7	10.8	10.9	10.8	10.8	10.7	10.7	10.7	10.6	10.5	– 0.1
Children population (0–14) as % of total population	14.3	15.3	15.7	14.9	13.9	13.2	13.3	13.7	14.1	13.9	13.6	– 0.8
Prime-age population (25–54) as % of total population	43.8	43.7	43.2	41.7	39.1	37.0	36.3	35.5	34.8	35.0	35.1	– 8.7
Working-age population (15–64) as % of total population	70.3	67.0	64.5	64.0	64.0	63.7	61.6	58.7	57.1	56.1	55.8	– 14.5
Elderly population (65 and over) as % of total population	15.4	17.7	19.8	21.0	22.1	23.0	25.1	27.5	28.8	30.0	30.6	15.3
Very elderly population (80 and over) as % of total population	3.6	3.9	4.0	5.0	6.5	7.6	7.9	8.2	8.7	10.4	12.3	8.7
Very elderly population (80 and over) as % of elderly population	23.5	21.8	20.4	23.6	29.4	33.0	31.5	29.7	30.1	34.6	40.0	16.6
Very elderly population (80 and over) as % of working age population	5.1	5.8	6.3	7.7	10.1	11.9	12.8	13.9	15.2	18.5	22.0	16.8
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	2.3	2.4	1.8	1.7	1.7	1.6	1.3	1.0	1.0	1.1	1.3	1.5
<b>Employment (growth rate)</b>	– 0.8	– 0.4	– 0.2	– 0.2	– 0.1	– 0.3	– 0.6	– 0.7	– 0.7	– 0.5	– 0.2	– 0.4
<b>Labour input: hours worked (growth rate)</b>	0.1	– 0.7	– 0.2	– 0.2	– 0.1	– 0.3	– 0.6	– 0.7	– 0.7	– 0.5	– 0.2	– 0.3
<b>Labour productivity per hour (growth rate)</b>	2.2	3.1	2.0	1.9	1.8	1.8	1.8	1.8	1.7	1.6	1.5	1.9
TFP (growth rate)	1.5	1.8	1.3	1.2	1.2	1.2	1.2	1.1	1.1	1.0	1.0	1.2
Capital deepening (contribution to labour productivity growth)	0.7	1.2	0.7	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.7
<b>GDP per capita (growth rate)</b>	2.1	2.1	1.6	1.7	1.8	1.7	1.3	1.1	1.1	1.3	1.6	1.6
<b>GDP per worker (growth rate)</b>	3.1	2.8	2.0	1.9	1.8	1.8	1.8	1.8	1.7	1.6	1.5	1.9
<b>GDP in 2010 prices (EUR million)</b>	145.1	163.2	179.9	195.7	213.5	231.9	248.8	263.0	276.2	290.9	309.3	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	6 803	6 705	6 484	6 362	6 344	6 312	6 103	5 812	5 605	5 418	5 312	– 1491
<b>Population growth (20–64)</b>	– 0.0	– 0.5	– 0.6	– 0.1	– 0.1	– 0.2	– 1.0	– 0.9	– 0.7	– 0.6	– 0.1	– 0.1
<b>Labour force 20–64 ('000)</b>	5 164	5 145	5 064	4 992	4 952	4 899	4 758	4 566	4 410	4 280	4 217	– 946
<b>Participation rate (20–64)</b>	75.9	76.7	78.1	78.5	78.1	77.6	78.0	78.6	78.7	79.0	79.4	3.5
<b>Participation rate (15–64)</b>	70.3	72.2	73.0	72.3	71.9	71.8	72.4	73.1	72.9	72.7	72.8	2.5
young (15–24)	31.1	33.5	29.6	27.7	29.9	31.0	31.2	31.2	30.1	29.4	29.7	– 1.4
prime age (25–54)	87.9	87.4	87.0	86.8	86.5	85.8	85.2	85.1	85.3	85.7	85.7	– 2.1
older (55–64)	50.1	51.8	55.9	60.1	65.1	67.5	69.7	71.3	70.6	69.7	71.3	21.3
<b>Participation rate (15–64) FEMALES</b>	61.7	63.4	64.4	64.0	64.0	63.9	64.6	65.3	65.2	65.2	65.4	3.8
young (15–24)	25.6	27.4	24.3	22.7	24.5	25.4	25.6	25.6	24.7	24.0	24.3	– 1.2
prime age (25–54)	79.8	78.9	78.5	78.4	78.0	77.1	75.9	75.6	75.9	76.6	76.9	– 2.9
older (55–64)	38.3	41.0	45.5	50.5	56.8	59.9	63.8	66.6	65.7	64.8	66.5	28.2
<b>Participation rate (15–64) MALES</b>	78.7	80.7	81.3	80.2	79.6	79.5	80.0	80.6	80.4	80.0	80.0	1.3
young (15–24)	36.4	39.3	34.7	32.5	35.1	36.3	36.7	36.6	35.3	34.4	34.9	– 1.6
prime age (25–54)	95.5	95.3	95.1	94.9	94.5	94.2	94.1	94.3	94.4	94.4	94.3	– 1.3
older (55–64)	62.8	63.3	66.7	69.8	73.5	75.1	75.6	75.9	75.4	74.7	76.2	13.4

<b>Employment rate (20–64)</b>	70.5	71.7	73.2	73.7	73.4	73.0	73.3	73.9	74.0	74.3	74.7	4.2
<b>Employment rate (15–74)</b>	58.7	59.0	59.0	59.0	59.3	59.1	58.5	57.4	57.3	57.8	58.1	– 0.7
<b>Unemployment rate (20–64)</b>	7.1	6.5	6.2	6.0	6.0	5.9	5.9	5.9	5.9	5.9	5.9	– 1.2
<b>Unemployment rate (15–74)</b>	7.3	6.6	6.3	6.2	6.1	6.0	6.0	5.9	5.9	5.9	5.9	– 1.3
<b>Employment (20–64) (million)</b>	4.8	4.8	4.7	4.7	4.7	4.6	4.5	4.3	4.1	4.0	4.0	– 0.8
<b>Employment (15–64) (million)</b>	4.8	4.8	4.8	4.7	4.7	4.6	4.5	4.3	4.2	4.0	4.0	– 0.8
Share of young (15–24) (%)	7	6	5	5	7	7	6	6	6	6	7	– 0
Share of prime age (25–54) (%)	79	80	80	79	74	70	70	71	72	74	75	– 4
Share of older (55–64) (%)	14	14	14	16	20	23	24	23	22	20	19	4
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	20.1	19.4	18.6	18.8	21.4	24.6	24.4	23.3	22.8	20.3	18.9	– 1.3
<b>Old-age dependency ratio (²)</b>	22	26	31	33	35	36	41	47	50	54	55	33
<b>Total dependency ratio (³)</b>	42	49	55	56	56	57	62	70	75	78	79	37
<b>Total economic dependency ratio (⁴)</b>	115	118	122	125	126	127	131	138	146	151	152	37
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	32	37	43	46	49	51	56	64	70	74	76	44
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	32	37	42	45	48	50	54	61	67	71	74	42

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## DENMARK EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	1.84	0.0
<b>Life expectancy at birth</b>												
males	77.0	77.8	78.6	79.4	80.2	80.9	81.7	82.4	83.1	83.8	84.4	7.4
females	81.1	82.0	82.8	83.6	84.3	85.1	85.8	86.5	87.2	87.8	88.4	7.3
<b>Life expectancy at 65</b>												
males	16.8	17.4	17.9	18.5	19.0	19.5	20.0	20.6	21.1	21.5	22.0	5.2
females	19.5	20.2	20.8	21.4	21.9	22.5	23.1	23.6	24.1	24.6	25.1	5.6
<b>Net migration ('000)</b>	11.9	11.6	11.4	10.9	10.5	10.1	9.6	9.2	8.7	8.3	7.9	– 4.0
<b>Net migration as % of population</b>	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	– 0.1
<b>Population (million)</b>	5.5	5.6	5.7	5.8	5.9	6.0	6.0	6.0	6.0	6.1	6.1	0.5
Children population (0–14) as % of total population	18.0	17.3	16.9	16.8	16.9	16.9	16.7	16.3	16.1	16.0	16.1	– 1.9
Prime-age population (25–54) as % of total population	40.2	39.2	38.2	37.1	36.3	36.2	36.4	36.3	35.9	35.6	35.5	– 4.7
Working-age population (15–64) as % of total population	65.4	64.0	63.1	62.1	60.5	59.2	58.7	58.7	59.2	59.1	58.4	– 7.1
Elderly population (65 and over) as % of total population	16.6	18.6	20.0	21.2	22.6	23.9	24.7	24.9	24.7	24.9	25.5	9.0
Very elderly population (80 and over) as % of total population	4.1	4.2	4.7	5.8	7.0	7.5	8.0	8.8	9.6	10.1	10.1	6.0
Very elderly population (80 and over) as % of elderly population	24.8	22.5	23.4	27.3	30.9	31.6	32.5	35.5	39.0	40.6	39.7	14.9
Very elderly population (80 and over) as % of working age population	6.3	6.6	7.4	9.3	11.6	12.7	13.7	15.1	16.3	17.1	17.3	11.1
<b>Macroeconomic assumptions*</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>AVG 2010–60</b>
<b>Potential GDP (growth rate)</b>	2.1	1.9	1.3	1.6	1.4	1.4	1.6	1.7	1.7	1.6	1.5	1.6
<b>Employment (growth rate)</b>	– 2.1	0.3	0.1	0.1	– 0.1	– 0.1	0.0	0.2	0.2	0.0	– 0.0	0.0
<b>Labour input : hours worked (growth rate)</b>	– 2.0	0.1	0.0	0.1	– 0.1	– 0.1	0.0	0.2	0.2	0.0	– 0.0	0.0
<b>Labour productivity per hour (growth rate)</b>	4.1	1.8	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
TFP (growth rate)	3.3	1.1	0.8	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Capital deepening (contribution to labour productivity growth)	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<b>GDP per capita (growth rate)</b>	1.4	1.5	1.0	1.3	1.2	1.3	1.5	1.6	1.6	1.5	1.4	1.4
<b>GDP per worker (growth rate)</b>	4.2	1.6	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
<b>GDP in 2010 prices (EUR million)</b>	234.4	254.7	271.3	293.3	315.8	339.2	365.3	396.6	431.9	468.4	505.2	
<b>Labour force assumptions</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Population (20–64) ('000)</b>	3 275	3 265	3 279	3 275	3 245	3 200	3 174	3 191	3 234	3 245	3 222	– 53
<b>Population growth (20–64)</b>	0.6	0.2	0.1	– 0.0	– 0.4	– 0.1	– 0.1	0.2	0.2	– 0.0	– 0.2	– 0.8
<b>Labour force 20–64 ('000)</b>	2 674	2 673	2 687	2 700	2 667	2 634	2 619	2 639	2 673	2 681	2 665	– 9
<b>Participation rate (20–64)</b>	81.6	81.9	81.9	82.4	82.2	82.3	82.5	82.7	82.7	82.6	82.7	1.1
<b>Participation rate (15–64)</b>	79.5	79.8	79.9	80.3	80.2	80.2	80.3	80.5	80.5	80.5	80.6	1.1
young (15–24)	67.8	69.4	69.4	69.3	69.4	69.1	69.0	69.2	69.3	69.3	69.3	1.5
prime age (25–54)	89.0	88.0	87.4	86.9	86.7	86.5	86.5	86.6	86.6	86.6	86.6	– 2.4
older (55–64)	61.1	64.2	67.4	71.7	71.2	71.5	71.1	72.0	72.9	73.0	73.2	12.1
<b>Participation rate (15–64) FEMALES</b>	76.1	76.7	77.0	78.2	78.3	78.4	78.6	78.8	78.9	78.9	79.0	2.9
young (15–24)	67.6	69.4	69.4	69.4	69.5	69.2	69.1	69.3	69.4	69.4	69.4	1.8
prime age (25–54)	85.6	84.9	84.7	84.4	84.5	84.4	84.5	84.6	84.6	84.6	84.6	– 1.0
older (55–64)	54.9	57.9	60.8	68.1	68.2	68.9	69.0	69.9	70.9	71.2	71.4	16.5
<b>Participation rate (15–64) MALES</b>	82.8	82.8	82.8	82.5	82.0	82.0	81.9	82.0	82.0	82.0	82.1	– 0.7
young (15–24)	68.0	69.3	69.4	69.1	69.4	69.0	68.9	69.1	69.2	69.3	69.3	1.3
prime age (25–54)	92.4	91.0	90.0	89.3	88.8	88.5	88.5	88.5	88.4	88.5	88.5	– 3.9
older (55–64)	67.4	70.6	73.9	75.3	74.2	74.2	73.3	74.3	74.9	74.8	75.0	7.5

<b>Employment rate (20–64)</b>	76.0	78.2	78.3	78.8	78.6	78.7	78.9	79.1	79.1	79.0	79.1	3.1
<b>Employment rate (15–74)</b>	65.5	66.2	66.1	66.8	66.7	66.4	66.5	67.3	68.0	68.1	67.6	2.1
<b>Unemployment rate (20–64)</b>	6.9	4.5	4.4	4.4	4.4	4.4	4.3	4.4	4.4	4.4	4.4	– 2.5
<b>Unemployment rate (15–74)</b>	7.4	4.8	4.7	4.7	4.6	4.6	4.6	4.6	4.6	4.6	4.6	– 2.8
<b>Employment (20–64) (million)</b>	2.5	2.6	2.6	2.6	2.6	2.5	2.5	2.5	2.6	2.6	2.5	0.1
<b>Employment (15–64) (million)</b>	2.7	2.7	2.7	2.8	2.7	2.7	2.7	2.7	2.7	2.7	2.7	0.1
Share of young (15–24) (%)	15	16	16	16	16	16	16	16	16	16	16	1
Share of prime age (25–54) (%)	70	68	67	65	65	66	67	67	66	65	66	– 4
Share of older (55–64) (%)	16	16	17	19	19	18	17	17	18	19	19	3
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	19.8	19.2	20.3	21.3	21.2	20.1	18.5	18.5	19.9	20.6	20.2	0.4
<b>Old-age dependency ratio (²)</b>	25	29	32	34	37	40	42	42	42	42	44	18
<b>Total dependency ratio (³)</b>	53	56	59	61	65	69	70	70	69	69	71	18
<b>Total economic dependency ratio (⁴)</b>	104	101	104	106	109	112	114	114	112	112	113	9
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	32	36	40	42	45	49	51	51	51	51	52	20
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	32	35	39	41	44	47	49	49	49	49	50	18

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## GERMANY EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.36	1.38	1.40	1.41	1.43	1.45	1.47	1.48	1.50	1.52	1.54	0.2
<b>Life expectancy at birth</b>												
males	77.6	78.5	79.3	80.0	80.8	81.5	82.2	82.9	83.6	84.2	84.8	7.2
females	82.7	83.4	84.1	84.7	85.4	86.0	86.6	87.2	87.8	88.3	88.9	6.2
<b>Life expectancy at 65</b>												
males	17.4	17.9	18.5	19.0	19.5	20.0	20.5	21.0	21.5	21.9	22.4	5.0
females	20.6	21.1	21.6	22.1	22.6	23.1	23.6	24.1	24.5	25.0	25.4	4.8
<b>Net migration ('000)</b>	41.0	56.3	71.5	68.8	66.0	63.3	60.5	57.8	55.0	52.3	49.5	8.5
<b>Net migration as % of population</b>	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0
<b>Population (million)</b>	81.7	80.9	80.0	79.0	77.7	76.3	74.6	72.7	70.6	68.3	66.2	–15.5
Children population (0–14) as % of total population	13.4	12.8	12.6	12.6	12.5	12.3	12.1	12.0	12.1	12.3	12.5	–0.9
Prime-age population (25–54) as % of total population	42.6	41.4	38.6	36.3	35.7	35.3	34.6	33.7	33.4	33.2	33.2	–9.3
Working-age population (15–64) as % of total population	66.0	65.6	64.2	62.1	59.2	56.7	56.2	56.0	55.6	54.9	54.8	–11.2
Elderly population (65 and over) as % of total population	20.6	21.6	23.2	25.3	28.4	31.0	31.7	32.0	32.3	32.8	32.8	12.2
Very elderly population (80 and over) as % of total population	5.1	5.8	7.3	8.0	8.2	9.2	10.7	12.9	14.5	14.1	13.5	8.4
Very elderly population (80 and over) as % of elderly population	24.9	27.0	31.6	31.5	28.9	29.5	33.8	40.4	44.7	42.9	41.3	16.4
Very elderly population (80 and over) as % of working age population	7.8	8.9	11.4	12.9	13.8	16.1	19.1	23.1	26.0	25.6	24.7	16.9
<b>Macroeconomic assumptions*</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>AVG 2010–60</b>
<b>Potential GDP (growth rate)</b>	3.6	1.5	0.9	0.8	0.5	0.6	0.8	0.9	0.8	0.7	0.8	0.9
<b>Employment (growth rate)</b>	0.5	–0.1	–0.5	–0.8	–1.0	–0.9	–0.7	–0.7	–0.8	–0.8	–0.7	–0.6
<b>Labour input: hours worked (growth rate)</b>	2.6	–0.4	–0.5	–0.8	–1.0	–0.9	–0.7	–0.7	–0.8	–0.8	–0.7	–0.6
<b>Labour productivity per hour (growth rate)</b>	1.0	1.8	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
TFP (growth rate)	1.4	1.2	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Capital deepening (contribution to labour productivity growth)	–0.4	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<b>GDP per capita (growth rate)</b>	3.7	1.7	1.1	1.0	0.9	1.0	1.3	1.4	1.4	1.4	1.5	1.3
<b>GDP per worker (growth rate)</b>	3.1	1.6	1.4	1.5	1.5	1.5	1.6	1.6	1.6	1.6	1.6	1.5
<b>GDP in 2010 prices (EUR million)</b>	2 498.8	2 737.7	2 877.5	2 993.2	3 088.5	3 173.1	3 287.9	3 431.4	3 575.1	3 714.5	3 860.8	
<b>Labour force assumptions</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Population (20–64) ('000)</b>	49 655	49 083	47 678	45 528	42 552	39 874	38 614	37 530	36 136	34 534	33 295	–16 361
<b>Population growth (20–64)</b>	0.6	–0.6	–0.7	–1.1	–1.4	–1.1	–0.4	–0.7	–0.8	–0.9	–0.6	–1.3
<b>Labour force 20–64 ('000)</b>	40 032	40 133	39 170	37 423	35 147	33 222	32 239	31 251	30 028	28 737	27 715	–12 316
<b>Participation rate (20–64)</b>	80.6	81.8	82.2	82.2	82.6	83.3	83.5	83.3	83.1	83.2	83.2	2.6
<b>Participation rate (15–64)</b>	76.7	77.8	78.4	78.4	78.6	79.0	79.2	79.0	78.9	78.9	78.9	2.2
young (15–24)	51.6	50.8	51.3	50.9	50.6	50.5	50.7	50.9	50.8	50.8	50.6	–1.0
prime age (25–54)	87.3	87.7	87.9	88.0	88.2	88.3	88.3	88.2	88.2	88.2	88.2	0.9
older (55–64)	62.5	68.6	72.0	73.0	72.8	73.9	75.3	75.3	74.7	74.9	74.8	12.3
<b>Participation rate (15–64) FEMALES</b>	70.8	72.4	73.5	73.9	74.6	75.2	75.5	75.5	75.3	75.4	75.3	4.5
young (15–24)	48.8	47.9	48.4	48.1	47.8	47.6	47.8	47.9	47.9	47.8	47.7	–1.2
prime age (25–54)	81.3	82.3	82.8	83.2	83.7	84.0	84.0	83.9	83.9	83.9	83.9	2.5
older (55–64)	54.5	61.4	66.1	68.3	69.2	70.8	72.7	73.1	72.5	72.7	72.7	18.2
<b>Participation rate (15–64) MALES</b>	82.4	83.1	83.2	82.8	82.5	82.8	82.8	82.5	82.3	82.4	82.4	–0.0
young (15–24)	54.3	53.7	54.2	53.7	53.4	53.3	53.5	53.7	53.6	53.6	53.4	–0.9
prime age (25–54)	93.1	92.8	92.8	92.6	92.6	92.5	92.4	92.4	92.4	92.4	92.4	–0.7
older (55–64)	70.8	75.8	77.9	77.7	76.3	77.1	77.9	77.6	76.8	77.0	76.9	6.1

<b>Employment rate (20–64)</b>	74.9	76.8	77.2	77.2	77.6	78.3	78.4	78.2	78.1	78.2	78.2	3.3
<b>Employment rate (15–74)</b>	61.4	64.3	64.9	63.9	62.7	62.0	63.0	64.4	64.1	63.4	63.2	1.7
<b>Unemployment rate (20–64)</b>	7.1	6.0	6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.0	– 1.0
<b>Unemployment rate (15–74)</b>	7.1	6.0	6.0	5.9	5.8	5.8	5.9	5.9	5.9	5.8	5.9	– 1.2
<b>Employment (20–64) (million)</b>	37.2	37.7	36.8	35.2	33.0	31.2	30.3	29.4	28.2	27.0	26.0	– 11.2
<b>Employment (15–64) (million)</b>	38.3	38.8	37.8	36.1	33.9	32.1	31.2	30.2	29.0	27.8	26.8	– 11.5
Share of young (15–24) (%)	11	10	10	10	10	10	10	10	10	10	11	– 1
Share of prime age (25–54) (%)	74	71	68	66	68	70	69	67	68	68	68	– 6
Share of older (55–64) (%)	15	19	22	25	22	20	21	22	22	22	21	6
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	18.4	21.2	24.5	26.5	24.1	21.4	22.0	23.5	23.4	22.8	22.5	4.1
<b>Old-age dependency ratio (²)</b>	31	33	36	41	48	55	56	57	58	60	60	29
<b>Total dependency ratio (³)</b>	52	52	56	61	69	76	78	79	80	82	83	31
<b>Total economic dependency ratio (⁴)</b>	110	104	104	109	116	123	127	129	130	132	133	23
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	42	43	46	51	59	67	71	72	73	75	75	33
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	42	42	44	48	55	63	67	68	69	70	71	29

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## ESTONIA EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.62	1.63	1.64	1.65	1.66	1.66	1.67	1.68	1.69	1.70	1.70	0.1
<b>Life expectancy at birth</b>												
males	69.8	71.2	72.5	73.8	75.0	76.2	77.4	78.5	79.6	80.6	81.6	11.8
females	80.1	81.0	81.9	82.7	83.6	84.4	85.1	85.9	86.6	87.3	88.0	7.9
<b>Life expectancy at 65</b>												
males	14.1	14.8	15.5	16.2	16.9	17.6	18.3	19.0	19.6	20.3	20.9	6.8
females	19.1	19.7	20.4	21.0	21.6	22.2	22.7	23.3	23.8	24.4	24.9	5.8
<b>Net migration ('000)</b>	–0.9	–1.3	–1.8	–1.2	–0.6	–0.0	–0.0	–0.0	–0.0	–0.0	–0.0	0.9
<b>Net migration as % of population</b>	–0.1	–0.1	–0.1	–0.1	–0.0	–0.0	–0.0	–0.0	–0.0	–0.0	–0.0	0.1
<b>Population (million)</b>	1.3	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	–0.2
Children population (0–14) as % of total population	15.2	16.5	17.2	16.4	15.2	14.2	14.1	14.6	15.0	14.9	14.4	–0.8
Prime-age population (25–54) as % of total population	41.9	42.4	41.2	39.5	37.9	37.3	36.2	34.4	34.0	34.6	34.8	–7.1
Working-age population (15–64) as % of total population	67.7	65.5	63.5	62.6	62.4	62.2	61.0	59.3	57.1	55.0	55.1	–12.6
Elderly population (65 and over) as % of total population	17.0	18.0	19.3	20.9	22.5	23.6	24.9	26.1	27.9	30.1	30.5	13.4
Very elderly population (80 and over) as % of total population	4.2	4.8	5.5	5.7	6.4	7.3	8.4	9.1	9.6	10.3	11.2	7.0
Very elderly population (80 and over) as % of elderly population	24.5	26.7	28.7	27.1	28.3	31.1	33.7	35.1	34.4	34.3	36.7	12.3
Very elderly population (80 and over) as % of working age population	6.2	7.3	8.7	9.1	10.2	11.8	13.8	15.4	16.8	18.8	20.3	14.2
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	3.1	2.4	1.7	2.2	1.9	1.7	1.5	1.1	0.9	1.0	1.2	1.7
<b>Employment (growth rate)</b>	–4.8	3.9	–0.4	0.1	–0.2	–0.4	–0.6	–0.9	–1.0	–0.7	–0.3	–0.5
<b>Labour input: hours worked (growth rate)</b>	–2.2	3.9	–0.4	0.1	–0.2	–0.4	–0.6	–0.9	–1.0	–0.7	–0.3	–0.4
<b>Labour productivity per hour (growth rate)</b>	5.5	–1.4	2.1	2.1	2.1	2.1	2.1	2.0	1.8	1.7	1.5	2.1
TFP (growth rate)	3.9	–1.5	1.4	1.4	1.4	1.4	1.4	1.3	1.2	1.1	1.0	1.3
Capital deepening (contribution to labour productivity growth)	1.6	0.1	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.5	0.8
<b>GDP per capita (growth rate)</b>	3.1	2.5	2.0	2.5	2.3	2.0	1.8	1.4	1.1	1.3	1.6	2.0
<b>GDP per worker (growth rate)</b>	8.3	–1.4	2.1	2.1	2.1	2.1	2.1	2.0	1.8	1.7	1.5	2.3
<b>GDP in 2010 prices (EUR million)</b>	14.5	16.9	18.5	20.4	22.6	24.7	26.8	28.5	29.9	31.3	33.1	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	829	813	775	739	720	710	694	671	635	596	583	–246
<b>Population growth (20–64)</b>	1.5	–0.8	–1.0	–0.9	–0.3	–0.4	–0.5	–0.8	–1.2	–1.2	–0.0	–1.5
<b>Labour force 20–64 ('000)</b>	665	660	633	609	594	583	568	547	517	490	482	–183
<b>Participation rate (20–64)</b>	80.2	81.1	81.7	82.3	82.5	82.1	81.8	81.5	81.5	82.3	82.7	2.5
<b>Participation rate (15–64)</b>	74.1	76.1	76.0	75.5	75.4	75.4	75.7	75.8	75.5	75.5	75.6	1.5
young (15–24)	39.6	40.3	35.0	33.3	35.6	37.0	38.2	37.7	36.2	35.3	35.7	–4.0
prime age (25–54)	88.3	88.1	88.3	88.5	88.5	88.2	87.8	87.7	87.9	88.1	88.2	–0.1
older (55–64)	64.4	65.2	67.1	70.6	73.7	73.6	74.0	73.6	71.8	71.8	73.6	9.2
<b>Participation rate (15–64) FEMALES</b>	71.4	73.5	73.8	73.3	73.1	72.9	73.1	73.2	72.9	73.0	73.2	1.9
young (15–24)	35.2	35.5	30.8	29.3	31.1	32.6	33.5	33.2	31.9	31.1	31.4	–3.8
prime age (25–54)	84.9	84.7	85.1	85.7	86.1	85.8	85.0	84.6	85.0	85.5	85.7	0.8
older (55–64)	64.4	67.2	69.0	71.5	73.3	72.7	73.2	73.2	71.5	71.4	73.4	8.9
<b>Participation rate (15–64) MALES</b>	77.1	78.8	78.4	77.7	77.7	77.8	78.4	78.4	78.0	77.9	77.9	0.9
young (15–24)	43.9	44.9	39.1	37.1	39.9	41.4	42.7	42.2	40.4	39.4	39.9	–4.0
prime age (25–54)	91.8	91.6	91.5	91.3	90.9	90.6	90.5	90.8	90.9	90.7	90.6	–1.2
older (55–64)	64.3	62.6	64.6	69.6	74.2	74.5	74.8	74.1	72.0	72.2	73.9	9.6



<b>Employment rate (20–64)</b>	66.8	69.4	70.5	73.6	75.9	75.9	75.8	75.6	75.7	76.4	76.8	10.1
<b>Employment rate (15–74)</b>	55.8	59.0	58.7	59.5	61.1	61.7	62.0	61.5	60.6	59.5	60.0	4.3
<b>Unemployment rate (20–64)</b>	16.7	14.3	13.7	10.6	8.0	7.5	7.3	7.2	7.2	7.1	7.1	– 9.7
<b>Unemployment rate (15–74)</b>	16.8	14.3	13.6	10.6	7.9	7.5	7.2	7.1	7.0	6.9	7.0	– 9.8
<b>Employment (20–64) (million)</b>	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.4	– 0.1
<b>Employment (15–64) (million)</b>	0.6	0.6	0.5	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	– 0.1
Share of young (15–24) (%)	9	7	6	7	8	9	8	8	7	8	8	– 1
Share of prime age (25–54) (%)	75	76	76	75	72	71	69	68	70	74	74	– 1
Share of older (55–64) (%)	16	17	18	19	20	21	22	25	23	18	17	2
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	17.8	19.4	20.2	19.7	20.0	21.0	22.8	25.4	23.7	19.0	17.8	– 0.0
<b>Old-age dependency ratio (²)</b>	25	27	30	33	36	38	41	44	49	55	55	30
<b>Total dependency ratio (³)</b>	48	53	57	60	60	61	64	69	75	82	82	34
<b>Total economic dependency ratio (⁴)</b>	133	127	131	128	122	121	123	128	136	143	145	12
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	38	39	42	45	47	50	53	57	63	71	73	36
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	36	37	40	43	45	47	50	54	60	66	69	33

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## IRELAND EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	2.07	2.06	2.05	2.04	2.04	2.03	2.02	2.01	2.00	2.00	1.99	– 0.1
<b>Life expectancy at birth</b>												
males	77.0	77.9	78.7	79.5	80.3	81.0	81.8	82.5	83.2	83.9	84.5	7.5
females	82.0	82.8	83.5	84.3	85.0	85.7	86.4	87.0	87.7	88.3	88.9	6.9
<b>Life expectancy at 65</b>												
males	16.8	17.4	18.0	18.5	19.1	19.6	20.1	20.7	21.2	21.7	22.2	5.3
females	20.0	20.6	21.2	21.8	22.4	22.9	23.5	24.0	24.5	25.0	25.5	5.5
<b>Net migration ('000)</b>	– 23.3	– 0.4	22.5	21.6	20.8	19.9	19.0	18.2	17.3	16.4	15.6	38.8
<b>Net migration as % of population</b>	– 0.5	– 0.0	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.8
<b>Population (million)</b>	4.5	4.6	4.8	5.1	5.3	5.5	5.8	6.0	6.2	6.4	6.6	2.1
Children population (0–14) as % of total population	21.5	22.6	22.2	20.3	18.7	18.3	18.9	19.5	19.4	18.8	18.0	– 3.5
Prime-age population (25–54) as % of total population	44.7	42.3	39.5	38.3	37.5	37.0	36.4	37.0	37.3	37.0	36.8	– 7.9
Working-age population (15–64) as % of total population	67.0	64.3	63.2	63.6	63.6	62.7	60.8	58.9	57.7	58.7	60.1	– 6.9
Elderly population (65 and over) as % of total population	11.5	13.0	14.6	16.1	17.7	19.0	20.3	21.6	22.9	22.5	21.9	10.5
Very elderly population (80 and over) as % of total population	2.8	3.0	3.3	3.8	4.7	5.4	6.1	6.8	7.5	8.2	9.1	6.3
Very elderly population (80 and over) as % of elderly population	24.4	23.0	22.6	23.7	26.3	28.4	30.0	31.5	32.6	36.4	41.4	17.0
Very elderly population (80 and over) as % of working age population	4.2	4.7	5.2	6.0	7.3	8.6	10.0	11.6	12.9	14.0	15.1	11.0
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	– 1.0	2.2	3.3	3.4	2.7	2.2	1.8	1.6	2.0	2.2	2.3	2.2
<b>Employment (growth rate)</b>	– 4.1	0.3	1.5	1.8	1.2	0.6	0.3	0.1	0.4	0.7	0.8	0.6
<b>Labour input : hours worked (growth rate)</b>	– 3.1	– 0.1	1.5	1.8	1.2	0.6	0.3	0.1	0.4	0.7	0.8	0.6
<b>Labour productivity per hour (growth rate)</b>	2.2	2.3	1.8	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6
TFP (growth rate)	0.9	1.5	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
Capital deepening (contribution to labour productivity growth)	1.3	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6
<b>GDP per capita (growth rate)</b>	– 1.5	1.4	2.2	2.4	1.8	1.3	1.0	0.9	1.3	1.7	1.9	1.4
<b>GDP per worker (growth rate)</b>	3.2	1.9	1.7	1.5	1.5	1.5	1.5	1.5	1.6	1.5	1.5	1.6
<b>GDP in 2010 prices (EUR million)</b>	153.9	165.1	188.5	221.6	257.9	289.9	319.3	347.3	379.6	422.1	473.3	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	2 727	2 680	2 735	2 847	2 984	3 112	3 183	3 199	3 212	3 348	3 516	789
<b>Population growth (20–64)</b>	– 0.8	– 0.1	0.7	0.8	1.0	0.7	0.3	– 0.1	0.4	1.0	0.9	1.7
<b>Labour force 20–64 ('000)</b>	2 040	2 023	2 060	2 136	2 223	2 306	2 343	2 343	2 361	2 461	2 575	535
<b>Participation rate (20–64)</b>	74.8	75.5	75.3	75.0	74.5	74.1	73.6	73.2	73.5	73.5	73.2	– 1.6
<b>Participation rate (15–64)</b>	69.6	69.7	69.2	68.2	68.0	68.3	68.3	67.8	67.6	67.4	67.3	– 2.3
young (15–24)	42.3	38.9	40.2	40.1	42.1	43.6	43.4	41.9	40.9	41.2	42.0	– 0.4
prime age (25–54)	80.4	80.1	79.7	79.2	78.5	77.5	76.9	76.9	76.9	76.9	76.9	– 3.5
older (55–64)	54.7	61.2	64.4	65.5	66.5	67.6	67.0	63.6	63.2	64.2	63.9	9.3
<b>Participation rate (15–64) FEMALES</b>	62.0	63.4	63.9	63.7	63.9	64.3	64.2	63.4	63.0	63.0	63.1	1.1
young (15–24)	41.5	37.6	39.1	38.9	40.9	42.3	42.0	40.5	39.5	39.9	40.6	– 0.9
prime age (25–54)	71.6	72.3	72.6	72.9	72.6	71.3	70.3	70.2	70.3	70.5	70.6	– 1.0
older (55–64)	44.3	54.5	59.7	61.8	63.8	66.6	67.0	63.7	62.8	63.9	63.6	19.3
<b>Participation rate (15–64) MALES</b>	77.2	76.1	74.6	72.8	72.1	72.3	72.4	72.1	72.0	71.6	71.3	– 5.9
young (15–24)	43.2	40.1	41.4	41.1	43.3	44.9	44.7	43.1	42.1	42.5	43.3	0.1
prime age (25–54)	89.3	88.1	86.8	85.6	84.4	83.7	83.4	83.4	83.2	83.1	83.0	– 6.3
older (55–64)	65.0	67.9	69.3	69.2	69.3	68.6	66.9	63.5	63.6	64.6	64.3	– 0.7

<b>Employment rate (20–64)</b>	64.9	64.9	65.7	67.9	69.5	69.5	69.2	68.9	69.3	69.3	69.0	4.1
<b>Employment rate (15–74)</b>	55.8	54.7	54.9	56.2	57.6	58.0	57.9	57.2	56.6	57.1	58.1	2.2
<b>Unemployment rate (20–64)</b>	13.2	14.1	12.8	9.5	6.7	6.2	6.0	5.9	5.8	5.7	5.7	– 7.5
<b>Unemployment rate (15–74)</b>	13.5	14.4	13.0	9.7	6.8	6.3	6.0	5.8	5.8	5.8	5.8	– 7.7
<b>Employment (20–64) (million)</b>	1.8	1.7	1.8	1.9	2.1	2.2	2.2	2.2	2.2	2.3	2.4	0.7
<b>Employment (15–64) (million)</b>	1.8	1.8	1.8	2.0	2.1	2.2	2.3	2.3	2.3	2.4	2.5	0.7
Share of young (15–24) (%)	9	8	9	11	13	13	12	11	11	12	12	3
Share of prime age (25–54) (%)	78	77	73	71	69	67	68	72	74	72	70	– 8
Share of older (55–64) (%)	13	15	17	18	19	20	21	17	15	16	17	5
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	15.1	16.6	17.7	18.1	18.5	19.6	20.5	18.1	15.2	15.9	17.7	2.6
<b>Old-age dependency ratio (²)</b>	17	20	23	25	28	30	33	37	40	38	37	19
<b>Total dependency ratio (³)</b>	49	55	58	57	57	60	64	70	73	70	67	17
<b>Total economic dependency ratio (⁴)</b>	144	154	154	145	137	138	143	151	157	157	153	9
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	26	31	34	37	39	42	47	52	56	56	54	27
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	26	30	33	35	37	40	44	49	53	53	52	26

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## GREECE EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.52	1.54	1.55	1.56	1.57	1.58	1.59	1.61	1.62	1.63	1.64	0.1
<b>Life expectancy at birth</b>												
males	77.8	78.6	79.4	80.2	80.9	81.6	82.3	83.0	83.7	84.3	84.9	7.1
females	82.8	83.4	84.0	84.5	85.1	85.7	86.2	86.7	87.3	87.8	88.3	5.5
<b>Life expectancy at 65</b>												
males	17.9	18.4	18.9	19.4	19.9	20.4	20.8	21.3	21.7	22.2	22.6	4.7
females	20.2	20.7	21.1	21.6	22.0	22.5	22.9	23.3	23.8	24.2	24.6	4.4
<b>Net migration ('000)</b>	24.9	30.1	35.4	34.0	32.7	31.3	30.0	28.6	27.2	25.9	24.5	– 0.4
<b>Net migration as % of population</b>	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	– 0.0
<b>Population (million)</b>	11.3	11.5	11.5	11.6	11.6	11.6	11.6	11.6	11.6	11.4	11.3	– 0.0
Children population (0–14) as % of total population	14.4	14.8	14.8	14.1	13.4	13.1	13.2	13.5	13.7	13.6	13.5	– 0.9
Prime-age population (25–54) as % of total population	44.0	42.7	41.3	39.1	36.9	35.1	34.0	33.8	33.7	33.7	33.8	– 10.1
Working-age population (15–64) as % of total population	66.5	65.1	64.2	63.5	62.7	60.8	58.5	56.2	54.8	54.8	55.2	– 11.3
Elderly population (65 and over) as % of total population	19.1	20.1	21.1	22.4	23.9	26.1	28.3	30.3	31.5	31.6	31.2	12.2
Very elderly population (80 and over) as % of total population	4.8	5.9	6.5	6.4	7.0	7.7	8.7	9.7	11.0	12.3	13.4	8.6
Very elderly population (80 and over) as % of elderly population	25.2	29.5	31.0	28.7	29.3	29.5	30.8	31.8	35.0	39.0	43.0	17.8
Very elderly population (80 and over) as % of working age population	7.2	9.1	10.2	10.1	11.2	12.7	14.9	17.2	20.1	22.5	24.3	17.1
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	– 4.5	1.2	1.2	1.2	1.4	1.2	1.0	1.0	1.3	1.3	1.4	1.0
<b>Employment (growth rate)</b>	– 2.1	0.8	0.5	0.0	– 0.2	– 0.4	– 0.6	– 0.6	– 0.3	– 0.2	– 0.1	– 0.2
<b>Labour input : hours worked (growth rate)</b>	1.6	0.5	0.5	0.0	– 0.2	– 0.4	– 0.6	– 0.6	– 0.3	– 0.2	– 0.1	– 0.1
<b>Labour productivity per hour (growth rate)</b>	– 6.0	0.7	0.7	1.2	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.1
TFP (growth rate)	– 5.3	1.2	0.5	0.8	1.1	1.1	1.1	1.0	1.0	1.0	1.0	0.8
Capital deepening (contribution to labour productivity growth)	– 0.7	– 0.5	0.2	0.4	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.3
<b>GDP per capita (growth rate)</b>	– 8.0	1.0	1.1	1.1	1.4	1.2	1.0	1.1	1.4	1.6	1.7	1.0
<b>GDP per worker (growth rate)</b>	– 2.4	0.4	0.7	1.2	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.2
<b>GDP in 2010 prices (EUR million)</b>	230.2	231.4	248.6	263.4	280.9	299.7	316.6	333.1	352.6	376.4	403.1	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	6 965	6 920	6 847	6 735	6 657	6 490	6 267	6 006	5 802	5 720	5 676	– 1 289
<b>Population growth (20–64)</b>	4.3	– 0.1	– 0.3	– 0.4	– 0.3	– 0.6	– 0.8	– 0.9	– 0.5	– 0.2	– 0.1	– 4.5
<b>Labour force 20–64 ('000)</b>	5 102	5 198	5 228	5 169	5 077	4 967	4 824	4 671	4 566	4 514	4 474	– 628
<b>Participation rate (20–64)</b>	73.2	75.1	76.4	76.7	76.3	76.5	77.0	77.8	78.7	78.9	78.8	5.6
<b>Participation rate (15–64)</b>	68.4	70.3	71.3	71.1	70.6	71.1	71.6	72.2	72.8	72.7	72.6	4.2
young (15–24)	31.4	31.4	30.5	29.4	30.6	31.7	31.5	31.0	30.6	30.4	30.6	– 0.8
prime age (25–54)	83.5	85.2	85.8	86.0	86.0	85.9	85.8	85.9	86.0	86.0	85.9	2.4
older (55–64)	45.5	50.2	55.6	59.7	61.2	63.4	64.9	65.9	68.4	69.2	69.6	24.1
<b>Participation rate (15–64) FEMALES</b>	57.7	61.0	62.9	63.4	63.5	64.3	64.9	65.5	66.0	65.9	65.8	8.1
young (15–24)	28.0	28.2	27.6	26.4	27.5	28.5	28.4	27.9	27.5	27.3	27.5	– 0.5
prime age (25–54)	72.3	75.4	76.9	77.7	78.0	78.1	77.9	78.0	78.1	78.1	78.0	5.7
older (55–64)	31.4	38.7	45.5	50.5	52.8	55.4	57.7	58.9	60.9	61.6	61.9	30.5
<b>Participation rate (15–64) MALES</b>	78.8	79.4	79.4	78.5	77.6	77.8	78.2	78.9	79.6	79.6	79.4	0.6
young (15–24)	34.5	34.5	33.3	32.2	33.7	34.7	34.5	34.0	33.5	33.3	33.6	– 0.9
prime age (25–54)	94.2	94.6	94.3	94.1	93.9	93.8	93.9	94.1	94.1	94.1	94.0	– 0.3
older (55–64)	60.4	62.0	66.0	68.7	69.2	70.8	71.5	72.6	75.9	76.9	77.3	16.9

<b>Employment rate (20–64)</b>	64.1	65.2	68.4	70.0	70.2	70.8	71.3	72.2	73.1	73.3	73.2	9.2
<b>Employment rate (15–74)</b>	52.8	53.5	55.2	55.6	55.2	54.8	54.3	54.2	54.7	55.8	56.6	3.8
<b>Unemployment rate (20–64)</b>	12.5	13.2	10.4	8.7	7.9	7.5	7.3	7.2	7.2	7.1	7.1	– 5.4
<b>Unemployment rate (15–74)</b>	12.6	13.4	10.5	8.8	8.0	7.6	7.4	7.3	7.2	7.2	7.2	– 5.5
<b>Employment (20–64) (million)</b>	4.5	4.5	4.7	4.7	4.7	4.6	4.5	4.3	4.2	4.2	4.2	– 0.3
<b>Employment (15–64) (million)</b>	4.5	4.5	4.7	4.8	4.7	4.6	4.5	4.4	4.3	4.2	4.2	– 0.3
Share of young (15–24) (%)	6	5	5	5	6	6	6	6	6	6	7	1
Share of prime age (25–54) (%)	81	80	78	75	72	70	70	72	73	73	73	– 9
Share of older (55–64) (%)	13	15	17	20	22	24	24	22	21	21	21	8
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	18.2	19.4	20.7	22.5	24.2	25.4	25.4	23.3	21.6	20.9	20.8	2.6
<b>Old-age dependency ratio (²)</b>	29	31	33	35	38	43	48	54	58	58	57	28
<b>Total dependency ratio (³)</b>	50	54	56	57	59	65	71	78	83	82	81	31
<b>Total economic dependency ratio (⁴)</b>	148	149	142	140	142	147	154	161	166	166	165	17
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	46	50	50	53	57	64	71	79	84	84	82	36
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	46	49	50	52	56	63	70	77	82	82	81	35

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## SPAIN EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.40	1.42	1.43	1.45	1.46	1.48	1.50	1.51	1.53	1.54	1.56	0.2
<b>Life expectancy at birth</b>												
males	78.6	79.4	80.2	80.9	81.6	82.3	83.0	83.6	84.2	84.8	85.4	6.8
females	84.7	85.3	85.8	86.4	86.9	87.5	88.0	88.5	89.0	89.5	89.9	5.3
<b>Life expectancy at 65</b>												
males	18.2	18.7	19.2	19.7	20.2	20.7	21.1	21.6	22.0	22.5	22.9	4.7
females	22.1	22.6	23.0	23.4	23.9	24.3	24.7	25.1	25.5	25.9	26.3	4.1
<b>Net migration ('000)</b>	73.8	170.6	267.4	257.2	246.9	236.6	226.3	216.0	205.7	195.4	185.2	111.3
<b>Net migration as % of population</b>	0.2	0.4	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	0.2
<b>Population (million)</b>	46.1	47.0	48.1	49.1	50.1	51.0	51.8	52.4	52.7	52.6	52.2	6.2
Children population (0–14) as % of total population	15.0	15.4	14.8	13.7	12.8	12.6	12.8	13.0	13.1	12.9	12.7	– 2.3
Prime-age population (25–54) as % of total population	46.6	44.9	42.8	40.5	38.3	36.4	35.4	35.1	34.8	34.6	34.4	– 12.3
Working-age population (15–64) as % of total population	68.0	66.5	65.9	65.4	64.1	61.9	59.2	56.5	55.3	55.4	55.9	– 12.2
Elderly population (65 and over) as % of total population	17.0	18.1	19.2	20.9	23.1	25.5	28.0	30.4	31.6	31.7	31.4	14.4
Very elderly population (80 and over) as % of total population	5.0	5.7	5.9	6.2	6.9	7.6	8.7	10.1	11.5	13.0	14.3	9.4
Very elderly population (80 and over) as % of elderly population	29.2	31.5	30.6	29.8	29.9	30.0	31.1	33.1	36.4	41.0	45.6	16.4
Very elderly population (80 and over) as % of working age population	7.3	8.6	8.9	9.5	10.8	12.3	14.7	17.8	20.8	23.4	25.6	18.3
<b>Macroeconomic assumptions*</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>AVG 2010–60</b>
<b>Potential GDP (growth rate)</b>	– 0.1	2.6	2.2	2.7	2.1	1.4	1.1	1.0	1.3	1.5	1.6	1.6
<b>Employment (growth rate)</b>	– 2.3	1.2	1.6	1.6	0.5	– 0.2	– 0.5	– 0.5	– 0.3	– 0.1	0.0	0.2
<b>Labour input: hours worked (growth rate)</b>	– 1.7	0.9	1.6	1.6	0.5	– 0.2	– 0.5	– 0.5	– 0.3	– 0.1	0.0	0.2
<b>Labour productivity per hour (growth rate)</b>	1.6	1.7	0.7	1.1	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.4
TFP (growth rate)	– 0.0	0.9	0.4	0.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.8
Capital deepening (contribution to labour productivity growth)	1.6	0.8	0.2	0.4	0.6	0.6	0.6	0.6	0.6	0.5	0.5	0.5
<b>GDP per capita (growth rate)</b>	– 0.8	2.2	1.7	2.3	1.7	1.1	0.8	0.8	1.3	1.6	1.7	1.4
<b>GDP per worker (growth rate)</b>	2.2	1.4	0.6	1.1	1.6	1.6	1.6	1.6	1.6	1.6	1.5	1.4
<b>GDP in 2010 prices (EUR million)</b>	1 062.6	1 163.3	1 277.7	1 443.4	1 626.5	1 762.7	1 870.4	1 967.6	2 088.5	2 241.5	2 418.8	
<b>Labour force assumptions</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Population (20–64) ('000)</b>	29 119	29 058	29 252	29 480	29 522	29 201	28 408	27 382	26 806	26 681	26 707	– 2 412
<b>Population growth (20–64)</b>	0.1	0.0	0.2	0.1	– 0.0	– 0.3	– 0.7	– 0.7	– 0.2	– 0.0	0.0	– 0.1
<b>Labour force 20–64 ('000)</b>	22 624	23 220	23 786	24 204	24 330	24 097	23 433	22 653	22 243	22 133	22 126	– 498
<b>Participation rate (20–64)</b>	77.7	79.9	81.3	82.1	82.4	82.5	82.7	83.0	83.0	83.0	82.8	5.2
<b>Participation rate (15–64)</b>	73.4	75.5	76.3	76.7	77.2	77.7	77.7	77.7	77.7	77.4	77.3	3.9
young (15–24)	43.0	42.0	40.5	40.7	42.4	43.2	42.8	42.0	41.4	41.3	41.8	– 1.2
prime age (25–54)	85.5	87.0	87.8	88.2	88.2	88.0	87.9	88.0	88.0	88.0	87.9	2.4
older (55–64)	50.8	59.1	66.2	71.1	74.4	75.8	75.1	74.6	75.0	75.2	75.7	24.9
<b>Participation rate (15–64) FEMALES</b>	65.9	70.0	72.5	73.9	75.1	76.0	76.3	76.2	76.1	75.9	75.8	9.9
young (15–24)	40.2	39.0	37.7	37.8	39.5	40.3	39.9	39.1	38.6	38.5	38.9	– 1.3
prime age (25–54)	78.3	81.8	84.0	85.4	85.8	85.6	85.3	85.4	85.5	85.5	85.5	7.2
older (55–64)	38.5	51.2	62.4	68.5	73.4	76.8	77.5	77.1	77.2	77.5	77.8	39.3
<b>Participation rate (15–64) MALES</b>	80.8	80.8	80.0	79.4	79.3	79.2	79.1	79.2	79.2	78.9	78.8	– 2.0
young (15–24)	45.6	44.9	43.3	43.4	45.2	46.0	45.6	44.8	44.2	44.1	44.5	– 1.0
prime age (25–54)	92.5	92.0	91.5	90.9	90.5	90.3	90.4	90.5	90.4	90.3	90.2	– 2.3
older (55–64)	63.9	67.5	70.2	73.8	75.4	74.8	72.8	72.1	72.9	73.0	73.6	9.6

<b>Employment rate (20–64)</b>	62.6	64.6	67.9	72.2	75.4	76.1	76.4	76.8	77.1	77.1	77.1	14.5
<b>Employment rate (15–74)</b>	52.6	53.8	55.9	58.8	60.7	60.6	59.9	59.2	59.4	60.5	61.2	8.6
<b>Unemployment rate (20–64)</b>	19.5	19.2	16.5	12.1	8.5	7.8	7.4	7.2	7.1	7.0	7.0	– 12.5
<b>Unemployment rate (15–74)</b>	20.1	19.7	17.0	12.4	8.7	7.9	7.5	7.3	7.2	7.2	7.1	– 12.9
<b>Employment (20–64) (million)</b>	18.2	18.8	19.9	21.3	22.3	22.2	21.7	21.0	20.7	20.6	20.6	2.4
<b>Employment (15–64) (million)</b>	18.4	18.9	20.0	21.6	22.6	22.5	22.0	21.3	21.0	20.9	20.9	2.5
Share of young (15–24) (%)	7	6	6	7	8	8	8	8	8	8	9	2
Share of prime age (25–54) (%)	81	79	76	72	69	67	68	70	72	71	70	– 11
Share of older (55–64) (%)	12	15	18	21	23	25	24	22	20	20	21	9
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	16.1	17.7	19.9	21.7	23.5	25.1	24.5	22.2	20.7	20.4	21.1	5.0
<b>Old-age dependency ratio (²)</b>	25	27	29	32	36	41	47	54	57	57	56	31
<b>Total dependency ratio (³)</b>	47	50	52	53	56	61	69	77	81	81	79	32
<b>Total economic dependency ratio (⁴)</b>	149	146	137	124	117	120	129	138	144	145	144	– 5
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	42	44	45	46	49	55	63	72	76	77	76	34
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	41	44	44	45	48	54	61	69	74	75	74	33

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## FRANCE EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	:	:	:	:	:	:	:	:	:	:	:	:
<b>Life expectancy at birth</b>												
males	77.9	78.7	79.6	80.3	81.1	81.8	82.5	83.2	83.9	84.5	85.1	7.2
females	84.6	85.2	85.8	86.4	87.0	87.6	88.1	88.6	89.1	89.6	90.0	5.5
<b>Life expectancy at 65</b>												
males	18.5	19.0	19.5	19.9	20.4	20.8	21.3	21.7	22.1	22.6	23.0	4.5
females	22.7	23.1	23.6	24.0	24.4	24.8	25.2	25.5	25.9	26.3	26.6	3.9
<b>Net migration ('000)</b>	71.9	81.3	90.8	87.3	83.8	80.3	76.8	73.3	69.9	66.4	62.9	– 9.0
<b>Net migration as % of population</b>	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	– 0.0
<b>Population (million)</b>	64.9	66.5	68.0	69.2	70.4	71.4	72.3	72.8	73.2	73.5	73.7	8.9
Children population (0–14) as % of total population	18.5	18.3	18.1	17.7	17.3	17.0	16.8	16.8	16.7	16.6	16.4	– 2.1
Prime-age population (25–54) as % of total population	39.7	38.7	37.3	36.2	35.3	35.2	35.0	34.8	34.8	34.7	34.7	– 5.0
Working-age population (15–64) as % of total population	64.8	63.0	61.5	60.4	59.3	58.4	57.6	57.4	57.2	57.0	57.0	– 7.7
Elderly population (65 and over) as % of total population	16.7	18.7	20.3	21.8	23.4	24.6	25.6	25.8	26.1	26.5	26.6	9.9
Very elderly population (80 and over) as % of total population	5.3	5.9	6.0	6.1	7.5	8.6	9.4	10.1	10.7	11.1	11.0	5.7
Very elderly population (80 and over) as % of elderly population	31.9	31.6	29.7	28.1	32.0	34.9	36.9	39.4	40.9	41.8	41.5	9.6
Very elderly population (80 and over) as % of working age population	8.2	9.3	9.8	10.2	12.6	14.7	16.4	17.7	18.6	19.4	19.4	11.1
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	1.6	2.5	1.9	1.8	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.7
<b>Employment (growth rate)</b>	0.1	0.1	0.6	0.3	0.1	0.0	0.1	0.0	0.0	0.1	0.1	0.2
<b>Labour input: hours worked (growth rate)</b>	– 0.2	– 0.1	0.6	0.3	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.2
<b>Labour productivity per hour (growth rate)</b>	1.8	2.6	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6
TFP (growth rate)	1.1	1.8	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Capital deepening (contribution to labour productivity growth)	0.7	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<b>GDP per capita (growth rate)</b>	– 0.7	2.0	1.5	1.5	1.3	1.3	1.4	1.5	1.5	1.5	1.6	1.4
<b>GDP per worker (growth rate)</b>	1.5	2.4	1.3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
<b>GDP in 2010 prices (EUR million)</b>	1 947.6	2 176.5	2 391.1	2 631.0	2 859.3	3 092.0	3 351.4	3 629.5	3 923.4	4 243.3	4 597.0	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	38 084	37 914	37 790	37 701	37 589	37 541	37 490	37 731	37 782	37 749	37 923	– 161
<b>Population growth (20–64)</b>	2.5	– 0.2	0.0	– 0.1	– 0.1	– 0.0	0.1	0.0	0.0	– 0.0	0.1	– 2.3
<b>Labour force 20–64 ('000)</b>	28 977	29 253	29 916	30 365	30 328	30 311	30 435	30 563	30 584	30 618	30 752	1 775
<b>Participation rate (20–64)</b>	76.1	77.2	79.2	80.5	80.7	80.7	81.2	81.0	81.0	81.1	81.1	5.0
<b>Participation rate (15–64)</b>	70.4	71.3	73.1	74.1	74.2	74.3	74.7	74.6	74.6	74.7	74.7	4.2
young (15–24)	39.8	39.5	39.4	39.2	39.4	39.7	39.8	39.7	39.5	39.5	39.6	– 0.2
prime age (25–54)	88.9	89.4	89.6	89.7	89.7	89.6	89.6	89.6	89.7	89.7	89.7	0.7
older (55–64)	42.5	45.6	55.4	61.9	63.0	62.3	63.8	63.4	62.8	63.2	63.3	20.8
<b>Participation rate (15–64) FEMALES</b>	66.2	67.4	69.5	70.9	71.2	71.3	71.8	71.7	71.6	71.7	71.7	5.5
young (15–24)	36.1	35.6	35.4	35.3	35.6	35.7	35.8	35.7	35.5	35.5	35.6	– 0.5
prime age (25–54)	83.8	85.0	85.7	86.1	86.2	86.2	86.1	86.1	86.2	86.2	86.2	2.4
older (55–64)	40.1	43.0	52.9	59.9	61.7	61.3	63.0	62.6	62.1	62.5	62.8	22.7
<b>Participation rate (15–64) MALES</b>	74.8	75.2	76.7	77.4	77.2	77.2	77.7	77.6	77.5	77.5	77.5	2.7
young (15–24)	43.5	43.2	43.3	43.0	43.1	43.5	43.6	43.5	43.3	43.3	43.4	– 0.1
prime age (25–54)	94.2	93.8	93.5	93.3	93.2	93.1	93.0	93.0	93.0	93.0	93.0	– 1.2
older (55–64)	45.1	48.5	58.1	64.1	64.5	63.4	64.6	64.2	63.4	63.9	63.9	18.8



<b>Employment rate (20–64)</b>	69.3	70.7	73.1	74.7	74.9	75.1	75.5	75.4	75.3	75.5	75.5	6.2
<b>Employment rate (15–74)</b>	57.2	57.0	57.5	58.7	58.9	58.9	59.2	59.5	59.7	59.4	59.5	2.2
<b>Unemployment rate (20–64)</b>	9.0	8.4	7.7	7.3	7.1	7.0	7.0	7.0	7.0	7.0	6.9	– 2.0
<b>Unemployment rate (15–74)</b>	9.4	8.8	8.0	7.6	7.4	7.3	7.3	7.2	7.2	7.2	7.2	– 2.2
<b>Employment (20–64) (million)</b>	26.4	26.8	27.6	28.1	28.2	28.2	28.3	28.4	28.5	28.5	28.6	2.2
<b>Employment (15–64) (million)</b>	26.8	27.3	28.1	28.6	28.7	28.7	28.8	28.9	29.0	29.0	29.1	2.3
Share of young (15–24) (%)	9	9	9	9	9	10	9	9	9	9	9	– 0
Share of prime age (25–54) (%)	79	78	75	73	73	74	74	73	74	74	74	– 5
Share of older (55–64) (%)	12	13	16	18	18	17	17	17	17	17	17	5
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	19.5	19.7	20.2	20.6	20.5	19.7	19.3	19.9	19.7	19.4	19.5	0.1
<b>Old-age dependency ratio (²)</b>	26	30	33	36	39	42	44	45	46	46	47	21
<b>Total dependency ratio (³)</b>	54	59	62	65	69	71	74	74	75	75	75	21
<b>Total economic dependency ratio (⁴)</b>	141	142	140	139	141	144	146	147	148	149	148	8
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	40	45	48	51	55	59	62	63	64	65	65	25
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	40	44	48	51	54	58	61	62	63	64	64	24

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## ITALY EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.42	1.44	1.45	1.47	1.48	1.50	1.51	1.53	1.54	1.56	1.57	0.2
<b>Life expectancy at birth</b>												
males	78.9	79.7	80.4	81.1	81.8	82.4	83.1	83.7	84.3	84.9	85.5	6.6
females	84.2	84.8	85.4	86.0	86.6	87.2	87.7	88.2	88.8	89.3	89.7	5.6
<b>Life expectancy at 65</b>												
males	18.1	18.6	19.1	19.6	20.1	20.6	21.0	21.5	22.0	22.4	22.8	4.7
females	21.7	22.2	22.7	23.1	23.6	24.0	24.5	24.9	25.3	25.7	26.1	4.4
<b>Net migration ('000)</b>	360.7	352.4	344.1	330.8	317.6	304.4	291.1	277.9	264.7	251.4	238.2	– 122.5
<b>Net migration as % of population</b>	0.6	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4	– 0.2
<b>Population (million)</b>	60.5	61.9	63.0	63.8	64.6	65.2	65.7	66.0	65.9	65.5	64.9	4.4
Children population (0–14) as % of total population	14.1	13.9	13.5	12.9	12.6	12.5	12.5	12.6	12.6	12.5	12.5	– 1.6
Prime-age population (25–54) as % of total population	43.3	42.2	40.5	38.3	36.5	35.7	35.4	35.0	34.6	34.5	34.3	– 9.0
Working-age population (15–64) as % of total population	65.7	64.6	64.1	63.4	61.7	59.5	57.5	56.3	55.9	55.9	55.9	– 9.8
Elderly population (65 and over) as % of total population	20.3	21.5	22.4	23.7	25.7	28.0	30.0	31.1	31.5	31.6	31.6	11.4
Very elderly population (80 and over) as % of total population	5.9	6.5	7.2	7.5	8.3	8.8	9.7	11.1	12.6	13.8	14.1	8.2
Very elderly population (80 and over) as % of elderly population	28.9	30.4	32.2	31.6	32.1	31.5	32.2	35.6	39.9	43.5	44.6	15.6
Very elderly population (80 and over) as % of working age population	8.9	10.1	11.2	11.8	13.4	14.8	16.8	19.7	22.5	24.6	25.2	16.3
<b>Macroeconomic assumptions*</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>AVG 2010–60</b>
<b>Potential GDP (growth rate)</b>	1.3	1.4	1.3	1.6	1.3	1.2	1.2	1.3	1.4	1.5	1.4	1.3
<b>Employment (growth rate)</b>	– 0.7	0.6	0.5	0.1	– 0.2	– 0.4	– 0.3	– 0.2	– 0.1	– 0.1	– 0.2	– 0.0
<b>Labour input: hours worked (growth rate)</b>	– 0.4	0.5	0.5	0.1	– 0.2	– 0.3	– 0.3	– 0.2	– 0.1	– 0.1	– 0.2	– 0.0
<b>Labour productivity per hour (growth rate)</b>	1.7	0.8	0.9	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.3
TFP (growth rate)	1.3	0.6	0.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	0.9
Capital deepening (contribution to labour productivity growth)	0.4	0.2	0.3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<b>GDP per capita (growth rate)</b>	0.2	1.0	1.0	1.4	1.1	1.0	1.1	1.3	1.5	1.6	1.6	1.2
<b>GDP per worker (growth rate)</b>	2.0	0.8	0.9	1.5	1.5	1.6	1.6	1.5	1.5	1.5	1.5	1.4
<b>GDP in 2010 prices (EUR million)</b>	1 548.8	1 648.0	1 739.4	1 872.3	2 011.3	2 138.8	2 269.0	2 417.8	2 591.6	2 786.3	2 988.4	
<b>Labour force assumptions</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Population (20–64) ('000)</b>	36 792	37 050	37 344	37 347	36 822	35 930	34 918	34 268	33 939	33 670	33 366	– 3 426
<b>Population growth (20–64)</b>	1.0	0.1	0.1	– 0.1	– 0.4	– 0.5	– 0.6	– 0.3	– 0.2	– 0.2	– 0.1	– 1.1
<b>Labour force 20–64 ('000)</b>	24 453	25 173	25 651	25 689	25 283	24 750	24 248	23 962	23 808	23 647	23 446	– 1 007
<b>Participation rate (20–64)</b>	66.5	67.9	68.7	68.8	68.7	68.9	69.4	69.9	70.1	70.2	70.3	3.8
<b>Participation rate (15–64)</b>	62.2	63.6	64.2	64.2	64.1	64.4	64.8	65.2	65.3	65.3	65.3	3.1
young (15–24)	28.7	29.4	28.9	28.9	29.6	29.8	29.4	29.2	29.1	29.1	29.2	0.5
prime age (25–54)	76.9	76.9	76.8	76.6	76.3	76.1	76.1	76.2	76.2	76.2	76.1	– 0.8
older (55–64)	37.8	45.6	52.3	55.9	57.4	58.2	59.0	60.3	61.3	62.0	62.6	24.8
<b>Participation rate (15–64) FEMALES</b>	51.1	53.4	54.5	54.6	54.7	55.0	55.3	55.6	55.7	55.8	55.8	4.7
young (15–24)	23.5	24.0	23.5	23.5	24.0	24.2	23.9	23.7	23.6	23.6	23.7	0.2
prime age (25–54)	64.4	65.6	66.2	66.2	65.7	65.3	65.1	65.2	65.2	65.2	65.1	0.7
older (55–64)	26.8	35.1	42.0	45.5	47.8	49.5	50.6	51.7	52.7	53.4	54.1	27.3
<b>Participation rate (15–64) MALES</b>	73.3	73.8	73.8	73.6	73.3	73.5	74.0	74.3	74.4	74.3	74.3	0.9
young (15–24)	33.6	34.4	33.9	33.9	34.6	34.9	34.5	34.3	34.1	34.1	34.3	0.7
prime age (25–54)	89.4	88.2	87.3	86.7	86.4	86.3	86.5	86.5	86.5	86.4	86.4	– 3.0
older (55–64)	49.5	56.7	63.2	66.9	67.4	67.2	67.7	69.0	69.9	70.4	70.8	21.4

<b>Employment rate (20–64)</b>	61.1	63.2	63.9	64.0	63.9	64.1	64.6	65.1	65.3	65.4	65.4	4.4
<b>Employment rate (15–74)</b>	49.9	51.5	51.8	51.8	51.0	50.4	50.2	50.7	51.5	52.0	52.0	2.1
<b>Unemployment rate (20–64)</b>	8.1	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	6.9	– 1.2
<b>Unemployment rate (15–74)</b>	8.4	7.2	7.2	7.1	7.1	7.0	7.0	7.0	7.1	7.0	7.0	– 1.4
<b>Employment (20–64) (million)</b>	22.5	23.4	23.9	23.9	23.5	23.0	22.6	22.3	22.2	22.0	21.8	– 0.6
<b>Employment (15–64) (million)</b>	22.6	23.6	24.0	24.1	23.7	23.2	22.7	22.5	22.3	22.2	22.0	– 0.6
Share of young (15–24) (%)	6	6	6	6	6	6	6	6	6	6	6	0
Share of prime age (25–54) (%)	82	80	76	73	71	71	73	73	73	72	72	– 11
Share of older (55–64) (%)	12	14	18	22	23	23	22	21	21	22	22	10
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	18.8	19.3	21.6	23.8	24.8	24.2	22.6	21.8	21.8	21.9	22.1	3.3
<b>Old-age dependency ratio (²)</b>	31	33	35	37	42	47	52	55	56	57	57	26
<b>Total dependency ratio (³)</b>	52	55	56	58	62	68	74	78	79	79	79	27
<b>Total economic dependency ratio (⁴)</b>	164	159	157	158	163	170	177	182	184	184	183	20
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	53	55	57	60	66	75	82	87	89	89	89	36
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	52	54	56	59	64	72	79	84	86	86	86	34

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## CYPRUS EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.50	1.51	1.52	1.54	1.55	1.56	1.57	1.59	1.60	1.61	1.62	0.1
<b>Life expectancy at birth</b>												
males	78.3	79.1	79.9	80.6	81.3	82.0	82.7	83.3	83.9	84.5	85.1	6.8
females	82.8	83.5	84.2	84.8	85.4	86.1	86.7	87.3	87.9	88.4	89.0	6.2
<b>Life expectancy at 65</b>												
males	17.8	18.3	18.8	19.3	19.8	20.2	20.7	21.2	21.6	22.1	22.5	4.8
females	20.0	20.6	21.1	21.7	22.2	22.7	23.3	23.8	24.3	24.8	25.3	5.3
<b>Net migration ('000)</b>	2.2	4.1	6.0	5.7	5.5	5.3	5.0	4.8	4.6	4.4	4.1	1.9
<b>Net migration as % of population</b>	0.3	0.5	0.7	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.1
<b>Population (million)</b>	0.8	0.8	0.9	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	0.3
Children population (0–14) as % of total population	16.8	16.7	17.3	17.2	16.5	15.5	14.8	14.6	14.8	14.9	14.8	– 2.0
Prime-age population (25–54) as % of total population	43.9	43.3	43.1	42.7	41.7	40.6	39.2	38.1	37.0	36.4	36.2	– 7.7
Working-age population (15–64) as % of total population	70.0	68.3	66.1	64.4	63.8	64.0	63.9	62.8	60.7	59.0	57.6	– 12.4
Elderly population (65 and over) as % of total population	13.2	15.0	16.6	18.4	19.7	20.5	21.3	22.6	24.4	26.0	27.6	14.4
Very elderly population (80 and over) as % of total population	3.0	3.3	3.8	4.5	5.4	6.2	7.1	7.7	8.0	8.4	9.3	6.4
Very elderly population (80 and over) as % of elderly population	22.4	21.8	22.9	24.3	27.2	30.3	33.4	34.3	32.6	32.2	33.8	11.4
Very elderly population (80 and over) as % of working age population	4.2	4.8	5.8	6.9	8.4	9.7	11.2	12.3	13.1	14.2	16.2	11.9
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	1.0	1.5	1.8	1.9	2.4	2.3	2.2	1.8	1.6	1.4	1.5	1.8
<b>Employment (growth rate)</b>	– 0.3	0.3	1.0	0.7	0.7	0.6	0.5	0.1	– 0.1	– 0.2	– 0.1	0.4
<b>Labour input: hours worked (growth rate)</b>	– 0.2	0.1	1.0	0.7	0.7	0.6	0.5	0.1	– 0.1	– 0.2	– 0.0	0.5
<b>Labour productivity per hour (growth rate)</b>	1.3	1.4	0.8	1.2	1.7	1.7	1.7	1.7	1.6	1.6	1.5	1.4
TFP (growth rate)	0.1	0.6	0.5	0.8	1.1	1.1	1.1	1.1	1.1	1.0	1.0	0.9
Capital deepening (contribution to labour productivity growth)	1.2	0.8	0.3	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.5
<b>GDP per capita (growth rate)</b>	– 4.1	0.5	0.6	1.0	1.6	1.7	1.6	1.3	1.1	1.0	1.2	1.1
<b>GDP per worker (growth rate)</b>	1.3	1.3	0.8	1.2	1.7	1.7	1.7	1.7	1.6	1.6	1.5	1.4
<b>GDP in 2010 prices (EUR million)</b>	17.5	19.0	20.8	22.8	25.4	28.5	31.8	35.1	38.1	40.9	44.0	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	508	528	544	555	568	589	607	615	611	605	598	90
<b>Population growth (20–64)</b>	5.0	0.7	0.6	0.3	0.6	0.7	0.6	0.0	– 0.2	– 0.2	– 0.1	– 5.1
<b>Labour force 20–64 ('000)</b>	406	433	453	468	482	498	510	514	511	507	503	98
<b>Participation rate (20–64)</b>	79.9	82.0	83.2	84.4	84.8	84.6	84.1	83.6	83.7	83.8	84.2	4.3
<b>Participation rate (15–64)</b>	73.2	76.3	77.9	78.6	78.4	78.2	78.0	77.9	78.1	78.0	78.0	4.8
young (15–24)	42.0	45.3	44.7	41.5	41.0	42.0	42.9	43.5	43.3	42.4	41.9	– 0.1
prime age (25–54)	87.3	89.2	90.2	90.8	90.9	90.9	90.9	90.8	90.9	91.0	91.0	3.7
older (55–64)	59.6	63.1	64.3	66.6	68.8	70.0	70.3	69.1	69.2	68.7	68.8	9.2
<b>Participation rate (15–64) FEMALES</b>	66.6	71.2	74.1	75.6	76.1	76.2	76.0	75.7	75.7	75.8	75.9	9.3
young (15–24)	41.3	44.1	43.5	40.4	39.6	40.7	41.6	42.2	42.0	41.1	40.6	– 0.8
prime age (25–54)	81.0	85.0	87.5	88.8	89.3	89.5	89.4	89.4	89.4	89.5	89.5	8.6
older (55–64)	44.8	50.5	52.9	56.7	60.5	63.1	64.6	63.7	63.4	63.0	63.1	18.3
<b>Participation rate (15–64) MALES</b>	79.8	81.3	81.8	81.5	80.7	80.2	80.0	80.1	80.3	80.2	80.1	0.3
young (15–24)	42.6	46.5	45.8	42.6	42.3	43.3	44.1	44.7	44.5	43.6	43.2	0.6
prime age (25–54)	93.5	93.4	93.0	92.7	92.6	92.4	92.3	92.3	92.4	92.4	92.4	– 1.1
older (55–64)	75.1	76.1	75.5	76.1	76.5	76.3	75.8	74.8	75.2	74.4	74.4	– 0.7

<b>Employment rate (20–64)</b>	74.8	77.3	79.0	80.4	80.9	80.8	80.4	79.9	80.0	80.2	80.5	5.8
<b>Employment rate (15–74)</b>	63.1	65.2	66.7	66.9	66.8	67.0	67.1	66.4	65.5	64.6	64.5	1.4
<b>Unemployment rate (20–64)</b>	6.4	5.8	5.1	4.7	4.5	4.4	4.4	4.3	4.3	4.3	4.3	– 2.1
<b>Unemployment rate (15–74)</b>	6.6	5.9	5.1	4.7	4.6	4.5	4.4	4.4	4.3	4.3	4.3	– 2.3
<b>Employment (20–64) (million)</b>	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.1
<b>Employment (15–64) (million)</b>	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.1
Share of young (15–24) (%)	11	10	9	8	8	9	9	9	9	8	9	– 2
Share of prime age (25–54) (%)	76	75	76	77	76	74	72	71	72	73	74	– 2
Share of older (55–64) (%)	13	15	15	15	15	17	19	20	20	19	17	4
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	16.2	17.5	18.2	17.4	17.2	18.4	20.7	22.0	22.2	21.3	19.6	3.3
<b>Old-age dependency ratio (²)</b>	19	22	25	29	31	32	33	36	40	44	48	29
<b>Total dependency ratio (³)</b>	43	46	51	55	57	56	57	59	65	69	74	31
<b>Total economic dependency ratio (⁴)</b>	104	99	98	100	102	102	102	105	110	116	121	17
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	25	28	31	34	38	39	41	44	49	54	59	34
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	24	27	30	33	36	38	39	42	46	51	56	31

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## LATVIA EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.31	1.33	1.35	1.37	1.39	1.41	1.43	1.45	1.47	1.49	1.51	0.2
<b>Life expectancy at birth</b>												
males	68.3	69.8	71.2	72.6	74.0	75.3	76.6	77.8	78.9	80.0	81.1	12.8
females	78.0	79.1	80.1	81.1	82.1	83.1	83.9	84.8	85.6	86.4	87.2	9.2
<b>Life expectancy at 65</b>												
males	13.5	14.2	15.0	15.7	16.5	17.2	17.9	18.6	19.3	20.0	20.6	7.2
females	18.1	18.8	19.5	20.1	20.8	21.4	22.1	22.7	23.3	23.9	24.4	6.3
<b>Net migration ('000)</b>	– 4.4	– 3.1	– 1.8	– 1.2	– 0.6	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	4.4
<b>Net migration as % of population</b>	– 0.2	– 0.1	– 0.1	– 0.1	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	0.2
<b>Population (million)</b>	2.2	2.2	2.1	2.1	2.0	2.0	1.9	1.8	1.8	1.7	1.7	– 0.6
Children population (0–14) as % of total population	13.8	14.7	14.9	14.0	13.0	12.1	11.9	12.1	12.3	12.2	11.9	– 1.9
Prime-age population (25–54) as % of total population	43.1	43.9	43.1	41.2	39.4	38.6	36.6	33.8	32.5	33.0	33.0	– 10.1
Working-age population (15–64) as % of total population	68.9	67.3	65.9	64.8	63.8	63.0	61.3	59.3	56.6	53.5	52.5	– 16.4
Elderly population (65 and over) as % of total population	17.3	18.1	19.2	21.2	23.2	24.9	26.8	28.5	31.2	34.3	35.6	18.3
Very elderly population (80 and over) as % of total population	4.0	4.6	5.5	5.8	6.3	7.2	8.6	9.8	10.7	11.7	12.8	8.8
Very elderly population (80 and over) as % of elderly population	23.1	25.6	28.5	27.6	27.1	28.7	32.0	34.4	34.2	34.1	35.9	12.8
Very elderly population (80 and over) as % of working age population	5.8	6.9	8.3	9.0	9.9	11.4	14.0	16.6	18.8	21.9	24.4	18.5
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	– 0.3	2.2	1.9	2.5	1.9	1.5	1.3	0.6	0.3	0.5	0.6	1.4
<b>Employment (growth rate)</b>	– 4.8	– 1.3	0.1	0.5	– 0.4	– 0.8	– 1.0	– 1.4	– 1.6	– 1.2	– 1.0	– 0.8
<b>Labour input: hours worked (growth rate)</b>	– 5.5	– 1.7	0.1	0.5	– 0.4	– 0.8	– 1.0	– 1.4	– 1.6	– 1.2	– 1.0	– 0.8
<b>Labour productivity per hour (growth rate)</b>	5.4	3.9	1.9	2.1	2.3	2.3	2.3	2.1	1.9	1.7	1.5	2.2
TFP (growth rate)	3.0	1.8	1.2	1.3	1.5	1.5	1.5	1.3	1.2	1.1	1.0	1.4
Capital deepening (contribution to labour productivity growth)	2.4	2.1	0.7	0.7	0.8	0.8	0.8	0.7	0.7	0.6	0.5	0.8
<b>GDP per capita (growth rate)</b>	0.9	2.7	2.5	3.1	2.5	2.1	1.8	1.3	1.0	1.2	1.4	2.0
<b>GDP per worker (growth rate)</b>	4.6	3.5	1.9	2.1	2.3	2.3	2.3	2.1	1.9	1.7	1.6	2.2
<b>GDP in 2010 prices (EUR million)</b>	18.0	20.3	22.1	24.7	27.7	30.0	32.1	33.6	34.3	35.0	36.0	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	1 407	1 380	1 308	1 234	1 180	1 135	1 081	1 021	939	851	800	– 607
<b>Population growth (20–64)</b>	0.2	– 0.9	– 1.1	– 1.2	– 0.8	– 0.8	– 1.0	– 1.3	– 1.9	– 1.8	– 0.7	– 0.9
<b>Labour force 20–64 ('000)</b>	1 124	1 134	1 078	1 017	972	932	886	827	755	695	665	– 459
<b>Participation rate (20–64)</b>	79.9	82.1	82.4	82.4	82.4	82.1	81.9	81.0	80.5	81.7	83.1	3.3
<b>Participation rate (15–64)</b>	73.7	77.5	77.2	76.3	76.4	76.4	76.6	76.0	75.2	75.8	76.9	3.2
young (15–24)	42.2	44.9	37.1	36.0	38.9	39.5	40.6	40.1	38.8	38.1	38.5	– 3.7
prime age (25–54)	88.5	89.6	90.3	91.0	91.2	91.1	91.0	91.1	91.4	91.4	91.3	2.8
older (55–64)	57.1	62.9	62.3	61.8	63.2	63.3	64.8	64.4	61.4	60.3	64.7	7.5
<b>Participation rate (15–64) FEMALES</b>	70.9	74.9	74.6	73.7	73.9	73.9	74.1	73.6	73.0	73.7	74.8	3.8
young (15–24)	38.5	40.8	33.3	32.3	35.2	35.6	36.6	36.2	35.0	34.4	34.6	– 3.8
prime age (25–54)	85.8	87.3	88.3	89.2	89.6	89.7	89.6	89.7	90.1	90.2	90.0	4.2
older (55–64)	55.7	61.3	59.5	58.8	59.8	59.6	61.0	61.2	58.6	57.6	61.7	6.0
<b>Participation rate (15–64) MALES</b>	76.6	80.3	80.0	78.9	78.9	78.9	79.1	78.4	77.4	77.9	78.9	2.3
young (15–24)	45.7	48.8	40.6	39.5	42.5	43.3	44.5	44.0	42.5	41.8	42.2	– 3.6
prime age (25–54)	91.3	92.0	92.4	92.7	92.7	92.5	92.4	92.5	92.5	92.5	92.5	1.2
older (55–64)	59.0	64.8	65.9	65.3	67.0	67.4	68.8	67.8	64.4	63.0	67.6	8.6

<b>Employment rate (20–64)</b>	65.1	66.4	67.6	71.7	75.3	75.7	75.8	75.1	74.6	75.9	77.2	12.1
<b>Employment rate (15–74)</b>	53.5	56.2	57.1	59.0	61.3	61.6	61.8	60.9	59.4	58.2	59.1	5.6
<b>Unemployment rate (20–64)</b>	18.4	19.1	18.0	12.9	8.6	7.9	7.5	7.3	7.2	7.2	7.1	– 11.3
<b>Unemployment rate (15–74)</b>	18.7	19.2	17.9	12.9	8.5	7.8	7.4	7.2	7.1	6.9	6.9	– 11.7
<b>Employment (20–64) (million)</b>	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.6	0.6	– 0.3
<b>Employment (15–64) (million)</b>	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.6	– 0.3
Share of young (15–24) (%)	10	7	5	6	8	8	8	7	7	8	8	– 2
Share of prime age (25–54) (%)	77	77	77	76	74	73	71	68	70	75	75	– 2
Share of older (55–64) (%)	14	16	17	17	18	19	21	24	23	18	17	4
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	16.8	19.2	20.9	20.8	21.2	22.2	24.6	28.3	27.6	22.1	20.1	3.3
<b>Old-age dependency ratio (²)</b>	25	27	29	33	36	40	44	48	55	64	68	43
<b>Total dependency ratio (³)</b>	45	49	52	54	57	59	63	69	77	87	91	45
<b>Total economic dependency ratio (⁴)</b>	138	132	131	122	114	115	119	126	137	146	149	12
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	40	40	42	44	47	51	56	62	72	83	88	48
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	39	39	40	42	45	49	53	59	67	76	82	43

## LEGEND:

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## LITHUANIA EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.55	1.56	1.57	1.58	1.59	1.60	1.61	1.62	1.63	1.65	1.66	0.1
<b>Life expectancy at birth</b>												
males	67.7	69.2	70.7	72.1	73.5	74.8	76.1	77.3	78.5	79.6	80.7	12.9
females	78.7	79.6	80.6	81.5	82.4	83.2	84.0	84.8	85.6	86.3	87.1	8.4
<b>Life expectancy at 65</b>												
males	13.5	14.3	15.0	15.7	16.4	17.1	17.8	18.5	19.1	19.8	20.4	6.9
females	18.4	19.0	19.6	20.2	20.8	21.4	22.0	22.6	23.1	23.7	24.2	5.8
<b>Net migration ('000)</b>	– 14.8	– 11.1	– 7.5	– 5.0	– 2.5	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	14.8
<b>Net migration as % of population</b>	– 0.4	– 0.3	– 0.2	– 0.2	– 0.1	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	0.4
<b>Population (million)</b>	3.3	3.2	3.2	3.1	3.0	3.0	2.9	2.9	2.8	2.7	2.7	– 0.7
Children population (0–14) as % of total population	15.0	15.3	16.3	16.2	15.1	13.8	13.3	13.5	14.0	14.1	13.7	– 1.2
Prime-age population (25–54) as % of total population	43.1	43.1	42.0	40.2	38.3	37.7	36.9	35.3	34.2	34.1	34.5	– 8.6
Working-age population (15–64) as % of total population	68.9	68.0	66.0	64.0	62.7	62.0	61.1	60.0	58.2	56.0	55.0	– 13.8
Elderly population (65 and over) as % of total population	16.1	16.7	17.7	19.8	22.3	24.2	25.6	26.4	27.8	29.9	31.2	15.1
Very elderly population (80 and over) as % of total population	3.7	4.4	4.9	5.3	5.6	6.4	7.8	9.3	10.2	10.6	10.8	7.1
Very elderly population (80 and over) as % of elderly population	23.0	26.3	27.8	26.6	25.2	26.3	30.6	35.3	36.5	35.5	34.7	11.6
Very elderly population (80 and over) as % of working age population	5.4	6.5	7.5	8.2	9.0	10.3	12.8	15.5	17.5	18.9	19.7	14.3
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	1.3	1.8	1.5	2.0	1.7	1.7	1.7	1.3	0.7	0.6	0.8	1.5
<b>Employment (growth rate)</b>	– 5.1	– 2.8	– 0.0	0.1	– 0.5	– 0.5	– 0.5	– 0.7	– 1.1	– 1.1	– 0.7	– 0.7
<b>Labour input: hours worked (growth rate)</b>	– 4.1	– 2.2	– 0.0	0.1	– 0.5	– 0.5	– 0.5	– 0.7	– 1.1	– 1.1	– 0.7	– 0.5
<b>Labour productivity per hour (growth rate)</b>	5.6	4.0	1.5	1.9	2.2	2.2	2.2	2.0	1.9	1.7	1.5	2.0
TFP (growth rate)	3.2	2.0	1.0	1.2	1.4	1.4	1.4	1.3	1.2	1.1	1.0	1.3
Capital deepening (contribution to labour productivity growth)	2.4	2.0	0.5	0.6	0.8	0.8	0.8	0.7	0.7	0.6	0.5	0.8
<b>GDP per capita (growth rate)</b>	2.4	2.2	1.9	2.4	2.1	2.1	2.1	1.7	1.2	1.1	1.4	1.9
<b>GDP per worker (growth rate)</b>	6.8	4.7	1.6	1.9	2.2	2.2	2.2	2.0	1.9	1.7	1.6	2.2
<b>GDP in 2010 prices (EUR million)</b>	27.4	31.6	33.7	36.7	40.2	43.5	47.4	51.0	53.4	55.1	57.0	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	2 054	2 026	1 948	1 827	1 725	1 669	1 629	1 586	1 506	1 405	1 334	– 719
<b>Population growth (20–64)</b>	– 0.1	– 0.7	– 0.9	– 1.4	– 0.8	– 0.6	– 0.4	– 0.7	– 1.3	– 1.3	– 0.6	– 0.5
<b>Labour force 20–64 ('000)</b>	1 613	1 600	1 542	1 456	1 376	1 327	1 294	1 256	1 189	1 115	1 066	– 547
<b>Participation rate (20–64)</b>	78.5	79.0	79.2	79.7	79.8	79.5	79.5	79.2	78.9	79.3	79.9	1.4
<b>Participation rate (15–64)</b>	71.0	73.0	73.9	73.5	72.7	72.5	73.0	73.4	73.2	73.0	73.0	2.0
young (15–24)	31.3	34.1	32.2	28.2	27.9	30.3	31.6	32.1	30.9	29.5	29.4	– 2.0
prime age (25–54)	88.5	88.0	87.9	87.9	87.9	87.5	87.3	87.4	87.7	87.8	87.6	– 0.8
older (55–64)	56.5	60.1	62.1	64.3	66.5	66.7	68.1	67.8	66.1	65.3	66.1	9.7
<b>Participation rate (15–64) FEMALES</b>	69.1	70.8	71.7	71.8	71.5	71.2	71.6	71.9	71.6	71.5	71.5	2.4
young (15–24)	27.7	30.4	28.6	24.9	24.6	26.7	28.0	28.4	27.4	26.0	25.9	– 1.7
prime age (25–54)	87.8	87.0	86.9	87.0	87.1	86.7	86.1	86.2	86.5	86.7	86.6	– 1.2
older (55–64)	51.9	55.3	57.6	61.5	65.4	65.6	67.3	67.0	65.1	64.2	65.1	13.3
<b>Participation rate (15–64) MALES</b>	73.0	75.3	76.3	75.3	74.0	73.8	74.5	74.8	74.7	74.4	74.3	1.4
young (15–24)	34.9	37.6	35.7	31.3	31.0	33.6	35.1	35.5	34.3	32.7	32.6	– 2.2
prime age (25–54)	89.2	89.0	88.8	88.8	88.7	88.3	88.4	88.6	88.8	88.8	88.6	– 0.5
older (55–64)	62.6	66.3	67.8	67.7	67.8	68.0	69.0	68.7	67.3	66.4	67.2	4.6



<b>Employment rate (20–64)</b>	64.6	65.3	66.1	70.0	73.0	73.3	73.5	73.4	73.2	73.6	74.2	9.6
<b>Employment rate (15–74)</b>	52.3	54.2	55.1	56.4	57.0	57.0	57.9	58.5	57.8	56.1	55.7	3.4
<b>Unemployment rate (20–64)</b>	17.8	17.3	16.5	12.2	8.4	7.8	7.5	7.3	7.3	7.2	7.2	– 10.6
<b>Unemployment rate (15–74)</b>	17.9	17.3	16.4	12.1	8.4	7.7	7.4	7.3	7.2	7.1	7.1	– 10.8
<b>Employment (20–64) (million)</b>	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.0	1.0	– 0.3
<b>Employment (15–64) (million)</b>	1.3	1.3	1.3	1.3	1.3	1.2	1.2	1.2	1.1	1.0	1.0	– 0.3
Share of young (15–24) (%)	8	7	5	5	6	7	7	7	6	6	7	– 1
Share of prime age (25–54) (%)	79	77	76	75	74	74	72	70	70	73	75	– 4
Share of older (55–64) (%)	13	16	19	20	20	19	20	23	23	21	18	5
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	15.6	18.3	21.2	21.8	21.1	20.2	21.4	24.5	25.3	22.5	19.2	3.6
<b>Old-age dependency ratio (²)</b>	23	25	27	31	36	39	42	44	48	53	57	33
<b>Total dependency ratio (³)</b>	45	47	52	56	60	61	64	67	72	78	82	37
<b>Total economic dependency ratio (⁴)</b>	146	141	141	137	133	135	136	139	146	154	159	14
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	39	39	42	46	51	56	59	62	67	75	80	42
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	38	39	41	44	49	54	58	60	65	72	77	39

## LEGEND:

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## LUXEMBOURG EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.59	1.60	1.61	1.62	1.63	1.64	1.65	1.65	1.66	1.67	1.68	0.1
<b>Life expectancy at birth</b>												
males	77.8	78.6	79.4	80.1	80.9	81.6	82.3	83.0	83.6	84.3	84.9	7.1
females	82.9	83.7	84.4	85.1	85.8	86.5	87.1	87.7	88.3	88.9	89.5	6.6
<b>Life expectancy at 65</b>												
males	17.3	17.9	18.4	18.9	19.5	20.0	20.5	21.0	21.4	21.9	22.4	5.0
females	21.1	21.7	22.2	22.8	23.3	23.8	24.3	24.7	25.2	25.6	26.1	4.9
<b>Net migration ('000)</b>	6.3	5.0	3.7	3.6	3.4	3.3	3.1	3.0	2.8	2.7	2.6	– 3.8
<b>Net migration as % of population</b>	1.2	0.9	0.6	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.4	– 0.9
<b>Population (million)</b>	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.2
Children population (0–14) as % of total population	17.7	17.0	16.7	16.5	16.1	15.7	15.4	15.2	15.1	15.1	15.1	– 2.5
Prime-age population (25–54) as % of total population	45.5	44.6	43.3	41.7	40.4	39.3	38.3	37.6	37.0	36.6	36.4	– 9.2
Working-age population (15–64) as % of total population	68.4	68.4	67.6	66.1	64.3	62.7	61.6	60.7	59.7	59.0	58.5	– 9.9
Elderly population (65 and over) as % of total population	14.0	14.7	15.8	17.4	19.6	21.6	23.0	24.2	25.2	25.8	26.4	12.5
Very elderly population (80 and over) as % of total population	3.7	4.1	4.3	4.5	5.0	5.9	6.9	8.1	9.2	9.8	10.2	6.5
Very elderly population (80 and over) as % of elderly population	26.6	28.1	27.3	25.5	25.7	27.1	30.0	33.7	36.5	37.8	38.7	12.1
Very elderly population (80 and over) as % of working age population	5.4	6.0	6.4	6.7	7.8	9.3	11.2	13.4	15.4	16.5	17.5	12.0
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	3.5	3.7	2.0	2.0	1.9	2.0	2.0	2.1	2.0	1.9	1.8	2.2
<b>Employment (growth rate)</b>	1.6	2.1	0.7	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.3	0.7
<b>Labour input : hours worked (growth rate)</b>	1.5	1.5	0.7	0.4	0.4	0.5	0.5	0.5	0.5	0.4	0.3	0.7
<b>Labour productivity per hour (growth rate)</b>	2.0	2.2	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6
TFP (growth rate)	1.6	1.3	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Capital deepening (contribution to labour productivity growth)	0.3	0.9	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6
<b>GDP per capita (growth rate)</b>	0.8	2.4	1.0	1.1	1.1	1.3	1.5	1.6	1.6	1.6	1.5	1.4
<b>GDP per worker (growth rate)</b>	1.9	1.6	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
<b>GDP in 2010 prices (EUR million)</b>	41.6	49.6	56.3	62.1	68.4	75.4	83.4	92.3	102.1	112.4	123.2	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	316	341	357	366	371	374	378	383	385	388	389	73
<b>Population growth (20–64)</b>	5.0	1.3	0.8	0.4	0.1	0.2	0.3	0.2	0.2	0.1	0.1	– 5.0
<b>Labour force 20–64 ('000)</b>	232	252	263	268	271	274	277	279	281	283	284	52
<b>Participation rate (20–64)</b>	73.5	73.9	73.6	73.2	73.1	73.3	73.1	72.9	72.9	72.9	73.0	– 0.5
<b>Participation rate (15–64)</b>	67.9	68.4	68.4	68.0	67.8	67.8	67.6	67.4	67.5	67.5	67.5	– 0.4
young (15–24)	25.3	28.5	28.9	28.6	28.3	28.3	28.5	28.6	28.6	28.6	28.4	3.2
prime age (25–54)	85.7	86.5	86.6	87.0	87.0	86.9	86.8	86.9	86.9	86.9	86.9	1.2
older (55–64)	40.1	40.2	42.1	41.5	41.1	42.2	42.4	41.8	42.0	41.8	41.6	1.5
<b>Participation rate (15–64) FEMALES</b>	60.0	62.6	63.5	63.7	63.6	63.7	63.6	63.4	63.4	63.3	63.3	3.3
young (15–24)	23.1	28.4	28.9	28.5	28.1	28.2	28.3	28.4	28.5	28.4	28.3	5.2
prime age (25–54)	76.4	78.5	79.4	80.1	80.2	80.1	80.0	80.0	80.0	80.1	80.1	3.6
older (55–64)	31.4	36.4	40.2	40.7	41.3	42.8	43.0	42.4	42.6	42.3	42.0	10.7
<b>Participation rate (15–64) MALES</b>	75.6	74.0	73.1	72.3	71.9	71.9	71.6	71.4	71.6	71.6	71.6	– 4.0
young (15–24)	27.4	28.6	28.9	28.8	28.4	28.5	28.6	28.7	28.8	28.7	28.6	1.2
prime age (25–54)	94.8	94.3	93.8	93.8	93.8	93.8	93.7	93.7	93.7	93.7	93.7	– 1.1
older (55–64)	48.5	43.9	43.9	42.2	40.8	41.6	41.7	41.2	41.5	41.2	41.1	– 7.4

<b>Employment rate (20–64)</b>	70.4	70.5	70.4	70.1	70.1	70.3	70.1	69.9	70.0	70.0	70.1	– 0.3
<b>Employment rate (15–74)</b>	59.0	58.7	58.1	57.0	55.9	55.2	55.0	55.0	54.8	54.6	54.6	– 4.4
<b>Unemployment rate (20–64)</b>	4.3	4.6	4.3	4.2	4.1	4.1	4.1	4.0	4.0	4.0	4.0	– 0.2
<b>Unemployment rate (15–74)</b>	4.4	4.8	4.5	4.3	4.3	4.2	4.2	4.2	4.2	4.2	4.2	– 0.2
<b>Employment (20–64) (million)</b>	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1
<b>Employment (15–64) (million)</b>	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.1
Share of young (15–24) (%)	6	7	6	6	6	7	7	7	7	7	7	1
Share of prime age (25–54) (%)	85	83	82	81	81	81	80	80	80	80	81	– 4
Share of older (55–64) (%)	10	10	12	13	13	13	13	13	13	13	13	3
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	16.0	17.2	19.1	20.4	20.3	20.0	20.3	20.4	20.4	20.4	20.1	4.1
<b>Old-age dependency ratio (²)</b>	20	21	23	26	30	34	37	40	42	44	45	25
<b>Total dependency ratio (³)</b>	46	46	48	51	55	60	62	65	67	69	71	25
<b>Total economic dependency ratio (⁴)</b>	124	124	126	131	138	144	149	154	157	161	163	39
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	31	32	35	40	46	52	57	61	65	67	69	39
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	30	32	35	40	46	52	57	61	64	67	69	38

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## HUNGARY EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.32	1.34	1.36	1.38	1.40	1.42	1.44	1.46	1.47	1.49	1.51	0.2
<b>Life expectancy at birth</b>												
males	70.4	71.8	73.0	74.3	75.5	76.7	77.8	78.9	80.0	81.0	81.9	11.5
females	78.4	79.5	80.5	81.5	82.4	83.3	84.2	85.0	85.9	86.6	87.4	9.0
<b>Life expectancy at 65</b>												
males	14.0	14.8	15.5	16.2	16.9	17.7	18.3	19.0	19.7	20.3	20.9	6.9
females	18.1	18.8	19.5	20.2	20.9	21.5	22.2	22.8	23.4	24.0	24.6	6.4
<b>Net migration ('000)</b>	21.6	21.8	21.9	21.1	20.2	19.4	18.5	17.7	16.8	16.0	15.2	– 6.5
<b>Net migration as % of population</b>	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	– 0.0
<b>Population (million)</b>	10.0	10.0	9.9	9.8	9.7	9.6	9.4	9.3	9.2	9.0	8.8	– 1.2
Children population (0–14) as % of total population	14.7	14.6	14.4	13.9	13.3	12.8	12.6	12.5	12.5	12.5	12.3	– 2.4
Prime-age population (25–54) as % of total population	42.8	42.7	43.5	42.6	40.8	38.5	37.4	36.2	35.1	34.6	34.2	– 8.6
Working-age population (15–64) as % of total population	68.6	67.5	65.6	64.8	64.9	64.1	62.4	59.7	58.1	56.6	55.5	– 13.2
Elderly population (65 and over) as % of total population	16.7	17.9	20.0	21.3	21.8	23.1	25.1	27.8	29.4	30.9	32.2	15.5
Very elderly population (80 and over) as % of total population	4.0	4.4	4.8	5.4	6.3	7.6	8.3	8.4	9.1	10.7	12.7	8.7
Very elderly population (80 and over) as % of elderly population	24.0	24.7	23.9	25.4	28.8	33.1	33.2	30.1	31.1	34.6	39.4	15.4
Very elderly population (80 and over) as % of working age population	5.8	6.5	7.3	8.4	9.7	11.9	13.3	14.0	15.8	18.9	22.9	17.1
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	1.2	0.7	1.4	1.9	1.9	1.4	1.2	1.0	0.9	0.9	0.9	1.3
<b>Employment (growth rate)</b>	0.2	– 1.8	0.5	0.3	– 0.3	– 0.7	– 1.0	– 1.0	– 0.9	– 0.8	– 0.7	– 0.5
<b>Labour input : hours worked (growth rate)</b>	– 0.2	– 1.9	0.5	0.3	– 0.3	– 0.7	– 1.0	– 1.0	– 0.9	– 0.8	– 0.7	– 0.5
<b>Labour productivity per hour (growth rate)</b>	1.3	2.6	0.9	1.5	2.1	2.1	2.1	2.0	1.8	1.7	1.5	1.7
TFP (growth rate)	0.3	1.0	0.6	1.0	1.4	1.4	1.4	1.3	1.2	1.1	1.0	1.1
Capital deepening (contribution to labour productivity growth)	1.0	1.6	0.3	0.5	0.7	0.7	0.8	0.7	0.6	0.6	0.5	0.7
<b>GDP per capita (growth rate)</b>	– 0.6	0.8	1.5	2.1	2.1	1.7	1.4	1.3	1.2	1.2	1.3	1.5
<b>GDP per worker (growth rate)</b>	1.0	2.5	0.9	1.5	2.1	2.1	2.1	2.0	1.9	1.7	1.6	1.7
<b>GDP in 2010 prices (EUR million)</b>	98.4	105.6	112.2	122.0	134.0	144.8	154.2	162.6	170.6	178.3	185.9	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	6 273	6 218	6 005	5 857	5 802	5 668	5 443	5 141	4 921	4 707	4 511	– 1 762
<b>Population growth (20–64)</b>	1.5	– 0.4	– 0.9	– 0.3	– 0.2	– 0.6	– 1.2	– 1.0	– 0.9	– 0.9	– 0.7	– 2.3
<b>Labour force 20–64 ('000)</b>	4 264	4 356	4 385	4 357	4 273	4 122	3 922	3 719	3 556	3 404	3 275	– 989
<b>Participation rate (20–64)</b>	68.0	70.1	73.0	74.4	73.6	72.7	72.1	72.3	72.3	72.3	72.6	4.6
<b>Participation rate (15–64)</b>	62.4	65.1	67.8	68.8	68.2	67.5	67.0	67.2	67.1	67.0	67.1	4.7
young (15–24)	25.7	27.4	25.9	25.1	25.6	25.9	26.0	26.1	25.8	25.4	25.3	– 0.4
prime age (25–54)	81.0	81.8	81.8	81.6	81.4	81.2	80.9	80.9	81.0	81.0	81.0	0.0
older (55–64)	37.1	43.9	52.8	60.8	61.3	60.7	59.0	59.5	59.2	58.5	59.1	22.0
<b>Participation rate (15–64) FEMALES</b>	56.5	59.6	62.8	64.1	63.7	63.0	62.5	62.7	62.6	62.4	62.6	6.0
young (15–24)	22.6	24.0	22.7	22.0	22.4	22.7	22.7	22.9	22.6	22.2	22.2	– 0.4
prime age (25–54)	74.6	75.5	75.6	75.6	75.6	75.5	75.0	74.9	74.9	75.0	75.1	0.5
older (55–64)	32.2	40.7	51.1	59.5	59.4	58.3	57.3	58.1	57.6	56.8	57.5	25.3
<b>Participation rate (15–64) MALES</b>	68.4	70.7	72.8	73.5	72.7	72.0	71.4	71.6	71.6	71.4	71.5	3.1
young (15–24)	28.7	30.6	29.0	28.1	28.6	29.0	29.0	29.2	28.8	28.4	28.4	– 0.4
prime age (25–54)	87.4	88.1	87.8	87.5	87.0	86.7	86.7	86.8	86.9	86.9	86.8	– 0.6
older (55–64)	43.0	47.6	54.7	62.3	63.4	63.2	60.8	60.9	60.8	60.1	60.8	17.7

<b>Employment rate (20–64)</b>	60.4	61.9	64.8	67.4	67.9	67.3	66.8	67.1	67.1	67.1	67.4	7.0
<b>Employment rate (15–74)</b>	49.2	50.3	51.8	53.6	55.2	54.7	53.1	51.8	51.4	51.7	51.6	2.4
<b>Unemployment rate (20–64)</b>	11.1	11.6	11.2	9.4	7.7	7.5	7.3	7.3	7.2	7.2	7.2	– 3.9
<b>Unemployment rate (15–74)</b>	11.2	11.7	11.3	9.4	7.7	7.4	7.2	7.1	7.1	7.1	7.1	– 4.1
<b>Employment (20–64) (million)</b>	3.8	3.9	3.9	3.9	3.9	3.8	3.6	3.4	3.3	3.2	3.0	– 0.8
<b>Employment (15–64) (million)</b>	3.8	3.9	3.9	4.0	4.0	3.8	3.6	3.5	3.3	3.2	3.0	– 0.8
Share of young (15–24) (%)	6	6	5	5	5	5	5	5	5	5	5	– 1
Share of prime age (25–54) (%)	82	80	80	78	75	72	72	73	73	74	75	– 7
Share of older (55–64) (%)	12	14	15	17	20	22	22	22	22	21	20	8
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	19.6	20.1	18.1	18.3	21.1	24.2	24.5	23.6	24.0	23.0	21.9	2.3
<b>Old-age dependency ratio (²)</b>	24	26	30	33	34	36	40	47	51	55	58	34
<b>Total dependency ratio (³)</b>	46	48	52	54	54	56	60	67	72	77	80	35
<b>Total economic dependency ratio (⁴)</b>	161	156	151	144	141	144	152	161	169	176	182	21
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	43	45	50	51	52	55	62	72	78	85	90	47
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	43	45	49	50	51	54	60	69	76	83	88	45

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## MALTA EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.44	1.45	1.47	1.48	1.50	1.51	1.53	1.54	1.56	1.57	1.59	0.1
<b>Life expectancy at birth</b>												
males	77.6	78.5	79.3	80.1	80.8	81.6	82.3	83.0	83.6	84.3	84.9	7.3
females	82.3	83.1	83.8	84.6	85.3	85.9	86.6	87.2	87.8	88.4	88.9	6.6
<b>Life expectancy at 65</b>												
males	17.0	17.6	18.1	18.7	19.2	19.7	20.3	20.8	21.3	21.8	22.2	5.2
females	20.2	20.7	21.3	21.8	22.4	22.9	23.4	23.9	24.4	24.9	25.4	5.2
<b>Net migration ('000)</b>	– 1.4	– 0.5	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	1.6
<b>Net migration as % of population</b>	– 0.3	– 0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.4
<b>Population (million)</b>	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	– 0.0
Children population (0–14) as % of total population	15.5	14.9	15.0	14.7	14.1	13.4	12.9	12.8	13.0	13.1	13.1	– 2.5
Prime-age population (25–54) as % of total population	41.4	40.6	40.5	40.8	40.1	39.0	37.9	36.6	35.4	34.7	34.6	– 6.8
Working-age population (15–64) as % of total population	69.4	66.7	64.3	62.4	61.7	62.1	62.0	60.9	59.3	57.3	55.8	– 13.6
Elderly population (65 and over) as % of total population	15.1	18.4	20.7	22.9	24.2	24.5	25.1	26.3	27.8	29.6	31.2	16.1
Very elderly population (80 and over) as % of total population	3.4	4.0	4.7	5.5	7.4	8.6	9.6	10.0	9.7	10.1	11.3	7.9
Very elderly population (80 and over) as % of elderly population	22.3	21.9	22.8	24.0	30.7	35.1	38.3	37.8	34.8	34.1	36.3	14.0
Very elderly population (80 and over) as % of working age population	4.8	6.0	7.3	8.8	12.1	13.8	15.5	16.4	16.3	17.6	20.3	15.4
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	3.7	1.9	1.9	2.0	1.9	1.7	1.4	1.1	0.8	0.7	0.9	1.5
<b>Employment (growth rate)</b>	2.2	0.4	0.2	0.2	0.1	– 0.1	– 0.4	– 0.7	– 0.8	– 0.9	– 0.7	– 0.1
<b>Labour input: hours worked (growth rate)</b>	0.9	0.0	0.2	0.2	0.1	– 0.1	– 0.4	– 0.7	– 0.8	– 0.9	– 0.7	– 0.2
<b>Labour productivity per hour (growth rate)</b>	2.7	1.9	1.7	1.7	1.8	1.8	1.8	1.7	1.7	1.6	1.5	1.7
TFP (growth rate)	2.8	1.1	1.1	1.1	1.2	1.2	1.2	1.1	1.1	1.0	1.0	1.1
Capital deepening (contribution to labour productivity growth)	– 0.0	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6
<b>GDP per capita (growth rate)</b>	4.4	1.9	1.7	1.9	2.0	2.0	1.6	1.3	1.1	0.9	1.2	1.6
<b>GDP per worker (growth rate)</b>	1.4	1.5	1.6	1.7	1.8	1.8	1.8	1.8	1.7	1.6	1.5	1.7
<b>GDP in 2010 prices (EUR million)</b>	6.2	6.9	7.5	8.3	9.1	10.0	10.7	11.4	11.9	12.4	12.9	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	259	252	247	240	236	235	232	226	217	207	198	– 61
<b>Population growth (20–64)</b>	– 1.6	– 0.6	– 0.4	– 0.6	– 0.2	– 0.0	– 0.4	– 0.7	– 0.8	– 1.1	– 0.8	0.8
<b>Labour force 20–64 ('000)</b>	167	169	172	174	175	175	172	167	161	153	147	– 20
<b>Participation rate (20–64)</b>	64.3	67.3	69.7	72.5	74.3	74.4	74.1	74.0	73.9	73.9	74.3	10.0
<b>Participation rate (15–64)</b>	60.7	63.8	66.3	68.7	70.2	70.4	70.3	70.3	70.3	70.2	70.3	9.6
young (15–24)	51.9	53.7	53.4	51.0	51.0	51.5	52.1	52.6	52.5	51.8	51.5	– 0.3
prime age (25–54)	73.2	75.8	77.9	78.7	79.0	79.2	79.4	79.5	79.5	79.5	79.5	6.3
older (55–64)	32.6	37.0	41.1	48.6	56.5	59.2	58.8	59.3	59.3	58.6	58.5	26.0
<b>Participation rate (15–64) FEMALES</b>	43.0	47.6	51.0	54.1	56.3	57.0	57.0	57.0	57.0	56.9	57.2	14.2
young (15–24)	48.8	50.3	49.7	48.0	47.7	48.4	48.9	49.4	49.2	48.6	48.2	– 0.6
prime age (25–54)	51.1	56.9	61.2	63.0	63.5	63.9	64.2	64.3	64.3	64.3	64.2	13.1
older (55–64)	14.3	18.4	21.3	28.9	39.2	43.8	44.0	44.3	44.4	43.7	44.0	29.6
<b>Participation rate (15–64) MALES</b>	77.7	79.3	81.0	82.6	83.4	83.0	82.7	82.7	82.6	82.4	82.4	4.7
young (15–24)	54.7	56.7	56.7	53.8	54.0	54.4	55.1	55.6	55.4	54.8	54.5	– 0.2
prime age (25–54)	94.4	94.0	93.8	93.5	93.4	93.3	93.2	93.3	93.4	93.5	93.4	– 1.0
older (55–64)	51.2	56.1	61.2	69.0	74.5	74.8	74.0	74.2	73.6	72.7	72.5	21.3

<b>Employment rate (20–64)</b>	60.4	63.1	65.4	68.1	69.8	70.0	69.7	69.6	69.5	69.5	69.9	9.5
<b>Employment rate (15–74)</b>	50.7	51.5	52.4	54.3	55.6	56.8	56.9	55.7	54.6	53.9	53.6	2.9
<b>Unemployment rate (20–64)</b>	6.0	6.2	6.1	6.1	6.0	6.0	6.0	6.0	6.0	6.0	6.0	–0.1
<b>Unemployment rate (15–74)</b>	6.9	6.9	6.8	6.7	6.6	6.6	6.6	6.6	6.6	6.6	6.6	–0.3
<b>Employment (20–64) (million)</b>	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	–0.0
<b>Employment (15–64) (million)</b>	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	–0.0
Share of young (15–24) (%)	16	15	13	11	11	12	12	11	11	11	12	–4
Share of prime age (25–54) (%)	73	73	74	75	74	71	69	68	68	69	70	–2
Share of older (55–64) (%)	11	12	13	13	15	18	19	20	21	20	18	7
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	20.3	20.3	20.2	18.2	18.0	20.3	22.0	23.4	24.1	23.1	21.0	0.7
<b>Old-age dependency ratio (²)</b>	22	28	32	37	39	39	40	43	47	52	56	34
<b>Total dependency ratio (³)</b>	44	50	55	60	62	61	61	64	69	74	79	35
<b>Total economic dependency ratio (⁴)</b>	152	150	149	148	145	142	143	147	153	162	168	16
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	37	45	51	56	59	59	60	64	70	77	83	46
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	37	45	51	56	58	58	60	63	69	76	82	45

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## NETHERLANDS EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.79	1.79	1.79	1.80	1.80	1.80	1.80	1.81	1.81	1.81	1.81	0.0
<b>Life expectancy at birth</b>												
males	78.7	79.4	80.1	80.8	81.5	82.1	82.8	83.4	84.0	84.6	85.2	6.5
females	82.8	83.5	84.2	84.9	85.5	86.2	86.8	87.4	88.0	88.5	89.1	6.3
<b>Life expectancy at 65</b>												
males	17.5	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.4	21.9	22.3	4.9
females	20.9	21.4	21.9	22.4	22.9	23.4	23.8	24.3	24.8	25.2	25.6	4.8
<b>Net migration ('000)</b>	35.5	20.5	5.6	5.3	5.1	4.9	4.7	4.5	4.3	4.1	3.8	–31.7
<b>Net migration as % of population</b>	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	–0.2
<b>Population (million)</b>	16.6	17.0	17.2	17.4	17.6	17.7	17.6	17.5	17.3	17.2	17.1	0.4
Children population (0–14) as % of total population	17.5	16.8	16.2	16.1	16.1	16.0	15.8	15.5	15.4	15.4	15.5	–2.0
Prime-age population (25–54) as % of total population	41.7	40.1	38.2	36.4	35.6	35.5	35.4	35.1	34.9	34.9	34.7	–7.0
Working-age population (15–64) as % of total population	67.0	65.3	63.9	61.9	59.6	57.8	57.2	57.5	57.8	57.6	57.3	–9.8
Elderly population (65 and over) as % of total population	15.4	17.9	19.9	22.0	24.3	26.2	27.0	27.0	26.9	27.0	27.2	11.8
Very elderly population (80 and over) as % of total population	4.0	4.4	4.9	5.6	7.1	8.2	9.2	10.4	11.3	11.5	11.1	7.1
Very elderly population (80 and over) as % of elderly population	25.6	24.3	24.3	25.4	29.4	31.2	34.0	38.5	42.2	42.7	40.8	15.1
Very elderly population (80 and over) as % of working age population	5.9	6.7	7.6	9.1	12.0	14.1	16.1	18.0	19.6	20.0	19.4	13.5
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	1.8	2.2	1.2	1.1	1.0	1.2	1.3	1.4	1.4	1.3	1.3	1.3
<b>Employment (growth rate)</b>	–0.5	0.4	–0.2	–0.5	–0.5	–0.3	–0.2	–0.2	–0.2	–0.2	–0.3	–0.2
<b>Labour input: hours worked (growth rate)</b>	–0.6	0.3	–0.3	–0.5	–0.5	–0.3	–0.2	–0.2	–0.2	–0.2	–0.3	–0.2
<b>Labour productivity per hour (growth rate)</b>	2.3	1.9	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6
TFP (growth rate)	1.8	1.4	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Capital deepening (contribution to labour productivity growth)	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<b>GDP per capita (growth rate)</b>	0.2	1.8	0.9	0.9	0.9	1.2	1.4	1.5	1.5	1.5	1.4	1.3
<b>GDP per worker (growth rate)</b>	2.3	1.8	1.4	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
<b>GDP in 2010 prices (EUR million)</b>	591.5	652.1	698.0	735.4	774.4	819.1	874.1	935.1	1 001.6	1 070.3	1 142.2	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	10 129	10 083	10 005	9 848	9 552	9 260	9 112	9 102	9 079	8 997	8 876	–1 254
<b>Population growth (20–64)</b>	1.6	–0.1	–0.2	–0.5	–0.6	–0.7	–0.1	–0.0	–0.1	–0.3	–0.2	–1.9
<b>Labour force 20–64 ('000)</b>	8 109	8 131	8 054	7 893	7 656	7 466	7 389	7 353	7 303	7 224	7 132	–976
<b>Participation rate (20–64)</b>	80.0	80.6	80.5	80.1	80.2	80.6	81.1	80.8	80.4	80.3	80.4	0.3
<b>Participation rate (15–64)</b>	78.2	78.7	78.6	78.4	78.3	78.7	79.1	78.8	78.5	78.4	78.5	0.3
young (15–24)	69.1	69.3	69.4	69.7	69.3	69.2	69.2	69.3	69.4	69.5	69.4	0.3
prime age (25–54)	87.9	88.3	88.5	88.4	88.3	88.0	87.8	87.8	87.8	87.7	87.8	–0.1
older (55–64)	56.0	58.0	59.3	59.4	58.7	59.0	60.6	60.2	59.6	59.2	59.5	3.5
<b>Participation rate (15–64) FEMALES</b>	72.6	74.7	75.4	75.8	76.3	77.0	77.5	77.3	77.0	76.9	77.0	4.4
young (15–24)	69.5	69.5	69.6	69.8	69.6	69.4	69.4	69.5	69.6	69.6	69.6	0.1
prime age (25–54)	82.4	84.3	85.5	86.1	86.4	86.3	86.1	86.1	86.1	86.1	86.1	3.7
older (55–64)	44.5	50.0	52.8	54.0	54.6	55.9	58.0	57.9	57.4	57.0	57.3	12.8
<b>Participation rate (15–64) MALES</b>	83.7	82.8	81.8	80.9	80.3	80.4	80.5	80.2	79.9	79.8	79.9	–3.8
young (15–24)	68.7	69.1	69.2	69.5	69.1	69.0	69.0	69.1	69.2	69.3	69.2	0.6
prime age (25–54)	93.3	92.3	91.4	90.7	90.1	89.6	89.3	89.3	89.3	89.3	89.4	–4.0
older (55–64)	67.4	66.0	65.8	64.8	62.8	62.2	63.2	62.4	61.7	61.3	61.6	–5.8



<b>Employment rate (20–64)</b>	76.8	78.1	78.0	77.6	77.7	78.2	78.6	78.3	78.0	77.8	77.9	1.0
<b>Employment rate (15–74)</b>	67.4	67.4	66.5	66.0	65.1	64.8	65.5	66.3	66.6	66.1	65.7	– 1.7
<b>Unemployment rate (20–64)</b>	4.0	3.2	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	– 0.9
<b>Unemployment rate (15–74)</b>	4.5	3.5	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	– 1.1
<b>Employment (20–64) (million)</b>	7.8	7.9	7.8	7.6	7.4	7.2	7.2	7.1	7.1	7.0	6.9	– 0.9
<b>Employment (15–64) (million)</b>	8.3	8.4	8.4	8.2	7.9	7.8	7.7	7.7	7.6	7.5	7.4	– 0.9
Share of young (15–24) (%)	15	16	16	16	16	16	16	16	16	16	16	1
Share of prime age (25–54) (%)	71	69	68	67	68	69	69	69	68	68	68	– 2
Share of older (55–64) (%)	14	15	16	17	17	15	15	15	16	16	16	2
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	19.5	20.0	21.6	22.8	22.0	19.9	18.9	19.6	20.3	20.5	20.6	1.1
<b>Old-age dependency ratio (²)</b>	23	27	31	36	41	45	47	47	46	47	48	24
<b>Total dependency ratio (³)</b>	49	53	57	62	68	73	75	74	73	73	75	25
<b>Total economic dependency ratio (⁴)</b>	97	96	100	106	113	118	120	121	121	121	122	26
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	29	33	38	44	50	55	58	58	58	58	59	30
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	29	32	37	42	48	53	56	56	56	56	57	28

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## AUSTRIA EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.39	1.41	1.43	1.44	1.46	1.48	1.49	1.51	1.52	1.54	1.56	0.2
<b>Life expectancy at birth</b>												
males	77.6	78.4	79.2	80.0	80.7	81.5	82.2	82.9	83.5	84.2	84.8	7.2
females	83.0	83.7	84.4	85.0	85.6	86.3	86.9	87.4	88.0	88.5	89.1	6.1
<b>Life expectancy at 65</b>												
males	17.6	18.1	18.6	19.1	19.6	20.1	20.6	21.1	21.5	22.0	22.4	4.8
females	20.9	21.4	21.9	22.4	22.9	23.3	23.8	24.3	24.7	25.1	25.6	4.7
<b>Net migration ('000)</b>	19.1	27.0	34.9	33.5	32.2	30.9	29.5	28.2	26.8	25.5	24.2	5.1
<b>Net migration as % of population</b>	0.2	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.0
<b>Population (million)</b>	8.4	8.5	8.6	8.7	8.9	8.9	9.0	9.0	9.0	8.9	8.9	0.5
Children population (0–14) as % of total population	14.8	14.1	13.9	13.8	13.8	13.6	13.4	13.2	13.2	13.4	13.5	– 1.3
Prime-age population (25–54) as % of total population	44.0	42.8	40.9	38.8	37.8	37.5	36.9	36.4	35.7	35.4	35.3	– 8.7
Working-age population (15–64) as % of total population	67.6	67.1	66.2	64.4	61.8	59.7	58.9	58.8	58.4	58.0	57.3	– 10.3
Elderly population (65 and over) as % of total population	17.6	18.8	19.9	21.8	24.4	26.6	27.7	27.9	28.4	28.6	29.2	11.5
Very elderly population (80 and over) as % of total population	4.8	5.0	5.6	6.4	7.0	7.6	8.8	10.5	11.8	12.0	11.6	6.7
Very elderly population (80 and over) as % of elderly population	27.4	26.8	28.2	29.5	28.8	28.5	31.8	37.6	41.6	41.7	39.7	12.3
Very elderly population (80 and over) as % of working age population	7.1	7.5	8.5	10.0	11.4	12.7	14.9	17.9	20.2	20.6	20.2	13.0
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	2.0	2.0	1.5	1.3	1.3	1.4	1.4	1.4	1.3	1.3	1.3	1.4
<b>Employment (growth rate)</b>	1.0	0.2	0.0	– 0.2	– 0.2	– 0.1	– 0.1	– 0.2	– 0.2	– 0.3	– 0.2	– 0.1
<b>Labour input: hours worked (growth rate)</b>	1.1	0.3	– 0.0	– 0.2	– 0.2	– 0.1	– 0.1	– 0.2	– 0.2	– 0.3	– 0.2	– 0.1
<b>Labour productivity per hour (growth rate)</b>	0.8	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
TFP (growth rate)	0.8	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Capital deepening (contribution to labour productivity growth)	0.0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<b>GDP per capita (growth rate)</b>	0.9	1.7	1.2	1.0	1.1	1.3	1.4	1.4	1.4	1.4	1.4	1.3
<b>GDP per worker (growth rate)</b>	1.0	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
<b>GDP in 2010 prices (EUR million)</b>	284.0	313.1	339.0	362.7	386.8	414.1	444.2	476.0	509.3	543.0	578.9	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	5 169	5 236	5 270	5 207	5 057	4 911	4 858	4 855	4 810	4 754	4 665	– 504
<b>Population growth (20–64)</b>	1.3	0.2	– 0.0	– 0.4	– 0.7	– 0.5	– 0.1	– 0.1	– 0.2	– 0.3	– 0.4	– 1.7
<b>Labour force 20–64 ('000)</b>	4 034	4 119	4 136	4 074	3 994	3 948	3 933	3 915	3 874	3 818	3 759	– 276
<b>Participation rate (20–64)</b>	78.0	78.7	78.5	78.3	79.0	80.4	81.0	80.6	80.5	80.3	80.6	2.5
<b>Participation rate (15–64)</b>	75.0	75.9	75.9	75.7	76.3	77.4	77.9	77.7	77.6	77.4	77.6	2.5
young (15–24)	59.5	62.2	61.9	61.6	61.5	61.3	61.3	61.4	61.5	61.4	61.3	1.8
prime age (25–54)	87.7	88.0	88.4	88.8	89.1	89.3	89.5	89.5	89.5	89.5	89.5	1.9
older (55–64)	43.1	47.7	51.2	51.9	52.1	54.2	56.4	56.2	56.9	56.0	56.1	12.9
<b>Participation rate (15–64) FEMALES</b>	69.3	71.1	71.7	72.2	73.4	75.0	75.7	75.5	75.4	75.1	75.3	6.0
young (15–24)	54.7	57.9	57.6	57.2	57.1	56.8	56.8	57.0	57.0	56.9	56.8	2.1
prime age (25–54)	82.8	84.5	85.6	86.4	86.9	87.2	87.4	87.5	87.4	87.4	87.4	4.7
older (55–64)	33.9	38.7	43.3	46.5	48.8	52.5	55.4	55.3	56.0	55.2	55.3	21.4
<b>Participation rate (15–64) MALES</b>	80.8	80.7	80.1	79.1	79.1	79.9	80.1	79.8	79.8	79.6	79.7	– 1.0
young (15–24)	64.1	66.3	66.1	65.8	65.6	65.5	65.5	65.6	65.7	65.6	65.5	1.5
prime age (25–54)	92.5	91.6	91.2	91.2	91.3	91.3	91.4	91.4	91.5	91.5	91.5	– 1.0
older (55–64)	52.9	57.0	59.2	57.4	55.5	56.0	57.3	57.1	57.7	56.8	56.9	4.0

<b>Employment rate (20–64)</b>	74.8	75.6	75.4	75.2	75.9	77.3	77.8	77.5	77.4	77.2	77.5	2.7
<b>Employment rate (15–74)</b>	63.7	64.5	64.6	63.7	62.8	62.9	63.8	64.8	64.8	64.2	63.9	0.2
<b>Unemployment rate (20–64)</b>	4.2	3.9	3.9	3.9	3.9	3.9	3.8	3.8	3.8	3.8	3.8	–0.3
<b>Unemployment rate (15–74)</b>	4.4	4.1	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	–0.5
<b>Employment (20–64) (million)</b>	3.9	4.0	4.0	3.9	3.8	3.8	3.8	3.8	3.7	3.7	3.6	–0.3
<b>Employment (15–64) (million)</b>	4.1	4.1	4.1	4.1	4.0	4.0	4.0	3.9	3.9	3.8	3.8	–0.3
Share of young (15–24) (%)	14	14	13	12	13	13	13	13	13	13	13	–1
Share of prime age (25–54) (%)	76	74	72	71	72	73	72	71	71	71	71	–5
Share of older (55–64) (%)	10	12	15	17	16	15	15	16	16	16	16	6
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	16.9	18.8	22.0	23.7	22.5	20.3	20.2	21.0	21.7	21.9	21.2	4.3
<b>Old-age dependency ratio (²)</b>	26	28	30	34	39	45	47	48	49	49	51	25
<b>Total dependency ratio (³)</b>	48	49	51	55	62	67	70	70	71	72	74	26
<b>Total economic dependency ratio (⁴)</b>	103	101	103	108	113	116	119	120	122	124	125	22
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	35	37	39	44	50	56	59	60	62	63	64	29
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	34	36	38	42	48	54	57	58	59	60	62	27

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## POLAND EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.40	1.42	1.43	1.45	1.46	1.48	1.50	1.51	1.53	1.54	1.56	0.2
<b>Life expectancy at birth</b>												
males	71.7	73.0	74.2	75.3	76.4	77.5	78.6	79.6	80.6	81.5	82.4	10.7
females	80.1	81.0	81.9	82.7	83.5	84.3	85.1	85.8	86.6	87.2	87.9	7.8
<b>Life expectancy at 65</b>												
males	14.8	15.5	16.2	16.9	17.5	18.2	18.8	19.4	20.0	20.6	21.2	6.4
females	19.1	19.7	20.3	20.9	21.5	22.1	22.7	23.2	23.8	24.3	24.8	5.7
<b>Net migration ('000)</b>	11.7	– 1.8	– 15.3	– 10.2	– 5.1	0.0	0.0	0.0	0.0	0.0	0.0	– 11.7
<b>Net migration as % of population</b>	0.0	– 0.0	– 0.0	– 0.0	– 0.0	0.0	0.0	0.0	0.0	0.0	0.0	– 0.0
<b>Population (million)</b>	38.2	38.4	38.4	38.1	37.5	36.8	36.0	35.3	34.5	33.6	32.6	– 5.6
Children population (0–14) as % of total population	15.1	15.2	15.6	14.9	13.6	12.5	12.1	12.2	12.5	12.4	12.0	– 3.1
Prime-age population (25–54) as % of total population	44.0	43.4	43.3	42.7	40.9	38.9	36.6	34.9	33.7	33.4	33.4	– 10.6
Working-age population (15–64) as % of total population	71.3	69.4	66.2	64.0	63.8	63.8	62.7	60.1	56.9	54.5	53.4	– 18.0
Elderly population (65 and over) as % of total population	13.5	15.4	18.2	21.0	22.6	23.7	25.3	27.6	30.6	33.0	34.6	21.0
Very elderly population (80 and over) as % of total population	3.4	3.9	4.3	4.4	5.7	7.6	9.2	9.5	9.6	10.6	12.6	9.2
Very elderly population (80 and over) as % of elderly population	24.9	25.5	23.5	20.7	25.2	32.1	36.2	34.5	31.3	32.0	36.3	11.4
Very elderly population (80 and over) as % of working age population	4.7	5.7	6.5	6.8	8.9	11.9	14.6	15.8	16.9	19.4	23.5	18.8
<b>Macroeconomic assumptions*</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>AVG 2010–60</b>
<b>Potential GDP (growth rate)</b>	3.8	3.8	2.0	1.6	1.5	1.4	1.2	0.8	0.5	0.5	0.6	1.5
<b>Employment (growth rate)</b>	0.4	0.5	– 0.3	– 0.6	– 0.6	– 0.7	– 1.0	– 1.2	– 1.3	– 1.2	– 0.9	– 0.7
<b>Labour input: hours worked (growth rate)</b>	2.5	0.4	– 0.4	– 0.6	– 0.6	– 0.7	– 1.0	– 1.2	– 1.3	– 1.2	– 0.9	– 0.6
<b>Labour productivity per hour (growth rate)</b>	1.3	3.4	2.3	2.2	2.1	2.1	2.1	2.0	1.8	1.7	1.5	2.2
TFP (growth rate)	0.4	2.0	1.5	1.4	1.4	1.4	1.4	1.3	1.2	1.1	1.0	1.3
Capital deepening (contribution to labour productivity growth)	0.8	1.3	0.8	0.8	0.7	0.7	0.8	0.7	0.6	0.6	0.5	0.8
<b>GDP per capita (growth rate)</b>	1.4	3.7	2.0	1.8	1.9	1.8	1.6	1.2	1.0	1.1	1.3	1.8
<b>GDP per worker (growth rate)</b>	3.4	3.2	2.3	2.2	2.1	2.2	2.2	2.0	1.9	1.7	1.6	2.2
<b>GDP in 2010 prices (EUR million)</b>	354.4	429.4	482.1	526.2	567.8	610.5	650.3	680.3	701.7	720.0	741.4	
<b>Labour force assumptions</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Population (20–64) ('000)</b>	24 772	24 633	23 636	22 416	21 857	21 568	20 898	19 722	18 179	16 861	15 942	– 8 830
<b>Population growth (20–64)</b>	3.9	– 0.5	– 1.0	– 0.9	– 0.3	– 0.3	– 0.9	– 1.3	– 1.7	– 1.4	– 0.9	– 4.7
<b>Labour force 20–64 ('000)</b>	17 720	17 647	17 237	16 676	16 122	15 565	14 822	13 888	12 923	12 136	11 581	– 6 140
<b>Participation rate (20–64)</b>	71.5	71.6	72.9	74.4	73.8	72.2	70.9	70.4	71.1	72.0	72.6	1.1
<b>Participation rate (15–64)</b>	65.8	66.9	68.4	69.0	68.1	66.9	66.2	66.0	66.5	66.9	67.2	1.4
young (15–24)	35.5	36.7	35.4	32.0	32.7	34.6	35.5	35.5	34.5	33.4	33.4	– 2.1
prime age (25–54)	84.2	84.0	84.0	83.6	82.9	82.3	82.2	82.6	83.1	83.2	82.8	– 1.4
older (55–64)	36.8	39.7	41.7	46.6	49.5	49.5	49.0	47.4	46.9	46.6	47.4	10.5
<b>Participation rate (15–64) FEMALES</b>	59.1	59.7	61.4	62.3	61.5	60.0	58.9	58.4	59.0	59.7	60.3	1.2
young (15–24)	30.6	31.5	30.3	27.3	27.8	29.6	30.4	30.3	29.4	28.4	28.5	– 2.1
prime age (25–54)	78.6	78.2	78.4	78.4	77.9	77.3	77.0	77.2	77.7	78.0	77.7	– 0.9
older (55–64)	26.1	28.4	29.8	33.8	37.1	36.9	36.6	34.7	34.1	33.7	34.6	8.5
<b>Participation rate (15–64) MALES</b>	72.6	74.1	75.4	75.6	74.6	73.7	73.5	73.5	73.8	73.8	73.8	1.2
young (15–24)	40.1	41.7	40.2	36.5	37.2	39.4	40.4	40.5	39.3	38.1	38.1	– 2.1
prime age (25–54)	89.8	89.7	89.4	88.6	87.8	87.1	87.2	87.7	88.1	88.0	87.6	– 2.2
older (55–64)	49.1	52.5	54.9	60.5	63.0	63.0	62.2	60.8	60.1	59.8	60.3	11.1

<b>Employment rate (20–64)</b>	64.7	66.0	67.5	69.0	68.5	67.0	65.9	65.4	66.0	66.8	67.5	2.8
<b>Employment rate (15–74)</b>	54.6	55.6	55.3	55.0	54.9	54.9	53.9	52.4	51.2	50.8	51.5	– 3.1
<b>Unemployment rate (20–64)</b>	9.6	7.8	7.5	7.3	7.2	7.2	7.1	7.1	7.1	7.1	7.1	– 2.5
<b>Unemployment rate (15–74)</b>	9.7	7.9	7.5	7.3	7.2	7.2	7.1	7.1	7.0	7.0	7.0	– 2.7
<b>Employment (20–64) (million)</b>	16.0	16.3	15.9	15.5	15.0	14.5	13.8	12.9	12.0	11.3	10.8	– 5.3
<b>Employment (15–64) (million)</b>	16.2	16.4	16.1	15.6	15.1	14.6	13.9	13.0	12.1	11.4	10.8	– 5.3
Share of young (15–24) (%)	9	8	7	6	7	8	8	7	7	7	7	– 2
Share of prime age (25–54) (%)	80	79	81	81	79	76	73	73	75	77	78	– 2
Share of older (55–64) (%)	11	13	12	12	14	17	19	20	18	16	15	4
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	18.6	20.7	19.7	18.0	19.0	22.2	25.6	27.0	25.7	23.1	20.6	2.1
<b>Old-age dependency ratio (²)</b>	19	22	28	33	35	37	40	46	54	61	65	46
<b>Total dependency ratio (³)</b>	40	44	51	56	57	57	60	66	76	83	87	47
<b>Total economic dependency ratio (⁴)</b>	133	131	133	137	141	145	151	160	170	180	187	53
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	31	35	41	48	53	57	62	70	82	92	99	68
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	30	34	40	47	52	55	60	67	78	87	94	64

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## PORTUGAL EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.32	1.34	1.36	1.38	1.40	1.42	1.44	1.45	1.47	1.49	1.51	0.2
<b>Life expectancy at birth</b>												
males	76.5	77.4	78.3	79.1	79.9	80.7	81.5	82.2	82.9	83.6	84.2	7.7
females	82.5	83.2	83.9	84.5	85.1	85.7	86.3	86.9	87.5	88.0	88.6	6.1
<b>Life expectancy at 65</b>												
males	17.1	17.6	18.1	18.7	19.2	19.7	20.2	20.7	21.1	21.6	22.1	5.0
females	20.4	20.9	21.4	21.9	22.4	22.8	23.3	23.8	24.2	24.7	25.1	4.7
<b>Net migration ('000)</b>	17.3	26.7	36.2	34.8	33.4	32.0	30.6	29.2	27.8	26.4	25.1	7.8
<b>Net migration as % of population</b>	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.1
<b>Population (million)</b>	10.6	10.7	10.7	10.8	10.8	10.8	10.8	10.7	10.6	10.4	10.2	– 0.4
Children population (0–14) as % of total population	15.1	14.5	13.5	12.8	12.4	12.3	12.3	12.3	12.2	12.0	12.0	– 3.1
Prime-age population (25–54) as % of total population	43.8	42.9	41.5	40.3	38.9	37.1	35.9	35.4	34.9	34.5	33.8	– 10.0
Working-age population (15–64) as % of total population	66.8	66.1	65.7	64.9	63.4	61.7	59.5	57.5	56.4	56.1	56.0	– 10.9
Elderly population (65 and over) as % of total population	18.0	19.3	20.7	22.3	24.2	26.0	28.2	30.2	31.4	31.8	32.0	14.0
Very elderly population (80 and over) as % of total population	4.6	5.4	5.9	6.3	7.1	7.9	8.9	10.1	11.1	12.4	13.6	9.0
Very elderly population (80 and over) as % of elderly population	25.3	27.7	28.6	28.4	29.1	30.4	31.6	33.3	35.2	38.8	42.4	17.1
Very elderly population (80 and over) as % of working age population	6.8	8.1	9.0	9.8	11.1	12.8	14.9	17.5	19.6	22.0	24.3	17.4
<b>Macroeconomic assumptions*</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>AVG 2010–60</b>
<b>Potential GDP (growth rate)</b>	1.3	1.6	1.3	2.1	2.0	1.6	1.4	1.2	1.1	1.1	1.1	1.3
<b>Employment (growth rate)</b>	– 1.5	0.2	0.4	0.6	0.0	– 0.4	– 0.6	– 0.7	– 0.6	– 0.5	– 0.4	– 0.3
<b>Labour input : hours worked (growth rate)</b>	– 0.5	0.2	0.4	0.6	0.0	– 0.4	– 0.6	– 0.7	– 0.6	– 0.5	– 0.4	– 0.2
<b>Labour productivity per hour (growth rate)</b>	1.8	1.4	0.9	1.4	2.0	2.0	2.0	1.9	1.8	1.6	1.5	1.5
TFP (growth rate)	1.5	1.2	0.6	0.9	1.3	1.3	1.3	1.2	1.1	1.1	1.0	1.0
Capital deepening (contribution to labour productivity growth)	0.3	0.2	0.3	0.5	0.7	0.7	0.7	0.7	0.6	0.6	0.5	0.5
<b>GDP per capita (growth rate)</b>	1.0	1.5	1.3	2.0	2.0	1.6	1.4	1.4	1.4	1.4	1.5	1.3
<b>GDP per worker (growth rate)</b>	2.9	1.4	0.9	1.4	1.9	2.0	2.0	1.9	1.8	1.7	1.5	1.5
<b>GDP in 2010 prices (EUR million)</b>	172.5	172.0	180.6	197.4	218.7	238.4	256.1	272.8	288.6	305.3	322.6	
<b>Labour force assumptions</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Population (20–64) ('000)</b>	6 551	6 517	6 476	6 438	6 321	6 167	5 936	5 684	5 497	5 387	5 283	– 1 268
<b>Population growth (20–64)</b>	– 0.2	– 0.2	– 0.1	– 0.2	– 0.5	– 0.6	– 0.9	– 0.8	– 0.5	– 0.4	– 0.4	– 0.1
<b>Labour force 20–64 ('000)</b>	5 199	5 251	5 266	5 265	5 192	5 066	4 873	4 679	4 534	4 437	4 340	– 859
<b>Participation rate (20–64)</b>	79.4	80.6	81.3	81.8	82.1	82.1	82.1	82.3	82.5	82.4	82.1	2.8
<b>Participation rate (15–64)</b>	74.1	75.2	75.7	76.4	77.0	77.1	77.0	77.0	77.0	76.8	76.7	2.6
young (15–24)	37.3	37.2	36.7	38.1	38.3	38.2	37.8	37.4	37.2	37.4	37.7	0.3
prime age (25–54)	88.7	89.4	89.9	90.2	90.1	90.1	90.1	90.1	90.1	90.0	90.0	1.3
older (55–64)	54.2	58.9	63.2	65.8	68.5	69.6	69.1	68.8	69.2	69.3	69.4	15.2
<b>Participation rate (15–64) FEMALES</b>	70.0	71.9	73.1	74.2	75.1	75.5	75.4	75.5	75.5	75.3	75.2	5.2
young (15–24)	35.4	35.3	34.8	36.1	36.4	36.3	36.0	35.6	35.4	35.6	35.8	0.4
prime age (25–54)	84.9	86.7	87.8	88.6	88.7	88.6	88.7	88.7	88.7	88.6	88.6	3.7
older (55–64)	47.3	53.0	58.6	62.3	66.2	68.0	67.7	67.4	67.9	68.0	68.1	20.9
<b>Participation rate (15–64) MALES</b>	78.3	78.5	78.3	78.5	78.8	78.7	78.6	78.5	78.4	78.2	78.1	– 0.2
young (15–24)	39.2	39.1	38.4	40.0	40.1	40.0	39.7	39.2	39.0	39.2	39.5	0.3
prime age (25–54)	92.6	92.2	91.9	91.8	91.5	91.5	91.5	91.5	91.5	91.4	91.4	– 1.2
older (55–64)	62.0	65.4	68.2	69.6	70.9	71.3	70.6	70.2	70.4	70.6	70.7	8.7

<b>Employment rate (20–64)</b>	70.5	70.5	72.1	74.1	75.8	76.0	76.1	76.4	76.6	76.5	76.3	5.8
<b>Employment rate (15–74)</b>	60.1	59.6	60.4	62.1	63.4	63.4	63.1	62.6	62.5	62.9	63.2	3.1
<b>Unemployment rate (20–64)</b>	11.1	12.5	11.3	9.3	7.8	7.4	7.3	7.2	7.1	7.1	7.1	–4.0
<b>Unemployment rate (15–74)</b>	11.0	12.4	11.2	9.2	7.5	7.2	6.9	6.8	6.8	6.8	6.8	–4.2
<b>Employment (20–64) (million)</b>	4.6	4.6	4.7	4.8	4.8	4.7	4.5	4.3	4.2	4.1	4.0	–0.6
<b>Employment (15–64) (million)</b>	4.7	4.6	4.7	4.8	4.8	4.7	4.6	4.4	4.3	4.2	4.1	–0.6
Share of young (15–24) (%)	7	7	7	7	7	7	7	7	7	7	7	0
Share of prime age (25–54) (%)	79	78	76	74	72	71	71	72	73	72	71	–8
Share of older (55–64) (%)	13	15	18	19	21	22	22	21	20	20	21	8
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	17.9	19.0	20.4	21.4	22.8	24.3	24.3	22.8	21.8	22.2	23.1	5.2
<b>Old-age dependency ratio (²)</b>	27	29	32	34	38	42	47	52	56	57	57	30
<b>Total dependency ratio (³)</b>	50	51	52	54	58	62	68	74	77	78	79	29
<b>Total economic dependency ratio (⁴)</b>	118	121	116	111	108	112	117	123	128	131	132	14
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	36	40	42	44	47	52	58	64	69	71	72	36
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	35	38	40	41	44	48	53	58	63	66	67	32

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## ROMANIA EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.38	1.39	1.41	1.43	1.45	1.46	1.48	1.50	1.51	1.53	1.55	0.2
<b>Life expectancy at birth</b>												
males	70.0	71.4	72.8	74.1	75.3	76.5	77.6	78.8	79.8	80.8	81.8	11.8
females	77.5	78.5	79.6	80.6	81.6	82.5	83.4	84.3	85.1	86.0	86.7	9.3
<b>Life expectancy at 65</b>												
males	14.1	14.8	15.5	16.2	16.9	17.6	18.3	18.9	19.6	20.2	20.8	6.7
females	17.2	17.9	18.6	19.3	20.0	20.6	21.3	22.0	22.6	23.2	23.8	6.6
<b>Net migration ('000)</b>	– 1.8	– 2.9	– 4.0	– 2.7	– 1.3	0.0	0.0	0.0	0.0	0.0	0.0	1.8
<b>Net migration as % of population</b>	– 0.0	– 0.0	– 0.0	– 0.0	– 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Population (million)</b>	21.4	21.2	21.0	20.6	20.2	19.8	19.4	18.9	18.4	17.9	17.2	– 4.2
Children population (0–14) as % of total population	15.2	15.0	14.8	14.0	13.0	12.3	12.0	12.0	11.9	11.8	11.6	– 3.6
Prime-age population (25–54) as % of total population	44.2	45.2	45.5	43.2	41.0	38.7	36.9	34.3	33.6	33.1	32.8	– 11.4
Working-age population (15–64) as % of total population	69.9	69.1	67.6	66.6	66.8	64.5	62.2	59.3	57.0	54.2	53.7	– 16.3
Elderly population (65 and over) as % of total population	14.9	15.8	17.6	19.5	20.2	23.2	25.7	28.7	31.1	34.1	34.8	19.9
Very elderly population (80 and over) as % of total population	3.2	3.8	4.3	4.4	5.1	6.4	7.5	7.7	9.6	11.3	13.3	10.1
Very elderly population (80 and over) as % of elderly population	21.2	23.8	24.6	22.6	25.4	27.8	29.3	26.8	31.0	33.2	38.2	17.1
Very elderly population (80 and over) as % of working age population	4.5	5.5	6.4	6.6	7.7	10.0	12.1	13.0	16.9	20.9	24.8	20.3
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	– 1.3	2.8	1.3	1.2	1.2	1.2	1.1	0.7	0.5	0.6	0.5	1.1
<b>Employment (growth rate)</b>	– 1.8	– 1.1	– 0.6	– 0.9	– 1.1	– 1.1	– 1.2	– 1.4	– 1.4	– 1.2	– 1.1	– 1.0
<b>Labour input: hours worked (growth rate)</b>	– 1.6	– 0.9	– 0.6	– 0.9	– 1.1	– 1.1	– 1.2	– 1.4	– 1.4	– 1.2	– 1.1	– 1.0
<b>Labour productivity per hour (growth rate)</b>	0.4	3.7	1.9	2.1	2.3	2.3	2.3	2.1	1.9	1.7	1.5	2.1
TFP (growth rate)	– 1.5	2.1	1.2	1.4	1.5	1.5	1.5	1.4	1.3	1.1	1.0	1.3
Capital deepening (contribution to labour productivity growth)	1.9	1.6	0.7	0.7	0.8	0.8	0.8	0.8	0.7	0.6	0.5	0.8
<b>GDP per capita (growth rate)</b>	– 1.1	3.0	1.6	1.6	1.6	1.6	1.5	1.2	1.1	1.2	1.2	1.5
<b>GDP per worker (growth rate)</b>	0.5	3.9	1.9	2.1	2.4	2.3	2.3	2.2	2.0	1.8	1.6	2.2
<b>GDP in 2010 prices (EUR million)</b>	121.9	139.6	150.6	160.1	169.8	180.1	190.4	197.9	204.1	209.7	215.3	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	13 768	13 578	13 119	12 643	12 444	11 823	11 202	10 423	9 720	8 923	8 507	– 5 261
<b>Population growth (20–64)</b>	0.6	– 0.7	– 0.8	– 0.6	– 0.2	– 1.2	– 1.3	– 1.5	– 1.5	– 1.5	– 0.8	– 1.5
<b>Labour force 20–64 ('000)</b>	9 417	9 325	9 024	8 651	8 271	7 745	7 230	6 696	6 229	5 815	5 546	– 3 870
<b>Participation rate (20–64)</b>	68.4	68.7	68.8	68.4	66.5	65.5	64.5	64.2	64.1	65.2	65.2	– 3.2
<b>Participation rate (15–64)</b>	63.8	64.4	64.5	63.9	62.2	61.4	60.7	60.4	60.2	60.9	60.9	– 2.9
young (15–24)	31.9	30.0	29.1	28.5	29.1	29.7	30.0	29.7	29.2	29.0	29.2	– 2.7
prime age (25–54)	79.5	78.7	77.8	76.7	75.7	74.8	74.4	74.8	75.0	74.9	74.8	– 4.7
older (55–64)	42.3	43.3	44.0	49.5	48.8	49.1	47.4	46.8	44.7	45.8	46.3	4.0
<b>Participation rate (15–64) FEMALES</b>	55.9	55.9	55.8	55.2	53.6	53.0	52.3	52.0	51.8	52.6	52.6	– 3.3
young (15–24)	26.7	25.1	24.3	23.8	24.3	24.8	25.1	24.8	24.4	24.3	24.4	– 2.3
prime age (25–54)	71.4	70.5	69.3	68.3	67.2	66.4	65.8	66.4	66.5	66.5	66.2	– 5.1
older (55–64)	33.3	32.6	32.1	37.6	37.7	38.6	37.4	36.9	34.7	35.7	36.2	2.9
<b>Participation rate (15–64) MALES</b>	71.7	72.9	73.2	72.6	70.7	69.8	69.0	68.7	68.4	69.0	68.9	– 2.8
young (15–24)	36.8	34.6	33.7	33.0	33.6	34.4	34.6	34.3	33.8	33.6	33.7	– 3.1
prime age (25–54)	87.5	86.8	86.1	85.0	83.9	83.0	82.7	83.0	83.1	83.1	83.0	– 4.5
older (55–64)	52.6	55.6	57.4	62.6	60.7	60.1	57.7	57.1	54.9	56.0	56.4	3.8



<b>Employment rate (20–64)</b>	63.4	64.0	64.2	64.0	62.2	61.3	60.4	60.1	60.0	61.0	61.1	– 2.4
<b>Employment rate (15–74)</b>	55.1	54.9	54.0	53.0	52.0	50.9	49.1	48.2	47.5	47.4	47.6	– 7.5
<b>Unemployment rate (20–64)</b>	7.3	6.8	6.6	6.5	6.4	6.4	6.4	6.4	6.4	6.4	6.4	– 0.9
<b>Unemployment rate (15–74)</b>	7.3	6.9	6.6	6.5	6.5	6.4	6.3	6.3	6.3	6.2	6.3	– 1.0
<b>Employment (20–64) (million)</b>	8.7	8.7	8.4	8.1	7.7	7.2	6.8	6.3	5.8	5.4	5.2	– 3.5
<b>Employment (15–64) (million)</b>	8.8	8.8	8.5	8.2	7.8	7.3	6.8	6.3	5.9	5.5	5.3	– 3.6
Share of young (15–24) (%)	8	6	6	6	6	6	6	6	6	6	7	– 2
Share of prime age (25–54) (%)	80	81	82	78	75	73	73	72	74	76	76	– 4
Share of older (55–64) (%)	12	13	12	16	19	20	21	22	20	18	18	6
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	17.2	18.7	17.4	19.5	22.7	24.3	25.4	27.1	25.9	22.8	22.4	5.2
<b>Old-age dependency ratio (²)</b>	21	23	26	29	30	36	41	48	55	63	65	43
<b>Total dependency ratio (³)</b>	43	45	48	50	50	55	61	69	76	85	86	43
<b>Total economic dependency ratio (⁴)</b>	132	135	138	142	149	157	167	180	192	202	208	76
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	31	35	40	45	48	58	67	79	90	103	108	76
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	30	34	38	43	47	55	63	74	84	96	101	71

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## SLOVENIA EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.54	1.55	1.56	1.57	1.58	1.59	1.60	1.61	1.63	1.64	1.65	0.1
<b>Life expectancy at birth</b>												
males	75.8	76.8	77.7	78.5	79.4	80.2	81.0	81.8	82.5	83.3	84.0	8.1
females	82.3	83.0	83.7	84.4	85.1	85.8	86.4	87.0	87.6	88.2	88.8	6.5
<b>Life expectancy at 65</b>												
males	16.4	17.0	17.6	18.1	18.7	19.2	19.8	20.3	20.8	21.4	21.9	5.5
females	20.2	20.8	21.3	21.9	22.4	22.9	23.4	23.9	24.4	24.8	25.3	5.1
<b>Net migration ('000)</b>	11.0	8.2	5.4	5.2	5.0	4.8	4.6	4.3	4.1	3.9	3.7	– 7.2
<b>Net migration as % of population</b>	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	– 0.4
<b>Population (million)</b>	2.1	2.1	2.1	2.2	2.2	2.1	2.1	2.1	2.1	2.1	2.1	0.0
Children population (0–14) as % of total population	14.1	14.7	15.2	14.6	13.6	12.9	12.9	13.5	13.9	13.9	13.6	– 0.4
Prime-age population (25–54) as % of total population	44.9	43.7	41.7	39.6	37.7	36.0	34.8	33.9	33.7	33.8	34.1	– 10.8
Working-age population (15–64) as % of total population	69.4	67.5	64.8	63.2	62.0	60.9	59.4	57.2	55.4	54.5	54.8	– 14.6
Elderly population (65 and over) as % of total population	16.5	17.7	20.0	22.2	24.4	26.2	27.7	29.3	30.7	31.6	31.5	15.0
Very elderly population (80 and over) as % of total population	4.0	4.7	5.2	5.6	6.5	8.0	9.3	10.3	11.0	11.7	12.8	8.8
Very elderly population (80 and over) as % of elderly population	24.4	26.7	26.2	25.3	26.6	30.6	33.5	35.0	35.8	37.0	40.7	16.3
Very elderly population (80 and over) as % of working age population	5.8	7.0	8.1	8.9	10.4	13.2	15.6	17.9	19.8	21.4	23.4	17.6
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	1.2	3.2	1.5	1.6	1.4	1.2	1.0	0.9	0.9	1.1	1.3	1.4
<b>Employment (growth rate)</b>	– 2.2	– 0.3	0.1	0.0	– 0.2	– 0.4	– 0.6	– 0.7	– 0.7	– 0.5	– 0.2	– 0.4
<b>Labour input : hours worked (growth rate)</b>	– 2.1	– 0.5	0.1	0.0	– 0.3	– 0.4	– 0.6	– 0.7	– 0.7	– 0.5	– 0.2	– 0.4
<b>Labour productivity per hour (growth rate)</b>	3.3	3.8	1.4	1.5	1.6	1.6	1.7	1.6	1.6	1.6	1.5	1.8
TFP (growth rate)	1.5	2.1	0.9	1.0	1.1	1.1	1.1	1.1	1.0	1.0	1.0	1.1
Capital deepening (contribution to labour productivity growth)	1.8	1.7	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.7
<b>GDP per capita (growth rate)</b>	0.6	2.8	1.3	1.5	1.4	1.3	1.1	1.0	1.1	1.4	1.6	1.4
<b>GDP per worker (growth rate)</b>	3.4	3.6	1.4	1.5	1.6	1.7	1.7	1.6	1.6	1.6	1.5	1.8
<b>GDP in 2010 prices (EUR million)</b>	36.1	41.4	45.2	48.7	52.4	55.9	59.1	62.0	64.8	68.1	72.4	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	1 322	1 330	1 295	1 251	1 222	1 200	1 172	1 125	1 077	1 038	1 024	– 298
<b>Population growth (20–64)</b>	1.2	– 0.2	– 0.7	– 0.6	– 0.4	– 0.3	– 0.6	– 0.9	– 0.8	– 0.6	– 0.1	– 1.3
<b>Labour force 20–64 ('000)</b>	1 005	1 023	1 022	1 004	979	956	928	894	860	836	825	– 180
<b>Participation rate (20–64)</b>	76.0	76.9	78.9	80.3	80.1	79.7	79.2	79.4	79.9	80.5	80.6	4.5
<b>Participation rate (15–64)</b>	71.7	72.9	74.7	75.1	74.7	74.5	74.3	74.6	74.8	74.9	74.7	3.0
young (15–24)	39.6	40.3	39.1	36.8	37.9	39.4	39.8	39.6	38.7	38.0	38.2	– 1.4
prime age (25–54)	90.2	90.0	90.2	90.0	89.6	89.3	89.4	89.7	89.8	89.8	89.6	– 0.6
older (55–64)	36.3	42.6	51.6	59.1	62.2	63.1	61.9	61.3	60.6	61.0	61.6	25.3
<b>Participation rate (15–64) FEMALES</b>	67.5	69.0	71.1	72.4	72.6	72.5	72.5	72.8	73.0	73.0	72.9	5.4
young (15–24)	35.2	37.3	36.1	34.0	35.2	36.6	36.9	36.7	35.9	35.3	35.5	0.2
prime age (25–54)	88.3	88.2	88.5	88.2	87.7	87.4	87.5	87.8	87.9	87.9	87.7	– 0.6
older (55–64)	25.6	33.4	43.7	55.6	61.3	62.3	60.9	60.2	59.8	60.0	60.7	35.1
<b>Participation rate (15–64) MALES</b>	75.7	76.5	78.1	77.6	76.7	76.3	76.1	76.4	76.6	76.7	76.6	0.9
young (15–24)	43.7	43.1	42.0	39.6	40.7	42.2	42.7	42.5	41.5	40.7	41.0	– 2.8
prime age (25–54)	91.8	91.7	91.9	91.7	91.4	91.2	91.2	91.5	91.7	91.7	91.5	– 0.4
older (55–64)	47.0	51.5	59.4	62.4	63.1	63.8	62.9	62.3	61.5	62.0	62.5	15.5

<b>Employment rate (20–64)</b>	70.5	70.4	72.5	74.7	75.4	75.1	74.7	75.0	75.4	76.0	76.1	5.6
<b>Employment rate (15–74)</b>	60.0	59.6	59.7	59.9	60.3	60.3	60.1	59.7	59.2	59.4	60.1	0.1
<b>Unemployment rate (20–64)</b>	7.2	8.5	8.1	6.9	5.9	5.7	5.6	5.6	5.6	5.6	5.5	– 1.7
<b>Unemployment rate (15–74)</b>	7.2	8.5	8.1	6.9	5.8	5.6	5.5	5.5	5.4	5.4	5.5	– 1.8
<b>Employment (20–64) (million)</b>	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	– 0.2
<b>Employment (15–64) (million)</b>	0.9	0.9	1.0	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8	– 0.2
Share of young (15–24) (%)	8	7	7	7	8	9	8	8	8	8	9	0
Share of prime age (25–54) (%)	82	80	78	75	73	71	70	71	73	74	75	– 7
Share of older (55–64) (%)	10	13	16	18	19	21	21	21	19	17	17	7
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	18.8	20.8	21.6	21.9	22.1	23.5	24.7	24.6	22.9	20.6	19.6	0.8
<b>Old-age dependency ratio (²)</b>	24	26	31	35	39	43	47	51	55	58	57	34
<b>Total dependency ratio (³)</b>	44	48	54	58	61	64	68	75	80	83	82	38
<b>Total economic dependency ratio (⁴)</b>	113	118	120	121	122	125	130	137	144	148	148	35
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	34	37	43	48	53	57	62	68	74	77	77	43
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	33	37	42	46	51	55	60	65	70	74	74	41

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## SLOVAKIA EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.41	1.43	1.44	1.46	1.48	1.49	1.51	1.52	1.54	1.55	1.57	0.2
<b>Life expectancy at birth</b>												
males	71.6	72.8	74.0	75.1	76.2	77.3	78.4	79.4	80.3	81.3	82.2	10.6
females	79.1	80.1	81.0	81.9	82.7	83.6	84.4	85.2	86.0	86.7	87.4	8.3
<b>Life expectancy at 65</b>												
males	14.1	14.8	15.5	16.2	16.9	17.6	18.2	18.9	19.5	20.2	20.8	6.6
females	18.0	18.6	19.3	19.9	20.6	21.2	21.9	22.5	23.1	23.7	24.3	6.3
<b>Net migration ('000)</b>	10.6	9.0	7.4	7.1	6.8	6.6	6.3	6.0	5.7	5.4	5.1	– 5.4
<b>Net migration as % of population</b>	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	– 0.1
<b>Population (million)</b>	5.4	5.5	5.6	5.6	5.6	5.5	5.5	5.4	5.3	5.2	5.1	– 0.3
Children population (0–14) as % of total population	15.3	15.3	15.6	15.0	13.8	12.8	12.4	12.5	12.7	12.6	12.4	– 3.0
Prime-age population (25–54) as % of total population	45.7	45.5	45.1	43.9	41.6	38.9	36.9	35.3	34.0	33.7	33.7	– 12.0
Working-age population (15–64) as % of total population	72.4	70.8	68.0	66.2	65.5	65.0	63.2	60.2	57.4	55.3	54.1	– 18.2
Elderly population (65 and over) as % of total population	12.3	13.8	16.4	18.8	20.7	22.2	24.4	27.3	29.9	32.1	33.5	21.2
Very elderly population (80 and over) as % of total population	2.7	3.0	3.2	3.7	4.7	6.3	7.5	8.2	8.8	10.2	12.3	9.5
Very elderly population (80 and over) as % of elderly population	22.3	21.7	19.6	19.8	22.9	28.3	30.6	30.2	29.4	31.7	36.6	14.3
Very elderly population (80 and over) as % of working age population	3.8	4.2	4.7	5.6	7.3	9.7	11.8	13.7	15.3	18.4	22.7	18.9
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	4.0	2.8	3.0	2.5	1.7	1.2	0.9	0.7	0.6	0.7	1.0	1.7
<b>Employment (growth rate)</b>	– 1.4	– 1.0	0.2	0.1	– 0.3	– 0.8	– 1.1	– 1.2	– 1.2	– 1.0	– 0.6	– 0.6
<b>Labour input : hours worked (growth rate)</b>	1.8	– 1.4	0.2	0.1	– 0.3	– 0.8	– 1.1	– 1.2	– 1.2	– 1.0	– 0.6	– 0.6
<b>Labour productivity per hour (growth rate)</b>	2.2	4.3	2.8	2.4	2.0	2.0	2.0	1.9	1.8	1.7	1.5	2.2
TFP (growth rate)	1.7	2.3	1.8	1.5	1.3	1.3	1.3	1.2	1.1	1.1	1.0	1.4
Capital deepening (contribution to labour productivity growth)	0.5	2.0	1.0	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.5	0.8
<b>GDP per capita (growth rate)</b>	3.6	2.5	2.8	2.5	1.8	1.4	1.1	0.9	0.9	1.1	1.5	1.8
<b>GDP per worker (growth rate)</b>	5.5	3.8	2.7	2.4	2.0	2.0	2.0	1.9	1.8	1.7	1.6	2.3
<b>GDP in 2010 prices (EUR million)</b>	65.9	77.8	90.6	103.1	114.2	122.2	128.5	133.4	137.5	142.0	148.2	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	3 574	3 620	3 533	3 420	3 346	3 304	3 195	3 017	2 829	2 657	2 532	– 1 042
<b>Population growth (20–64)</b>	1.2	– 0.1	– 0.6	– 0.5	– 0.3	– 0.3	– 0.9	– 1.2	– 1.3	– 1.2	– 0.7	– 1.9
<b>Labour force 20–64 ('000)</b>	2 685	2 702	2 679	2 607	2 525	2 434	2 304	2 163	2 032	1 925	1 858	– 828
<b>Participation rate (20–64)</b>	75.1	74.7	75.8	76.2	75.5	73.7	72.1	71.7	71.8	72.4	73.4	– 1.8
<b>Participation rate (15–64)</b>	68.9	69.6	71.0	70.8	69.7	68.3	67.2	67.0	67.0	67.2	67.8	– 1.1
young (15–24)	31.8	33.2	31.5	29.0	29.4	31.0	31.6	31.7	30.9	30.1	30.1	– 1.7
prime age (25–54)	86.9	86.0	85.5	85.0	84.4	84.0	83.3	83.3	83.5	83.7	83.7	– 3.2
older (55–64)	45.1	46.3	51.1	53.7	56.0	54.8	52.6	51.4	50.2	49.2	50.7	5.5
<b>Participation rate (15–64) FEMALES</b>	61.4	62.2	64.7	65.2	64.4	62.9	61.6	61.2	61.1	61.4	62.0	0.6
young (15–24)	26.1	27.1	25.7	23.7	24.0	25.4	25.9	25.9	25.3	24.6	24.6	– 1.6
prime age (25–54)	80.8	79.5	78.9	78.6	78.1	77.6	76.5	76.1	76.3	76.7	76.9	– 3.9
older (55–64)	32.2	36.1	46.2	51.4	53.9	52.0	49.8	48.7	47.4	46.4	47.9	15.7
<b>Participation rate (15–64) MALES</b>	76.4	77.0	77.2	76.3	75.0	73.7	72.8	72.8	72.8	72.9	73.4	– 3.0
young (15–24)	37.2	38.9	37.0	34.1	34.5	36.5	37.2	37.2	36.3	35.4	35.4	– 1.9
prime age (25–54)	93.0	92.3	91.9	91.3	90.6	90.2	90.1	90.3	90.6	90.6	90.4	– 2.6
older (55–64)	59.8	57.7	56.3	56.1	58.2	57.7	55.4	54.1	53.0	52.0	53.5	– 6.3

<b>Employment rate (20–64)</b>	64.7	64.4	66.1	68.5	69.5	68.1	66.8	66.6	66.7	67.3	68.2	3.5
<b>Employment rate (15–74)</b>	54.0	53.9	54.1	54.6	55.2	54.5	53.0	51.1	50.0	49.9	50.6	– 3.4
<b>Unemployment rate (20–64)</b>	13.9	13.7	12.8	10.2	7.9	7.5	7.3	7.2	7.1	7.1	7.1	– 6.9
<b>Unemployment rate (15–74)</b>	14.3	14.0	13.0	10.3	8.1	7.6	7.4	7.3	7.2	7.2	7.2	– 7.1
<b>Employment (20–64) (million)</b>	2.3	2.3	2.3	2.3	2.3	2.3	2.1	2.0	1.9	1.8	1.7	– 0.6
<b>Employment (15–64) (million)</b>	2.3	2.3	2.3	2.4	2.3	2.3	2.1	2.0	1.9	1.8	1.7	– 0.6
Share of young (15–24) (%)	7	6	5	5	6	7	7	6	6	6	7	– 1
Share of prime age (25–54) (%)	81	80	80	80	77	74	73	73	74	76	77	– 4
Share of older (55–64) (%)	12	13	14	15	17	19	21	21	20	17	16	4
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	17.2	19.0	19.1	18.7	20.1	23.6	25.7	26.1	25.5	23.2	21.0	3.9
<b>Old-age dependency ratio (²)</b>	17	20	24	28	32	34	39	45	52	58	62	45
<b>Total dependency ratio (³)</b>	38	41	47	51	53	54	58	66	74	81	85	47
<b>Total economic dependency ratio (⁴)</b>	133	135	136	136	136	141	151	163	175	185	189	56
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	28	32	38	44	48	53	61	71	82	91	97	68
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	28	32	38	43	48	52	60	70	80	90	95	67

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## FINLAND EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	1.86	– 0.0
<b>Life expectancy at birth</b>												
males	76.6	77.5	78.4	79.2	80.0	80.8	81.6	82.3	83.0	83.7	84.4	7.7
females	83.2	83.9	84.6	85.2	85.9	86.5	87.0	87.6	88.2	88.7	89.2	6.0
<b>Life expectancy at 65</b>												
males	17.3	17.8	18.3	18.9	19.4	19.9	20.4	20.9	21.4	21.8	22.3	5.0
females	21.3	21.8	22.2	22.7	23.2	23.6	24.1	24.5	25.0	25.4	25.8	4.5
<b>Net migration ('000)</b>	14.1	12.1	10.1	9.7	9.3	8.9	8.5	8.1	7.7	7.4	7.0	– 7.2
<b>Net migration as % of population</b>	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	– 0.1
<b>Population (million)</b>	5.4	5.5	5.6	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	0.4
Children population (0–14) as % of total population	16.6	16.6	16.9	16.8	16.5	16.1	15.9	15.9	16.1	16.1	16.0	– 0.6
Prime-age population (25–54) as % of total population	39.2	37.9	37.0	36.1	35.9	35.6	35.3	35.2	34.9	35.0	35.0	– 4.2
Working-age population (15–64) as % of total population	66.2	63.2	60.9	59.3	58.4	58.1	58.6	58.4	57.9	57.5	56.9	– 9.3
Elderly population (65 and over) as % of total population	17.3	20.2	22.3	23.8	25.1	25.7	25.5	25.6	26.0	26.4	27.1	9.8
Very elderly population (80 and over) as % of total population	4.7	5.1	5.6	6.3	8.1	9.3	9.8	10.2	10.3	10.1	10.4	5.7
Very elderly population (80 and over) as % of elderly population	27.2	25.3	25.1	26.4	32.5	36.1	38.6	39.9	39.6	38.1	38.3	11.2
Very elderly population (80 and over) as % of working age population	7.1	8.1	9.2	10.6	14.0	16.0	16.8	17.5	17.8	17.5	18.2	11.1
<b>Macroeconomic assumptions*</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>AVG 2010–60</b>
<b>Potential GDP (growth rate)</b>	3.1	2.3	1.7	1.3	1.4	1.6	1.6	1.5	1.4	1.4	1.5	1.7
<b>Employment (growth rate)</b>	– 0.4	– 0.7	– 0.2	– 0.2	– 0.1	0.1	0.0	– 0.0	– 0.1	– 0.1	– 0.0	– 0.1
<b>Labour input : hours worked (growth rate)</b>	1.1	– 0.8	– 0.2	– 0.2	– 0.1	0.1	0.0	– 0.0	– 0.1	– 0.1	– 0.0	– 0.1
<b>Labour productivity per hour (growth rate)</b>	2.0	3.1	2.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.7
TFP (growth rate)	2.1	2.4	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2
Capital deepening (contribution to labour productivity growth)	– 0.1	0.7	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<b>GDP per capita (growth rate)</b>	2.2	1.9	1.4	1.1	1.3	1.6	1.6	1.5	1.4	1.4	1.5	1.5
<b>GDP per worker (growth rate)</b>	3.5	3.1	2.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.8
<b>GDP in 2010 prices (EUR million)</b>	180.3	206.1	226.2	243.0	259.9	280.4	303.4	327.2	351.6	376.9	404.9	
<b>Labour force assumptions</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Population (20–64) ('000)</b>	3 216	3 164	3 103	3 047	3 009	3 003	3 034	3 033	3 009	2 987	2 957	– 259
<b>Population growth (20–64)</b>	0.4	– 0.3	– 0.4	– 0.3	– 0.2	0.1	0.1	– 0.0	– 0.2	– 0.2	– 0.1	– 0.6
<b>Labour force 20–64 ('000)</b>	2 545	2 531	2 507	2 463	2 433	2 435	2 450	2 448	2 433	2 413	2 398	– 147
<b>Participation rate (20–64)</b>	79.1	80.0	80.8	80.8	80.9	81.1	80.8	80.7	80.9	80.8	81.1	2.0
<b>Participation rate (15–64)</b>	74.6	75.7	76.4	76.1	76.0	76.1	75.9	76.0	76.2	76.1	76.2	1.7
young (15–24)	50.0	52.2	51.3	50.4	50.6	50.9	51.2	51.4	51.2	50.9	50.8	0.8
prime age (25–54)	87.5	87.3	87.2	87.2	87.2	87.3	87.4	87.3	87.4	87.4	87.4	– 0.1
older (55–64)	60.5	63.6	66.6	66.6	65.6	66.6	65.9	65.8	66.4	65.4	65.8	5.3
<b>Participation rate (15–64) FEMALES</b>	72.8	73.9	74.7	74.5	74.5	74.8	74.6	74.7	74.8	74.7	74.9	2.1
young (15–24)	50.1	52.5	51.6	50.8	51.0	51.3	51.5	51.7	51.5	51.3	51.2	1.1
prime age (25–54)	84.4	84.2	84.1	84.2	84.4	84.7	84.8	84.7	84.7	84.8	84.8	0.4
older (55–64)	60.9	64.0	67.1	67.3	66.3	66.9	66.5	66.7	67.3	66.3	66.7	5.8
<b>Participation rate (15–64) MALES</b>	76.3	77.5	78.1	77.7	77.4	77.5	77.3	77.3	77.6	77.4	77.6	1.2
young (15–24)	49.9	52.0	51.0	50.0	50.1	50.5	50.8	51.1	50.9	50.5	50.4	0.6
prime age (25–54)	90.5	90.3	90.1	90.0	89.8	89.7	89.8	89.9	90.0	90.0	89.9	– 0.6
older (55–64)	60.2	63.3	66.1	66.0	64.9	66.2	65.4	65.0	65.5	64.6	65.0	4.8

<b>Employment rate (20–64)</b>	73.1	75.2	76.0	76.1	76.1	76.3	76.0	76.0	76.1	76.0	76.3	3.2
<b>Employment rate (15–74)</b>	60.8	61.5	61.0	61.3	61.3	61.6	62.1	62.2	61.7	61.4	61.4	0.6
<b>Unemployment rate (20–64)</b>	7.7	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	– 1.8
<b>Unemployment rate (15–74)</b>	8.5	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	– 2.1
<b>Employment (20–64) (million)</b>	2.4	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	– 0.1
<b>Employment (15–64) (million)</b>	2.4	2.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.3	2.3	– 0.1
Share of young (15–24) (%)	11	12	11	11	11	12	12	12	11	11	11	1
Share of prime age (25–54) (%)	71	70	70	71	72	71	70	70	70	71	72	1
Share of older (55–64) (%)	18	18	19	19	17	17	18	18	18	18	17	– 1
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	22.1	21.4	21.3	20.9	19.3	19.2	20.3	20.5	20.8	20.3	19.3	– 2.8
<b>Old-age dependency ratio (²)</b>	26	32	37	40	43	44	43	44	45	46	48	21
<b>Total dependency ratio (³)</b>	51	58	64	69	71	72	71	71	73	74	76	25
<b>Total economic dependency ratio (⁴)</b>	118	118	123	129	133	134	133	133	135	137	138	20
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	37	42	48	53	57	59	58	58	60	61	63	27
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	36	41	46	51	55	57	56	57	58	59	61	25

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## SWEDEN EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.94	1.93	1.93	1.93	1.92	1.92	1.92	1.91	1.91	1.91	1.90	– 0.0
<b>Life expectancy at birth</b>												
males	79.4	80.1	80.8	81.4	82.1	82.7	83.3	83.8	84.4	85.0	85.5	6.1
females	83.4	84.1	84.8	85.4	86.0	86.6	87.2	87.7	88.3	88.8	89.3	5.9
<b>Life expectancy at 65</b>												
males	18.2	18.7	19.2	19.6	20.1	20.5	21.0	21.4	21.8	22.3	22.7	4.4
females	21.1	21.6	22.1	22.6	23.1	23.5	24.0	24.5	24.9	25.3	25.7	4.7
<b>Net migration ('000)</b>	59.9	44.0	28.2	27.1	26.0	24.9	23.8	22.7	21.7	20.6	19.5	– 40.4
<b>Net migration as % of population</b>	0.6	0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	– 0.5
<b>Population (million)</b>	9.4	9.8	10.1	10.4	10.6	10.8	10.9	11.1	11.2	11.4	11.5	2.2
Children population (0–14) as % of total population	16.6	17.3	17.9	18.0	17.6	17.0	16.5	16.5	16.8	16.9	16.8	0.2
Prime-age population (25–54) as % of total population	39.1	39.2	39.0	37.2	36.2	36.1	36.2	35.7	35.1	35.4	35.5	– 3.6
Working-age population (15–64) as % of total population	65.1	62.8	61.4	60.5	59.9	59.6	59.4	59.2	58.6	57.7	56.9	– 8.2
Elderly population (65 and over) as % of total population	18.3	19.8	20.7	21.5	22.5	23.5	24.1	24.2	24.5	25.4	26.3	8.0
Very elderly population (80 and over) as % of total population	5.3	5.2	5.4	6.4	7.6	8.1	8.3	8.8	9.4	9.9	10.0	4.7
Very elderly population (80 and over) as % of elderly population	28.9	26.0	26.1	30.0	33.9	34.3	34.5	36.3	38.4	38.8	37.8	8.9
Very elderly population (80 and over) as % of working age population	8.1	8.2	8.8	10.6	12.7	13.5	14.0	14.9	16.1	17.1	17.5	9.4
<b>Macroeconomic assumptions*</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	AVG 2010–60
<b>Potential GDP (growth rate)</b>	5.5	1.6	1.7	1.8	1.7	1.8	1.8	1.8	1.6	1.5	1.7	1.9
<b>Employment (growth rate)</b>	1.1	– 0.1	0.2	0.2	0.2	0.3	0.3	0.2	0.1	– 0.0	0.1	0.3
<b>Labour input: hours worked (growth rate)</b>	2.5	– 0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.1	– 0.0	0.1	0.3
<b>Labour productivity per hour (growth rate)</b>	2.9	1.8	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6
TFP (growth rate)	3.3	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
Capital deepening (contribution to labour productivity growth)	– 0.4	0.7	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
<b>GDP per capita (growth rate)</b>	4.2	0.9	1.1	1.3	1.4	1.5	1.5	1.4	1.3	1.2	1.5	1.4
<b>GDP per worker (growth rate)</b>	4.4	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6
<b>GDP in 2010 prices (EUR million)</b>	346.1	389.3	426.0	465.0	507.3	553.9	605.8	662.6	720.0	777.3	840.7	
<b>Labour force assumptions</b>	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Population (20–64) ('000)</b>	5 481	5 628	5 661	5 689	5 725	5 761	5 833	5 937	5 988	5 952	5 915	434
<b>Population growth (20–64)</b>	0.8	0.4	0.0	0.2	– 0.0	0.3	0.3	0.3	0.1	– 0.3	0.1	– 0.7
<b>Labour force 20–64 ('000)</b>	4 630	4 815	4 891	4 931	4 961	5 003	5 076	5 165	5 205	5 175	5 172	542
<b>Participation rate (20–64)</b>	84.5	85.5	86.4	86.7	86.7	86.8	87.0	87.0	86.9	87.0	87.4	3.0
<b>Participation rate (15–64)</b>	79.1	81.1	81.5	81.4	81.2	81.2	81.4	81.7	81.8	81.6	81.9	2.8
young (15–24)	51.9	56.3	52.7	52.2	52.9	53.0	53.5	54.1	53.7	53.0	52.9	1.0
prime age (25–54)	90.0	90.5	91.2	91.7	91.9	91.9	92.0	92.0	92.0	92.1	92.2	2.1
older (55–64)	73.9	74.8	75.7	76.6	76.4	76.9	77.6	78.1	78.0	76.6	77.9	3.9
<b>Participation rate (15–64) FEMALES</b>	76.5	78.3	78.8	78.7	78.5	78.5	78.8	79.1	79.1	79.0	79.3	2.7
young (15–24)	51.8	56.0	52.9	52.5	53.0	53.0	53.5	54.0	53.7	53.1	53.0	1.2
prime age (25–54)	87.1	87.5	88.1	88.7	89.0	89.1	89.2	89.2	89.3	89.4	89.4	2.3
older (55–64)	69.8	70.6	71.1	71.7	71.4	71.7	72.3	72.9	73.0	71.4	72.9	3.1
<b>Participation rate (15–64) MALES</b>	81.6	83.8	84.2	84.1	83.8	83.8	84.0	84.3	84.4	84.2	84.3	2.7
young (15–24)	52.1	56.7	52.6	52.0	52.8	52.9	53.5	54.2	53.7	53.0	52.9	0.8
prime age (25–54)	92.8	93.5	94.1	94.5	94.7	94.7	94.6	94.6	94.6	94.7	94.7	1.9
older (55–64)	78.0	78.9	80.2	81.4	81.5	82.0	82.8	83.1	82.8	81.6	82.8	4.7



<b>Employment rate (20–64)</b>	78.3	80.5	81.4	81.7	81.7	81.9	82.1	82.0	81.9	82.0	82.5	4.2
<b>Employment rate (15–74)</b>	64.6	66.3	66.9	67.4	67.1	66.6	66.7	67.3	67.5	66.9	66.3	1.8
<b>Unemployment rate (20–64)</b>	7.3	5.9	5.8	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	– 1.6
<b>Unemployment rate (15–74)</b>	8.4	6.5	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.3	6.3	– 2.0
<b>Employment (20–64) (million)</b>	4.3	4.5	4.6	4.6	4.7	4.7	4.8	4.9	4.9	4.9	4.9	0.6
<b>Employment (15–64) (million)</b>	4.4	4.6	4.7	4.8	4.8	4.9	4.9	5.0	5.0	5.0	5.0	0.6
Share of young (15–24) (%)	11	12	10	10	11	11	12	11	11	11	11	0
Share of prime age (25–54) (%)	70	71	72	70	70	70	70	69	68	70	71	1
Share of older (55–64) (%)	19	18	18	19	19	19	18	20	21	19	18	– 1
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	19.5	18.6	19.2	20.1	20.1	19.2	18.8	20.0	21.3	19.6	18.0	– 1.6
<b>Old-age dependency ratio (²)</b>	28	32	34	35	37	39	41	41	42	44	46	18
<b>Total dependency ratio (³)</b>	54	59	63	65	67	68	68	69	71	73	76	22
<b>Total economic dependency ratio (⁴)</b>	107	104	107	110	112	113	113	113	115	118	120	13
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	36	38	41	43	46	48	49	50	51	53	56	20
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	35	37	39	42	44	46	47	48	49	51	54	18

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## UNITED KINGDOM

## EC-EPC (AWG) 2012 PROJECTIONS

### MAIN DEMOGRAPHIC AND MACROECONOMIC ASSUMPTIONS

Demographic projections — EUROPOP2010 (Eurostat)	2010	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	Change 2010–60
<b>Fertility rate</b>	1.94	1.94	1.93	1.93	1.93	1.92	1.92	1.92	1.91	1.91	1.91	– 0.0
<b>Life expectancy at birth</b>												
males	78.3	79.1	79.9	80.6	81.4	82.1	82.7	83.4	84.0	84.6	85.2	7.0
females	82.4	83.2	83.9	84.7	85.4	86.0	86.7	87.3	87.9	88.5	89.1	6.7
<b>Life expectancy at 65</b>												
males	18.0	18.5	19.0	19.5	20.0	20.5	21.0	21.4	21.9	22.3	22.8	4.8
females	20.7	21.2	21.8	22.3	22.8	23.3	23.8	24.3	24.8	25.3	25.7	5.0
<b>Net migration ('000)</b>	197.9	195.4	193.0	185.6	178.1	170.7	163.3	155.9	148.5	141.0	133.6	– 64.2
<b>Net migration as % of population</b>	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	– 0.1
<b>Population (million)</b>	62.2	64.4	66.5	68.5	70.4	72.0	73.6	75.1	76.5	77.8	79.0	16.8
Children population (0–14) as % of total population	17.4	17.7	18.2	18.1	17.8	17.4	17.2	17.2	17.3	17.3	17.1	– 0.3
Prime-age population (25–54) as % of total population	41.0	40.6	39.3	37.7	36.8	37.0	36.8	36.4	36.0	36.0	36.2	– 4.9
Working-age population (15–64) as % of total population	66.0	64.3	63.0	62.0	60.8	59.9	59.6	59.7	59.3	58.6	58.3	– 7.7
Elderly population (65 and over) as % of total population	16.5	18.0	18.8	19.8	21.4	22.7	23.2	23.1	23.4	24.1	24.6	8.0
Very elderly population (80 and over) as % of total population	4.7	4.9	5.2	5.7	6.7	7.1	7.7	8.7	9.4	9.5	9.3	4.6
Very elderly population (80 and over) as % of elderly population	28.2	27.3	27.8	28.7	31.3	31.5	33.5	37.5	40.0	39.5	37.8	9.7
Very elderly population (80 and over) as % of working age population	7.1	7.6	8.3	9.2	11.0	11.9	13.0	14.5	15.8	16.2	15.9	8.9
<b>Macroeconomic assumptions*</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>AVG 2010–60</b>
<b>Potential GDP (growth rate)</b>	1.3	3.4	2.1	1.9	1.9	1.9	2.0	1.9	1.8	1.7	1.8	2.0
<b>Employment (growth rate)</b>	0.2	0.0	0.4	0.4	0.3	0.4	0.5	0.4	0.2	0.2	0.2	0.3
<b>Labour input: hours worked (growth rate)</b>	– 0.4	0.2	0.4	0.4	0.3	0.4	0.5	0.4	0.2	0.2	0.2	0.3
<b>Labour productivity per hour (growth rate)</b>	1.6	3.2	1.7	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.7
TFP (growth rate)	1.0	2.4	1.1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.1
Capital deepening (contribution to labour productivity growth)	0.6	0.8	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.6
<b>GDP per capita (growth rate)</b>	– 0.5	2.7	1.4	1.3	1.4	1.5	1.6	1.5	1.4	1.4	1.5	1.5
<b>GDP per worker (growth rate)</b>	1.0	3.4	1.6	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.6
<b>GDP in 2010 prices (EUR million)</b>	1 694.5	1 928.2	2 151.5	2 370.1	2 599.7	2 856.8	3 152.5	3 477.3	3 807.8	4 148.7	4 523.3	
<b>Labour force assumptions</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Population (20–64) ('000)</b>	37 178	37 750	38 340	38 515	38 612	38 834	39 574	40 575	41 062	41 238	41 547	4 369
<b>Population growth (20–64)</b>	1.6	0.3	0.2	0.1	0.0	0.2	0.5	0.4	0.1	0.1	0.2	– 1.4
<b>Labour force 20–64 ('000)</b>	29 358	30 106	30 616	30 764	30 899	31 233	31 949	32 685	33 024	33 193	33 515	4 156
<b>Participation rate (20–64)</b>	79.0	79.8	79.9	79.9	80.0	80.4	80.7	80.6	80.4	80.5	80.7	1.7
<b>Participation rate (15–64)</b>	75.4	76.4	76.5	76.2	76.2	76.5	76.8	76.8	76.7	76.6	76.7	1.3
young (15–24)	59.4	60.0	59.1	57.8	58.4	58.6	58.8	59.0	58.8	58.5	58.4	– 0.9
prime age (25–54)	85.0	85.0	84.8	84.7	84.8	84.6	84.5	84.5	84.5	84.5	84.5	– 0.5
older (55–64)	59.9	63.6	66.0	67.4	67.6	68.7	70.7	70.7	70.2	69.9	70.1	10.2
<b>Participation rate (15–64) FEMALES</b>	69.3	70.8	71.3	71.5	71.9	72.4	72.7	72.6	72.5	72.5	72.6	3.2
young (15–24)	56.7	57.1	56.3	55.3	55.8	56.0	56.1	56.2	56.1	55.8	55.8	– 0.9
prime age (25–54)	78.6	79.0	79.0	79.1	79.4	79.5	79.4	79.3	79.3	79.3	79.4	0.8
older (55–64)	51.1	56.3	60.8	63.9	65.2	66.5	68.5	68.3	67.8	67.5	67.7	16.6
<b>Participation rate (15–64) MALES</b>	81.5	81.9	81.6	80.7	80.3	80.5	80.7	80.8	80.7	80.6	80.7	– 0.8
young (15–24)	61.9	62.8	61.8	60.3	60.9	61.2	61.4	61.6	61.3	61.0	61.0	– 1.0
prime age (25–54)	91.4	90.9	90.5	90.2	90.0	89.6	89.4	89.5	89.6	89.5	89.5	– 1.9
older (55–64)	69.2	71.1	71.5	71.0	70.0	70.9	72.8	73.0	72.5	72.2	72.5	3.3

<b>Employment rate (20–64)</b>	73.5	74.1	75.1	75.6	76.0	76.4	76.8	76.6	76.5	76.6	76.8	3.3
<b>Employment rate (15–74)</b>	62.9	62.8	63.3	63.6	63.3	63.4	64.3	65.2	65.2	64.6	64.4	1.5
<b>Unemployment rate (20–64)</b>	6.9	7.1	6.0	5.4	5.1	4.9	4.9	4.9	4.9	4.8	4.8	– 2.1
<b>Unemployment rate (15–74)</b>	7.9	8.0	6.8	6.1	5.8	5.6	5.6	5.5	5.5	5.5	5.5	– 2.4
<b>Employment (20–64) (million)</b>	27.3	28.0	28.8	29.1	29.3	29.7	30.4	31.1	31.4	31.6	31.9	4.6
<b>Employment (15–64) (million)</b>	28.5	29.0	29.8	30.3	30.7	31.1	31.8	32.5	32.8	33.0	33.4	4.9
Share of young (15–24) (%)	14	13	12	13	14	14	14	14	14	14	14	0
Share of prime age (25–54) (%)	72	72	70	69	68	69	69	68	68	69	69	– 2
Share of older (55–64) (%)	15	15	17	19	18	16	17	18	18	18	17	2
<b>Dependency ratios:</b>	<b>2010</b>	<b>2015</b>	<b>2020</b>	<b>2025</b>	<b>2030</b>	<b>2035</b>	<b>2040</b>	<b>2045</b>	<b>2050</b>	<b>2055</b>	<b>2060</b>	<b>Change 2010–60</b>
<b>Share of older population (55–64) (¹)</b>	17.8	17.8	19.5	20.5	19.5	17.7	17.9	19.2	19.6	18.8	17.9	0.1
<b>Old-age dependency ratio (²)</b>	25	28	30	32	35	38	39	39	40	41	42	17
<b>Total dependency ratio (³)</b>	51	55	59	61	64	67	68	67	69	71	72	20
<b>Total economic dependency ratio (⁴)</b>	113	115	117	119	121	122	122	121	122	124	125	12
<b>Economic old-age dependency ratio (15–64) (⁵)</b>	33	37	39	42	45	48	49	49	50	51	53	19
<b>Economic old-age dependency ratio (15–74) (⁶)</b>	33	36	38	40	43	46	47	47	47	49	50	18

**LEGEND:**

\* The potential GDP and its components is used to estimate the rate of potential output growth, net of normal cyclical variations.

(¹) Share of older population = Population aged 55 to 64 as % of population aged 15–64.

(²) Old-age dependency ratio = Population aged 65 and over as % of the population aged 15–64.

(³) Total dependency ratio = Population under 15 and over 64 as % of the population aged 15–64.

(⁴) Total economic dependency ratio = Total population less employed as % of employed population 15–74.

(⁵) Economic old-age dependency ratio (15–64) = Inactive population aged 65+ as % of employed population 15–64.

(⁶) Economic old-age dependency ratio (15–74) = Inactive population aged 65+ as % of employed population 15–74.

NB : = data not provided

Source: Commission services (Directorate-General for Economic and Financial Affairs), Eurostat (EUROPOP2010), EPC (AWG)

## REFERENCES

- Ahn, N., Garcia, J. R., Herce, J. A. (2005), 'Demographic Uncertainty and Healthcare Expenditure in Spain', Documento de Trabajo 2005–07, Paper for the project DEMWEL (Demographic Uncertainty and the Sustainability of Social Welfare System) financed by the European Commission, fifth framework programme of the European Community for research, technological development and demonstration activities (1998–2002).
- Australian Productivity Commission (2005), *Economic Implications of an Ageing Australia*, Research Report, Canberra, Australia.
- Baldacci, E., Tuzi, D. (2003), 'Demographic Trends and Pension System in Italy: An Assessment of 1990s reforms', *Labour*, Vol. 17, Special Issue, Blackwell Publishing.
- Barro, R. J., Sala-i-Martin, X. (1995), *Economic Growth*, McGraw-Hill, USA.
- Batljan, I., Lagergren, M., (2004), 'Inpatient/outpatient healthcare costs and remaining years of life — effect of decreasing mortality on future acute healthcare demand', *Social Science and Medicine*, Vol. 59, pp. 2459–2466.
- Booth, H., Maindonald, J., Smith, L. (2002), 'Applying Lee-Carter under conditions of variable mortality decline', *Population Studies*, 56:325–336.
- Brugiavini, A., Peracchi, F. (2005), 'Fiscal implications of pension reforms in Italy', Gruber, J., Wise, D. A. (eds) (2005), *Social Security Programs and Retirement around the World: Fiscal Implication*, NBER website, 26 July 2005.
- Brugiavini, A., Peracchi, F. (2003), 'Social Security Wealth and Retirement Decisions in Italy', *Labour*, Vol. 17, Special Issue, Blackwell Publishing.
- Burniaux, J.-M., Duval, R., Jaumotte, F. (2003), 'Coping with ageing: a dynamic approach to quantify the impact of alternative policy options on future labour supply in OECD countries', OECD Economics Department Working Paper No 371.
- Busse, R., Krauth, C., Schwartz, F. W., (2002), 'Use of acute hospital beds does not increase as the population ages: results from a seven-year cohort study in Germany', *Journal of Epidemiology and Community Health*, 2002, Vol. 56, pp. 289–293.
- Börsch-Supan, A. (2003), 'Labor market effects of population aging', *Labour*, Vol. 17, Special Issue, Blackwell Publishing.
- Carone, G. (2005), *Long-term labour force projections for the 25 EU Member States: A set of data for assessing the impact of ageing*, Directorate-General for Economic and Financial Affairs, European Economy Economic Papers, No 235.
- Carone, G., Costello, D., Diez Guardia, N., Mourre, G., Przywara, B., Salomaki, A. (2005), *The economic impact of ageing populations in the EU25 Member States*, Directorate-General for Economic and Financial Affairs, European Economy Economic Papers, No 236.
- Carone, G., Denis C., McMorro, K., Mourre, G., Röger, W. (2006), *Long-term labour productivity and GDP projections for the EU25 Member States: a production function framework*, Directorate-General for Economic and Financial Affairs, European Economy Economic Papers, No 253.
- Comas-Herrera, A., Wittenberg, R., Pickard, L. (2005): 'Making projections of public expenditure on long-term care for the European member states: Methodological proposal for discussion', paper presented at the Commission-AWG-OECD workshop on 21 and 22 February 2005.
- Czypionka, T., Müllbacher, S., Riedel, M., Röhring, G., (2007) 'Death-related Costs in Austria', *Health System Watch Quarterly*, Institute for Advanced Studies, Austria.
- Denis, C., Grenouilleau, D., Mc Morrow, K., Röger, W. (2006): *Calculating potential growth rates and output gaps — A revised production function approach*, Directorate-General for Economic and Financial Affairs, European Economy Economic Papers, No 247.
- Dolbhammer, G., Kytir, J., (2001) 'Compression or expansion of morbidity? Trends in healthy-life expectancy in the elderly Austrian

population between 1978 and 1998', *Social Science & Medicine*, Vol. 52, No 3, pp. 385–391.

Downes, J., Drew, A., Ollivaud, P. (2003), 'The OECD medium-term reference scenario: economic outlook', OECD Economics Department Working Papers, No 372, Paris.

Duval, R. (2003), 'The retirement effects of old-age pension and early retirement schemes in OECD countries', OECD Economics Department Working Papers, No 370, Paris.

Dybczak, K., Przywara, B. (2010): *The role of technology in healthcare expenditure in the EU*, Directorate-General for Economic and Financial Affairs, European Economy Economic Papers, No 400.

Economic Policy Committee (2001), 'Budgetary challenges posed by ageing populations', EPC/ECFIN/655/01-EN of 24 October 2001.

Economic Policy Committee (2003a), 'The impact of ageing populations on public finances: overview of analysis carried out at EU level and proposals for a future work programme', EPC/ECFIN/407/04-rev.3-EN of 22 October 2003.

Economic Policy Committee (2003b), 'Budgetary challenges posed by ageing population: the impact on public spending on education', EPC/ECFIN/435 of 22 October 2003.

Economic Policy Committee (2008), 'The 2009 budgetary projection exercise of the Ageing Working Group: Second progress report to the EPC', ECFIN/CEFCPE(2008) REP/ 52951 rev, Brussels, 23 June 2008.

Economic Policy Committee and European Commission (2005), *The 2005 projections of age-related expenditure (2004–50) for the EU-25 Member States: underlying assumptions and projection methodologies*, European Economy Special Report, No 4/2005.

Economic Policy Committee and European Commission (2008), *The 2009 Ageing Report: underlying Assumptions and projection methodologies for the EU-27 Member States (2007–60)*, European Economy, No 7, December 2008.

Economic Policy Committee and European Commission (2006), *The impact of ageing on public expenditure: projections for the EU25 Member States on pensions, health care, long-term care, education and unemployment transfers (2004–50)*, European Economy, Special Report, No 1/2006.

Economic Policy Committee and European Commission (2007) *Pensions Schemes and Projection Models in EU-25 Member States*, European Economy Occasional Papers, No 35, November 2007.

European Commission (2006), *The long-term sustainability of public finances in the European Union*, European Economy, No 4/2006.

European Commission (2008a), *Economic forecast — Spring 2008*, European Economy, No 1/2008.

European Commission (2008b), *Public finances in EMU in 2008*, European Economy, No 4/2008.

Economic Policy Committee and European Commission (EPC-EC) (2009), *The 2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2008–60)*, European Economy, No 2, April 2009, Directorate-General for Economic and Financial Affairs, European Commission, 2009 ([http://ec.europa.eu/economy\\_finance/publications/publication14992\\_en.pdf](http://ec.europa.eu/economy_finance/publications/publication14992_en.pdf)).

European Commission, Directorate-General for Economic and Financial Affairs (2011a), 'Health and long-term care expenditure projections: availability/collection of data', note for the attention of the Ageing Working Group of the EPC, ECFIN/C2(2011)128176.

European Commission, Directorate-General for Economic and Financial Affairs (2011b), 'Long-term care expenditure projections: methodology and main assumptions', Note for the attention of the Ageing Working Group of the EPC, ECFIN/C2(2011)545542.

Eurostat (2004), 'Classification of funded pension schemes in case of government responsibility or guarantee', News release 30/2004, 2 March 2004.

- Eurostat (2005a), 'EU25 population rises until 2025, then falls', Eurostat press release 448/2005, 8 April 2005.
- Eurostat (2005b), 'AWG ad hoc scenario', presentation to the AWG meeting, 16 June 2006.
- Eurostat (2008a), 'Ageing characterises the demographic perspectives of the European societies', *Statistics in Focus*, No 72/2008.
- Eurostat (2008b), 'Population projections 2008–60 — From 2015, deaths projected to outnumber births in the EU-27', News release No 119/2008, 26 August 2008, EUROPOP2008 convergence scenario is available online ([http://epp.eurostat.ec.europa.eu/portal/page?\\_pageid=1996,45323734&\\_dad=portal&\\_schema=PORTAL&screen=welcomeref&open=/data/popul/populat/proj/proj\\_08c&language=en&product=EU\\_MAIN\\_TREE&root=EU\\_MAIN\\_TREE&scrollto=263](http://epp.eurostat.ec.europa.eu/portal/page?_pageid=1996,45323734&_dad=portal&_schema=PORTAL&screen=welcomeref&open=/data/popul/populat/proj/proj_08c&language=en&product=EU_MAIN_TREE&root=EU_MAIN_TREE&scrollto=263)).
- Eurostat (2009), 'Methodology and main results of the Eurostat Population Projections 2008-based (EUROPOP2008)', Eurostat, Methodologies and Working Papers series, Luxembourg, forthcoming.
- Eurostat (2011), 'Eurostat Population Projections 2010-based "EUROPOP2010": Methodology and results of a long-term scenario of demographic convergence' (forthcoming).
- Fries, J. F., (1980), 'Ageing, natural death, and the compression of morbidity', *The New England Journal of Medicine*, Vol. 303, pp. 130–135.
- Fries, J. F., (1989), 'The compression of morbidity: near or far?', *Milbank Memorial Fund Quarterly*, Vol. 67, pp. 208–232.
- Fries, J. F., (2005), 'The compression of morbidity', *Milbank Quarterly*, Vol. 83, No 4, pp. 801–823.
- Gabriele, S., Cislighi, C., Costantini, F., Innocenti, F., Lepore, V., Raitano, M., Tediosi, F., Valerio, M., Zocchetti, C., (2005), 'Demographic factors and health expenditure profiles by age: the case of Italy', Società Italiana di Economia Pubblica, Dipartimento di Economia Pubblica e Territoriale, Università di Pavia.
- Getzen, T. E., (2000), 'Healthcare is an individual necessity and a national luxury: Applying multilevel decision models to the analysis of healthcare expenditures', *Journal of Health Economics*, Vol. 19(2), pp. 259–270.
- Gruber, J., Wise, D. A. (2002), 'Social Security Programs and Retirement Around the World: Micro Estimation', NBER Working Paper No 9407.
- Gruber, J., Wise, D. A. (2005a), 'Social Security Programs and Retirement Around the World: Fiscal Implications — Introduction and summary', NBER Working Paper No 11290.
- Gruber, J., Wise, D. A. (eds) (2005b), 'Social Security Programs and Retirement around the World: Fiscal Implications', NBER website, 26 July 2005 (<http://www.nber.com/books/intlSS-p3/index.html>).
- Gruenberg, E. M., (1977), 'The failure of success', *Milbank Memorial Fund Quarterly*, Vol. 55, pp. 3–24.
- Hatton, T. J., Williamson, J. G. (2003), 'What fundamentals drive world migration?', Discussion Paper No 2003/23, United Nations University/World Institute for Development Economics Research, March 2003.
- Jagger, C., Matthews, R., Matthews, F., Robinson, T., Robine, J. M., Brayne, C., and the Medical Research Council Cognitive Function and Ageing Study Investigators (2007), 'The burden of disease on disability-free life expectancy in later life', *The Journals of Gerontology*, Series A, Biological Sciences and Medical Sciences, Vol. 62, No 4, pp. 408–414.
- Lafortune, G., Balestat, G., and the Disability Study Expert Group Members, (2007), 'Trends in severe disability among elderly people: assessing the evidence in 12 OECD countries and the future implications', OECD Health Working Papers No 26, OECD.
- Latulippe, D. (1996), 'Effective retirement age and duration of retirement in the industrial countries between 1950 and 1990', ILO, Issues in Social Protection Discussion Paper No 2.



- Lanzieri, (2011), 'The greying of the baby boomers — A century-long view of ageing in European populations', Eurostat, *Statistics in Focus*, 23/2011.
- Madsen, M. (2004), 'Methodologies to incorporate "death-related" costs in projections of health and long-term care based on Danish data', Ministry of Finance, Denmark.
- Manton, K. G. (1982), 'Changing concepts of morbidity and mortality in the elderly population', *Milbank Memorial Fund Quarterly*, Vol. 60, pp. 183–244.
- Montanino, A., Przywara, B., Young, D. (2004), *Investment in Education: the Implications for Economic Growth and Public Finances*, European Economy Economic Papers, No 217.
- Mor, V., (2005), 'The compression of morbidity hypothesis: a review of research and prospects for the future', *Journal of the American Geriatrics Society*, Vol. 53, No 9, pp. S308–S309.
- Nusselder, W. J., (2003), 'Compression of morbidity', Robine, J. M., Jagger, C., Mathers, C. D., Crimmins, E. M., Suzman, R. M., (eds), *Determining Health Expectancies*, John Wiley & Sons, Ltd, Chichester, United Kingdom.
- OECD (2003), 'Labour force participation of groups at the margin of the labour market: past and future trends and policy challenges', Working Party No 1 on Macroeconomic and Structural Policy Analysis, ECO/CPE/WPI(2003)8.
- OECD (2006), *Costs of Care for Elderly Populations*, Guidelines for estimating long-term care expenditure, DELSA/HEA/DIS(2006)4, 14 February 2006.
- OECD (2007), 'Data collection on long-term care (focusing on recipients)', meeting of OECD Health Data National Correspondents, DELSA/HEA/HD(2007)7, 28 September 2007.
- OECD (2000), *A System of Health Accounts*, Version 1.0.
- Olshansky, S. J., Rudberg, M. A., Carnes, B. A., Cassel, C. K., Brody, J. A. (1991), 'Trading off longer life for worsening health', *Journal of Aging and Health*, Vol. 3, pp. 194–216.
- Polder, J. J., Barendregt, J. J., Van Oers, H. (2006), 'Healthcare costs in the last year of life — The Dutch experience', *Journal of Social Science & Medicine*, Vol. 63, Issue 7, October 2006, p. 1720–1731.
- Raitano, M. (2006), *The Impact of Death-Related Costs on Health-Care Expenditure: A Survey*, ENEPRI Research Report No 17.
- Robine, J. M., Michel, J. P., (2004), 'Looking Forward to a General Theory on Population Aging', *The Journals of Gerontology*, Series A, Biological Sciences and Medical Sciences, Vol. 59 No 6, pp. M590–M597.
- Robine, J. M., Jagger, C., Mathers, C. D., Crimmins, E. M., Suzman, R. M., (2003a), 'Trends in health expectancies', Robine, J. M., Jagger, C., Mathers, C. D., Crimmins, E. M., Suzman, R. M. (eds), *Determining Health Expectancies*, John Wiley & Sons, Ltd, Chichester, United Kingdom.
- Robine, J. M., Jagger, C., Mathers, C. D., Crimmins, E. M., Suzman, R. M. (eds), (2003b), *Determining Health Expectancies*, John Wiley & Sons, Ltd, Chichester, United Kingdom.
- Rogers, A., Castron, L. J. (1981), *Model Migration Schedules*, IIASA Research Report RR-81-03, Laxenburg, Austria.
- Scherer, P. (2002), *Age of withdrawal from the labour force in the OECD countries*, Labour Market and Social policy Occasional Papers, No 49-DELSA.
- Schmertmann, C. (2003), 'A system of model fertility schedules with graphically intuitive parameters', *Demographic Research*, 9:81–110.
- Schmertmann, C. (2005): 'Quadratic spline fits by nonlinear least squares', *Demographic Research*, 12:105–106.
- Seshamani, M., Gray, A. M. (2004), 'A longitudinal study of the effects of age and time to death on hospital costs', *Journal of Health Economics*, Vol. 23, No 2, pp. 217–235.
- Siegel, J. S., Swanson, D. A. (eds) (2004), *The Methods and Materials of Demography*, Second edition, Elsevier Academic Press, San Diego (USA).

Solow, R. M. (1956), 'A Contribution to the Theory of Economic Growth', *Quarterly Journal of Economics*, No 70, pp. 65–94.

Suhrcke, M., Fumagalli, E., Hancock, R. (2010) 'Is There a Wealth Dividend of Aging Societies', *Public Health Reviews*, Issue 2 — Ageing Societies, Vol. 32

United Nations (2004), *World Population Prospects: The 2002 Revision*, Vol. III: Analytical Report, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat.

United Nations (2008), *World Population Prospects: The 2006 Revision*, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat.

United Nations (2010), *World Population Prospects: The 2008 Revision*, Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat.

van Elk, R., Mot, E., Franses, P. H. (2009), 'Modelling healthcare expenditures: overview of the literature and evidence from a panel time series model', CPB Discussion Paper No 121, Netherlands Bureau for Economic Policy Analysis.

Verbrugge, L. M. (1984), 'Longer life but worsening health? Trends in health and mortality of middle-aged and older persons', *Milbank Memorial Fund Quarterly*, Vol. 62, pp. 475–519.





## EUROPEAN ECONOMY SERIES

Previous titles in the European Economy series can be accessed and downloaded free of charge from the following address:

[ec.europa.eu/economy\\_finance/publications/](http://ec.europa.eu/economy_finance/publications/)

### 2009

---

- 1-2009 • Five years of an enlarged European Union
- 2-2009 • The 2009 Ageing Report: Economic and budgetary projections for the EU-27 Member States (2007-2060)
- 3-2009 • Economic Forecast – Spring 2009
- 4-2009 • Monitoring revenue trends and tax reforms in Member States (Joint EC-EPC 2008 Report)
- 5-2009 • Public Finances in EMU 2009
- 6-2009 • Annual report on the euro area 2009
- 7-2009 • Economic Crisis in Europe: Causes, Consequences and Responses
- 8-2009 • Labour market and wage developments in 2008
- 9-2009 • Sustainability Report - 2009
- 10-2009 • European Economic Forecast – Autumn 2009
- 11-2009 • Product Market Review 2009 – Microeconomic Consequences of the Crisis and Implications for the Recovery

### 2010

---

- 1-2010 • Surveillance of Intra-Euro-Area Competitiveness and Imbalances
- 2-2010 • European Economic Forecast – Spring 2010
- 3-2010 • Convergence Report 2010
- 4-2010 • Public Finances in EMU 2010
- 5-2010 • Labour market and wage developments in 2009
- 6-2010 • Monitoring tax revenues and tax reforms in EU Member States – 2010 – Tax policy after the crisis
- 7-2010 • European Economic Forecast – Autumn 2010
- 8-2010 • Product Market Review - 2010-2011

### 2011

---

- 1-2011 • European Economic Forecast – Spring 2011
- 2-2011 • Labour market developments – 2011
- 3-2011 • Public finances in EMU – 2011
- 4-2011 • The 2012 Ageing Report: Underlying Assumptions and Projection Methodologies





European Commission

**European Economy – 4/2011 – The 2012 Ageing Report: Underlying Assumptions and Projection Methodologies**

Luxembourg: Publications Office of the European Union

2011 — 322 pp. — 21 x 29.7 cm

ISBN 978-92-79-19298-2

doi:10.2765/15373

Price (excluding VAT) in Luxembourg: EUR 50



## **How to obtain EU publications**

### **Free publications**

- via EU Bookshop (**<http://bookshop.europa.eu>**);
- at the European Commission's representations or delegations.  
You can obtain their contact details on the internet (<http://ec.europa.eu>) or by sending a fax to +352 2929-42758.

### **Priced publications:**

- via EU Bookshop (<http://bookshop.europa.eu>);
- Priced subscriptions (e.g annual series of the Official Journal of the European Union, and the reports of cases before the Court of Justice as well before the Court of Justice of the European Union):

via one of the sales agents of the Publications Office of the European Union ([http://publications.europa.eu/others/agents/index\\_en.htm](http://publications.europa.eu/others/agents/index_en.htm)).

In 2009, the ECOFIN Council gave the Economic Policy Committee (EPC) a mandate to update its common exercise of age-related expenditure projections by the autumn of 2012 on the basis of a new population projection by Eurostat.

The long-term age-related expenditure projections provide an indication of the timing and scale of changes in economic developments that could result from an ageing population in a 'no-policy change' scenario. The projections show where (in which countries), when, and to what extent ageing pressures will accelerate as the baby-boom generation retires and average life span in the EU continues to increase. Hence, the updated projections of age-related expenditure and the associated sustainability assessments will provide important insights on both the economic impact of ageing and the risks to the long-term sustainability of Member States' public finances reflecting new economic environment, affected by a durable impact of the current crisis, and further reform effort by EU MS.

This first report provides a description of underlying macroeconomic assumptions and projection methodologies of the age-related expenditure projections for all Member States. On the basis of these underlying assumptions and methodologies, age-related expenditures covering pensions, health care, long-term care, education and unemployment transfers will be calculated and presented to the ECOFIN Council in May 2012.

Price (excluding VAT) in Luxembourg: EUR 50

European Economy (6 issues minimum per year): EUR 160

The annual subscription runs from 1 January to 31 December of each year.

Payments to be made only to sales agents on the list (see inside backcover for details).

These are surface mail rates. For air subscription rates, please apply to the sales offices.

[www.ec.europa.eu/economy\\_finance](http://www.ec.europa.eu/economy_finance)



ISBN 978-92-79-19298-2

