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Deliverable 7
Regional population dynamics: a report assessing the effects of demographic developments on regional competitiveness and cohesion

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This basic report exists only in an electronic version.

TABLE OF CONTENTS

LIST OF TABLES v

LIST OF FIGURES vi

LIST OF APPENDIX FIGURES vii

1. OVERVIEW OF THE SCENARIO PROJECTIONS AND INDICATORS 1

1.1 Introduction 1
1.2 The projection model 2
1.3 Plan of the report 4

2. TOTAL POPULATION CHANGE 5

2.1 Europe-wide trends in population and components of change by scenario 5
2.2 Country trends in population and components of change by scenario 14
2.3 Region trends in population and components of change by scenario 17
2.4 Regional trends by cluster 37
2.5 Regional population re-distribution using density and income gradients 40

3. THE AGEING OF EUROPE 42

3.1 Europe-wide trends in population ageing by scenario 42
3.2 Country trends in population ageing by scenario 46
3.3 Region trends in population ageing by scenario 49

4. THE FUTURE LABOUR FORCE OR EUROPE 60

4.1 Labour force participation 60
4.1.1 Labour force participation rates: ESPON space 60
4.1.2 Labour force participation rates: countries 62
4.1.3 Activity rates: typology of regions 74
4.2 Trends in the labour force 83
4.2.1 Trends in the labour force: ESPON space 83
4.2.2 Trends in the labour force: countries 85
4.2.3 Trends in the labour force: typology of regions 90
4.2.4 Regional trends 94
4.3 Dependency ratio 99
4.3.1 Dependency ratio: ESPON space 99
4.3.2 Dependency ratios: countries 100
4.3.3 Dependency ratios: typology of regions 106
4.4 Labour productivity 112
4.4.1 Labour productivity: ESPON space 112
4.4.2 Labour productivity: countries 114
4.4.3 Labour productivity: typology of regions 116

4.5 Dynamics of the age structure of the labour force 117
4.5.1 Dynamics of the age structure of the labour force: ESPON space 117
4.5.2 Dynamics of the age structure of the labour force: countries 119
4.5.3 Dynamics of the age structure of the labour force: typology of regions 120

5. PROJECTION DATABASE 122

6. WHAT THE RESULTS SAY ABOUT ALTERNATIVE FUTURES FOR COHESION AND COMPETITIVENESS 124

REFERENCES 126

APPENDIX 127

LIST OF TABLES

Table 2-1: Europe: projected populations for the policy scenarios, 2005-2050 5
Table 2-2: Europe: projected populations, UN and Eurostat, 2005-2050 6
Table 2-3: Europe: projected births for the policy scenarios, 2005-2050 9
Table 2-4: Europe: projected deaths for the policy scenarios, 2005-2050 10
Table 2-5: Europe: projected natural increase for the policy scenarios, 2005-2050 10
Table 2-6: Europe: projected internal migration for the policy scenarios, 2005-2050 11
Table 2-7: Europe: projected inter-country migration for the policy scenarios, 2005-2050 12
Table 2-8: Europe: projected Extra-Europe immigration for the policy scenarios, 2005-2050 13
Table 2-9: Europe: projected Extra-Europe emigration for the policy scenarios, 2005-2050 13
Table 2-10: Europe: projected Extra-Europe net migration for the policy scenarios, 2005-2050 14
Table 2-11: Clusters: projected populations for the policy scenarios, 2005-2050 38
Table 2-12: The regional redistribution of population across density and income gradients under four policy scenarios, 2005-2050 41
Table 3-1: Europe: projected age group populations for the policy scenarios, 2005-2050 43
Table 3-2: Europe: projected age structure indicators for the status quo and policy scenarios, 2005-2050 46
Table 4-1: Labour force participation rates of males 66
Table 4-2: Labour force participation rates of females 72
Table 4-3: Labour force participation rates of males, types 79
Table 4-4: Labour force participation rates of females, types 83
Table 4-5: Labour force, ESPON space (x mln) 84
Table 4-6: Labour force (x 1 000) 89
Table 4-7: Estimate of yearly change of GDP per person (%) according to yearly change in labour productivity (%), 2005-2050, ESPON space 114
Table 4-8: Estimate of yearly change of GDP per person (%) according to yearly change in labour productivity (%), 2005-2050, countries 116
Table 4-9: Estimate of yearly change of GDP per person (%) according to yearly change in labour productivity (%), 2005-2050, typology of regions 117
Table 4-10: Balance between younger and older part of the labour force [1], ESPON space 119
Table 4-11: Balance between younger and older part of the labour force[1], countries 120
Table 4-12: Balance between younger and older part of the labour force[1], typology of regions 121
Table 5-1: Scenario output files for total populations and components of change 122
Table 5-2: Scenario output files for populations by 5 year age groups 123

LIST OF FIGURES

Figure 2-1: Scenario profile for population stocks and components of change, 2005-50: Europe 8
Figure 2-2: Scenario profile for population stocks and components of change, 2005-50: Romania 15
Figure 2-3: Scenario profile for population stocks and components of change, 2005-50: United Kingdom 16
Figure 2-4: Percentage change in regional populations, status quo projection, 2005-50 18
Figure 2-5: Percentage change in regional populations, four policy scenarios, 2005-50 19
Figure 2-6: Percentage change in regional births, status quo projection, 2005-50 20
Figure 2-7: Percentage change in regional births, four policy scenarios, 2005-50 21
Figure 2-8: Percentage change in regional deaths, status quo projection, 2005-50 22
Figure 2-9: Percentage change in regional deaths, four policy scenarios, 2005-50 23
Figure 2-10: Net internal migration rates per 1000 population, status quo projection, 2005-10 25
Figure 2-11: Net internal migration rates per 1000 population, four policy scenarios, 2005-10 26
Figure 2-12: Net internal migration rates per 1000 population, status quo projection, 2045-50 27
Figure 2-13: Net internal migration rates per 1000 population, four policy scenarios, 2045-50 28
Figure 2-14: Net inter-country migration rates per 1000 population, status quo projection, 2005-10 29
Figure 2-15: Net inter-country migration rates per 1000 population, four policy scenarios, 2005-10 30
Figure 2-16: Net inter-country migration rates per 1000 population, status quo projection, 2045-50 31
Figure 2-17: Net inter-country migration rates per 1000 population, four policy scenarios, 2045-50 32
Figure 2-18: Net extra-Europe migration rates per 1000 population, status quo projection, 2005-10 33
Figure 2-19: Net extra-Europe migration rates per 1000 population, four policy scenarios, 2005-10 34
Figure 2-20: Net extra-Europe migration rates per 1000 population, status quo projection, 2045-50 35
Figure 2-21: Net extra-Europe migration rates per 1000 population, four policy scenarios, 2045-50 36
Figure 3-1: Scenario profiles for population ageing and dependency ratios, 2005-50: Europe 45
Figure 3-2: Scenario profile for population ageing and dependency ratios, 2005-50: Romania 47
Figure 3-3: Scenario profile for population ageing and dependency ratios, 2005-50: United Kingdom 48
Figure 3-4: Percentage change in child ages (ages 0-14), status quo projection, 2005-50 50
Figure 3-5: Percentage change in child ages (ages 0-14), four policy scenarios, 2005-50 51
Figure 3-6: Percentage change in working ages (ages 15-64), status quo projection, 2005-50 52
Figure 3-7: Percentage change in working ages (ages 15-64), four policy scenarios, 2005-50 53
Figure 3-8: Percentage change in older ages (ages 65+), status quo projection, 2005-50 54
Figure 3-9: Percentage change in older ages (ages 65+), four policy scenarios, 2005-50 55
Figure 3-10: Percentage change in old-age dependency ratios, status quo projection, 2005-50 56
Figure 3-11: Percentage change in old-age dependency ratios, 2005-50 57
Figure 3-12: Percentage change in very-old-age dependency ratios, status quo projection, 2005-50 58
Figure 3-13: Percentage change in very-old-age dependency ratios, four policy scenarios, 2005-50 59
Figure 4-1: Labour force participation, ESPON countries, 2005 and 2050 61
Figure 4-2: Labour force participation of males, four selected countries, 2005 and 2050 63
Figure 4-3: Labour force participation of females, four selected countries, 2005 and 2050 69
Figure 4-4: Labour force participation of males, types, 2005 and 2050 76
Figure 4-5: Labour force participation of females, types, 2005 and 2050 80
Figure 4-6: Females labour force change 2005-2050, ESPON space 84
Figure 4-7: Labour force change 2005-2050, countries 86
Figure 4-8: Male labour force change 2005-2050, countries 87
Figure 4-9: Female labour force change 2005-2050, countries 88
Figure 4-10: Male labour force change 2005-2050, types, GSE, EME, LSE, and CME scenarios 91
Figure 4-11: Female labour force change 2005-2050, types, GSE, EME, LSE, and CME scenarios 92
Figure 4-12: Labour force change 2005-2050, types, GSE, EME, LSE, and CME scenarios 93
Figure 4-13: Male labour force change 2005-2050, regions, GSE, EME, LSE, and CME scenarios 96
Figure 4-14: Female labour force change 2005-2050, regions, GSE, EME, LSE, and CME scenarios 97
Figure 4-15: Labour force change 2005-2050, regions, GSE, EME, LSE, and CME scenarios 98

Figure 4-16: Dependency ratio, 2005 and 2050, ESPON space 100
Figure 4-17: Dependency ratio, 2005, countries 101
Figure 4-18: Dependency ratio, 2050, Challenged Market Europe scenario, countries 102
Figure 4-19: Dependency ratio, 2050, Expanding Market Europe scenario, countries 103
Figure 4-20: Dependency ratio, 2050, Growing Social Europe scenario, countries 104
Figure 4-21: Dependency ratio, 2050, Limited Social Europe scenario, countries 105
Figure 4-22: Dependency ratio, 2005, types 107
Figure 4-23: Dependency ratio, 2050 Challenged Market Europe, types 108
Figure 4-24: Dependency ratio, 2050 Expanding Market Europe, types 109
Figure 4-25: Dependency ratio, 2050 Growing Social Europe, types 110
Figure 4-26: Dependency ratio, 2050 Limited Social Europe, types 111
Figure 4-27: Labour force by 5 year age groups, ESPON space 118

LIST OF APPENDIX FIGURES

Figure A.1: Scenario profile for population stocks and components of change, 2005-50: Austria 127
Figure A.2: Scenario profile for population stocks and components of change, 2005-50: Belgium 128
Figure A.3: Scenario profile for population stocks and components of change, 2005-50: Bulgaria 129
Figure A.4: Scenario profile for population stocks and components of change, 2005-50: Cyprus 130
Figure A.5: Scenario profile for population stocks and components of change, 2005-50: Czech Republic 131
Figure A.6: Scenario profile for population stocks and components of change, 2005-50: Denmark 132
Figure A.7: Scenario profile for population stocks and components of change, 2005-50: Estonia 133
Figure A.8: Scenario profile for population stocks and components of change, 2005-50: Finland 134
Figure A.9: Scenario profile for population stocks and components of change, 2005-50: France 135
Figure A.10: Scenario profile for population stocks and components of change, 2005-50: Germany 136
Figure A.11: Scenario profile for population stocks and components of change, 2005-50: Greece 137
Figure A.12: Scenario profile for population stocks and components of change, 2005-50: Hungary 138
Figure A.13: Scenario profile for population stocks and components of change, 2005-50: Iceland 139
Figure A.14: Scenario profile for population stocks and components of change, 2005-50: Ireland 140
Figure A.15: Scenario profile for population stocks and components of change, 2005-50: Italy 141
Figure A.16: Scenario profile for population stocks and components of change, 2005-50: Latvia 142
Figure A.17: Scenario profile for population stocks and components of change, 2005-50: Liechtenstein 143
Figure A.18: Scenario profile for population stocks and components of change, 2005-50: Lithuania 144
Figure A.19: Scenario profile for population stocks and components of change, 2005-50: Luxembourg 145
Figure A.20: Scenario profile for population stocks and components of change, 2005-50: Malta 146
Figure A.21: Scenario profile for population stocks and components of change, 2005-50: Netherlands 147
Figure A.22: Scenario profile for population stocks and components of change, 2005-50: Norway 148
Figure A.23: Scenario profile for population stocks and components of change, 2005-50: Poland 149
Figure A.24: Scenario profile for population stocks and components of change, 2005-50: Portugal 150
Figure A.25: Scenario profile for population stocks and components of change, 2005-50: Slovakia 151
Figure A.26: Scenario profile for population stocks and components of change, 2005-50: Slovenia 152
Figure A.27: Scenario profile for population stocks and components of change, 2005-50: Spain 153
Figure A.28: Scenario profile for population stocks and components of change, 2005-50: Sweden 154
Figure A.29: Scenario profile for population stocks and components of change, 2005-50: Switzerland 155
Figure A.30: Scenario profile for population ageing and dependency ratios, 2005-50: Austria 156
Figure A.31: Scenario profile for population ageing and dependency ratios, 2005-50: Belgium 157
Figure A.32: Scenario profile for population ageing and dependency ratios, 2005-50: Bulgaria 158
Figure A.33: Scenario profile for population ageing and dependency ratios, 2005-50: Cyprus 159
Figure A.34: Scenario profile for population ageing and dependency ratios, 2005-50: Czech Republic 160

Figure A.35: Scenario profile for population ageing and dependency ratios, 2005-50: Denmark 161
Figure A.36: Scenario profile for population ageing and dependency ratios, 2005-50: Estonia 162
Figure A.37: Scenario profile for population ageing and dependency ratios, 2005-50: Finland 163
Figure A.38: Scenario profile for population ageing and dependency ratios, 2005-50: France 164
Figure A.39: Scenario profile for population ageing and dependency ratios, 2005-50: Germany 165
Figure A.40: Scenario profile for population ageing and dependency ratios, 2005-50: Greece 166
Figure A.41: Scenario profile for population ageing and dependency ratios, 2005-50: Hungary 167
Figure A.42: Scenario profile for population ageing and dependency ratios, 2005-50: Iceland 168
Figure A.43: Scenario profile for population ageing and dependency ratios, 2005-50: Ireland 169
Figure A.44: Scenario profile for population ageing and dependency ratios, 2005-50: Italy 170
Figure A.45: Scenario profile for population ageing and dependency ratios, 2005-50: Latvia 171
Figure A.46: Scenario profile for population ageing and dependency ratios, 2005-50: Liechtenstein 172
Figure A.47: Scenario profile for population ageing and dependency ratios, 2005-50: Lithuania 173
Figure A.48: Scenario profile for population ageing and dependency ratios, 2005-50: Luxembourg 174
Figure A.49: Scenario profile for population ageing and dependency ratios, 2005-50: Malta 175
Figure A.50: Scenario profile for population ageing and dependency ratios, 2005-50: Netherlands 176
Figure A.51: Scenario profile for population ageing and dependency ratios, 2005-50: Norway 177
Figure A.52: Scenario profile for population ageing and dependency ratios, 2005-50: Poland 178
Figure A.53: Scenario profile for population ageing and dependency ratios, 2005-50: Portugal 179
Figure A.54: Scenario profile for population ageing and dependency ratios, 2005-50: Slovakia 180
Figure A.55: Scenario profile for population ageing and dependency ratios, 2005-50: Slovenia 181
Figure A.56: Scenario profile for population ageing and dependency ratios, 2005-50: Spain 182
Figure A.57: Scenario profile for population ageing and dependency ratios, 2005-50: Sweden 183
Figure A.58: Scenario profile for population ageing and dependency ratios, 2005-50: Switzerland 184

1. OVERVIEW OF THE SCENARIO PROJECTIONS AND INDICATORS

1.1 Introduction

In this report we bring together the results of other deliverables designed to build a picture of the demographic future of Europe and discuss them in detail, drawing out implications for European cohesion and competitiveness. So in Deliverable D4 we reported on the multilevel scenario model, called MULTIPOLES, which was developed by IOM/CEFMR (Marek Kupiszewski and Dorota Kupiszewska). This model combines features of a full multiregional model with features of a simpler model for external migration but deals consistently with populations at two spatial scales: country (NUTS0) and region (NUTS2). In Deliverable D5 we reported on the application of the projection model with a set of simple assumptions that constitute our *Reference Scenarios*. The reference scenarios enable us to measure the impact of more sophisticated sets of assumptions. In this report we borrow the results of the Status Quo (STQ) scenario, in which the input demographic rates and flows of the years 2003 to 2006 with start populations as of 1.1.2005 are assumed constant over the time interval 2005 to 2050.

The STQ projection results give an anchor against which we can compare the projection results of the *Policy Scenarios*. These scenarios were discussed in detail in Deliverable D6 both in terms of theory (what effects we would expect from the application of a set of social, economic and demographic policies) and in terms of empirical outcomes for the scenario demographic drivers. We constructed a two class by two class framework for the four scenarios. The two dimensions were *Distribution-Fairness* and *Economy-Environment*. The two classes on the Distribution-Fairness dimension represented policy bundles which were either socially oriented or market oriented. The socially oriented policies were likely to be effective for improving cohesion across the countries and regions of Europe, reducing inequalities in the demographic rates and flows and therefore in the outcomes. The market oriented policies were likely to be effective in improving the competitiveness of European countries and regions but at the expense of greater inequality. The two classes on the Economy-Environment dimension represented bundles of policies likely to solve the climate change and resource depletion problems of Europe (e.g. develop sustainable energy supply) or bundles of policies that failed in this respect (e.g. do nothing). The four scenarios that come from combining these dimensions we labelled *Growing Social Europe* or *GSE* (successful economy-environment policies; effective cohesion policies), *Expanding Market Europe* or *EME* (successful economy-environment policies; policies favouring successful regions that neglect the also-ran regions), *Limited Social Europe* or *LSE* (*un*successful economy-environment policies; effective cohesion policies) and *Challenged Market Europe* or CME (*un*successful economy-environment policies; policies favouring

successful regions that neglect the also-ran regions).The report examines what might happen to the population of Europe under each scenario. We look and interpret the outcomes as contributing to the improvement of cohesion or not, and as contributing to the improvement of competitiveness or not. Cohesion is manifested by the coming together of population structures and dynamics; competitiveness is manifested by the diverging apart of population structures and dynamics.

The spatial framework used for reporting on the results consists of at the following levels: Europe (1 unit), Countries (31 units), Regions (287), Region types (7) and Region sub-types (19). In this report on regional demographic outcomes we focus on the full dynamics at Europe and country level via a collection of key time series graphs and capture the regional variety of experience through mapping the start situation in 2005 or 2005-10 and the end situation in 2050 or 2045-50. However, our Scenario workbooks contain the same detail at region, region type and region sub-type as we present here at Europe and country scale. Interested users can consult these Scenario workbooks to discover the alternative futures of their own regions or a set of regions of interest. The MULTIPOLES outputs for each projection are large sets of comma separated variable files (the standard format used for sharing data) which we have combined, labelled and made accessible in spreadsheets within multiple sheet work books. These menu driven and value added Workbooks are described in Chapter 6 of the report. The report focuses on a broad description of the outcomes.

1.2 The projection model

The MULTIPOLES population projection program used to produce the policy scenario simulations implements a supranational multiregional hierarchical cohort-component model. A detailed description of the model is presented in Deliverable 4. The model, developed since mid 1990s, has been substantially modified to meet the requirements of the DEMIFER project. It allows for simultaneous projections and simulations of regional and national populations and labour force by country, region, 5-year age group (to 100+) and sex.

The model follows an idea by Rees (Rees et al., 1992; Rees, 1996) to handle migration on three levels: internal migration, international intra-system migration and international extra-system migration. The model has been improved and applied in several previous projects which have projected sets of European countries (Bijak et al. 2005, Bijak et al. 2007, Bijak et al. 2008) by the team led by Marek Kupiszewski at the Central European Forum for Population and Migration Research. Internal migration and inter-country migration are modelled and projected using emigration rates. Because all origins and destinations are included in each sub-model, in-migration flows are the sum for a destination of the emigration rates of origins multiplied by the origin population. For international extra-system migration, we use emigration rates and immigration numbers, as the rates of emigration from the “rest of the world” are difficult to estimate. Such a structure is particularly

suitable for the modelling of large population systems, for which data quality and availability varies substantially.

The model requires data on population at the beginning of the projection (here 1 January 2005) by region, sex and 5-year age group up to 100+; mortality (mortality rates by region, sex and 5-year age group); fertility (fertility rates by region and 5-year age group 15-49); internal out-migration (rates by origin and destination region, sex and 5-year age group); emigration (rates by region, sex and 5-year age-group), percentage distribution of emigrants from each origin country among the destination countries (including the Rest of the world), by sex; distribution of immigrants arriving to each country from other countries of the system among the destination regions, by sex; annual number of immigrants from the Rest of the world arriving to each country; share of males among the immigrants from the Rest of the world, by destination country; age distribution of immigrants from the Rest of the world, by destination country and sex and distribution of immigrants arriving to each country from the Rest of the world among the destination regions, by sex. Apart from the demographic data, labour force participation rates are prepared by region, sex and 5-year age groups (15-75+). For large population systems, as was the case in DEMIFER project, data preparation is difficult and perhaps the most time consuming task. Detailed information on data requirements is given in Deliverable 4 and in Chapter 5 in this Deliverable. The methodology of the preparation of data for the policy scenarios can be found in Deliverable 6.

As the model was designed to facilitate the assessment of the impact of migration on population and labour force age structures, four diagnostic indicators were defined: the *old-age dependency ratio* (ODR), defined as the ratio of population aged 65 and more to population in the age group 15-64 years; the *economic old-age dependency* ratio (EODR), defined as the ratio of the economically inactive population at the retirement age (i.e. persons of 65 years or more) to the whole active population aged 15 years or more; the *labour market dependency ratio* (LMDR) defined as the ratio of the whole economically inactive population to the whole active population and the *very old age dependency ratio* (VODR) defined as the population at the age 75+ to total economically active population aged 15+. These indicators are computed for each country, region type and region in each step of the simulation (every 5 years). Some more information on the ratios is in Deliverable 5.

The model outputs information on population and labour force by age (21 five-year age groups), sex, country and region and produces regional and national population accounts, with information on the numbers of birth, deaths, internal in- and out-migration events, international immigration and emigration within Europe, as well as extra-Europe immigration and emigration in each 5-year projection period. The results of projection may be aggregated, using an external typology. A detailed description of the output files including a list of variables is presented in Annex B of Deliverable 4.

1.3 Plan of the report

For convenience this first draft of Deliverable D7 gathers together the tables and figures that illustrate projection outcomes in a set after the text. Within the text, markers are placed to indicate that a table or figure should be read in conjunction with the text.

The first Chapter of the report has reminded the reader of the ingredients needed to carry out projections of the population of countries and regions in Europe. We need a model of the population dynamics, a set of benchmark period rates and flows and a set of assumptions for each of the five demographic components (mortality, fertility and three types of migration). The second Chapter discusses total population change and the component contributions for Europe, the countries and the regions for the four policy scenarios and status quo reference scenario. Chapter 3 reviews the patterns of ageing of the populations of Europe and its member countries and their regions. Chapter 4 discusses the future labour force of Europe, countries and regions associated with the four policy scenarios, drawing out implications for cohesion and competitiveness. Chapter 5 describes the Scenario Workbooks for further use Chapter 6 synthesizes the scenario results and identifies their implications for regional development.

2. TOTAL POPULATION CHANGE

We examine first the changes in the total population of Europe as a whole and then the components of change as they are projected in our four scenarios and the status quo reference scenario. Then we turn our attention to the country level and repeat the analysis with brief comments on each of the 31 ESPON member states. Finally, we drill down to the regional level and summarise the changes in the patterns of population change between 2005 and 2050 for the population and between 2005-2010 and 2045-2050 for the components of change.

2.1 Europe-wide trends in population and components of change by scenario

Table 2-1 sets out the total populations for each decade between 2005 and 2050, as projected under the status quo scenario and the four policy scenarios. Under the status quo scenario the population of Europe declines by 40 million over the 45 years. In all of the policy scenarios the population remains roughly steady or increases, even for the Limited Social Europe and Challenged Market Europe under which fertility remains low and immigration from the rest of the world moderate. The difference between the status quo scenario and the LSE and CME scenarios is explained by the lives saved as a result of lower mortality over the forty five years. So Europe is likely to see 40 million extra old people by mid-century provided that health services do not collapse.

Table 2-1: Europe: projected populations for the policy scenarios, 2005-2050

Scenario	2005	2010	2020	2030	2040	2050
	Population (millions)					
Status Quo	503	507	507	499	483	463
Growing Social Europe	503	507	521	543	568	592
Expanding Market Europe	503	507	523	547	576	605
Limited Social Europe	503	506	510	512	509	502
Challenged Market Europe	503	506	510	510	507	500
	Time series					
Status Quo	100	101	101	99	96	92
Growing Social Europe	100	101	104	108	113	118
Expanding Market Europe	100	101	104	109	114	120
Limited Social Europe	100	100	101	102	101	100
Challenged Market Europe	100	100	101	101	101	99

These projections can be compared with the latest UN projections (medium, high and low) and the latest Eurostat projection (Table 2-2). Both central projections fall within our scenario range. The Eurostat projection mirrors the trajectories of our LSE and CME scenarios but at a slightly higher level. The GSE and EME projections are well above both the Eurostat and UN high projection. This is

to be expected: for the GSE and EME scenarios to be realised means that huge strides have been made in stimulating economic growth in Europe and solving its environmental challenges. The projections reported here provide some idea of the uncertainty in the future population. Uncertainty has been formally assessed through stochastic projections by Alho, Keilman and colleagues in their Uncertain Population of Europe probabilistic projections and by Lutz, Scherbov, Sanderson and colleagues in their IIASA world and European projections. Developing similar measures of uncertainty for our current projections would be a major task because our models are more complex than those for which stochastic projections have so far been developed. This is a task for future research.

Table 2-2: Europe: projected populations, UN and Eurostat, 2005-2050

	2005	2010	2020	2030	2040	2050
United Nations	Populations (millions)					
Medium	502	510	519	520	516	509
High	502	510	529	544	556	572
Low	502	510	508	495	476	451
	Time series					
Medium	100	102	103	103	103	101
High	100	102	105	108	111	114
Low	100	102	101	99	95	90
Eurostat	Populations (millions)					
	501	512	527	534	535	530
	Time series					
	100	102	105	107	107	106

Sources:
United Nations: sum of World Population Prospects 2008 projections of 31 ESPON countries.
Eurostat: sum of central projections of EU 27 member states.

In Figure 2-1 we graph a time series of population and the components of population change in absolute numbers. The input assumptions in terms of rates and flows have been described in Deliverable D6. Population is reported at five year intervals and the components are counted for five year time periods. The scales refer to numbers of people, numbers born, numbers who die, numbers who migrate in millions over each 5 year period. In terms of total population (top left graph) the main difference within the policy scenarios is between the "successful" and "unsuccessful" scenarios. Within each pair the social versus market orientation of policy appears not to make much difference. However, that is a product of our assumptions: what the projections do is to reveal the fuller implications of those assumptions. Natural increase (top right hand graph) is mildly positive in the GSE and EME projections but increasingly negative in the LSE and CME scenarios though not as negative as in the STQ scenario. The net migration (wholly from/to the rest of the world in the case of Europe) graph (second down at the top right of Figure 2-1) is positive in all scenarios except for the

CME where the European economy has become unattractive to immigrants and many have returned to their emerging country economies which are experiencing much better growth (the pattern of the last two decades). However, the EME and GSE assume much higher levels of immigration to supply the labour needs of successful Europe. Under the EME scenario the net immigration rises to 12 million per 5years or 2.4 million per year or circa 4.8 per thousand population. This level will require Europe to commit to be a world region that welcomes and integrates its immigrant population in a much more positive way than at present.

Scenario profile (data in 000s): **Demifer - Europe**

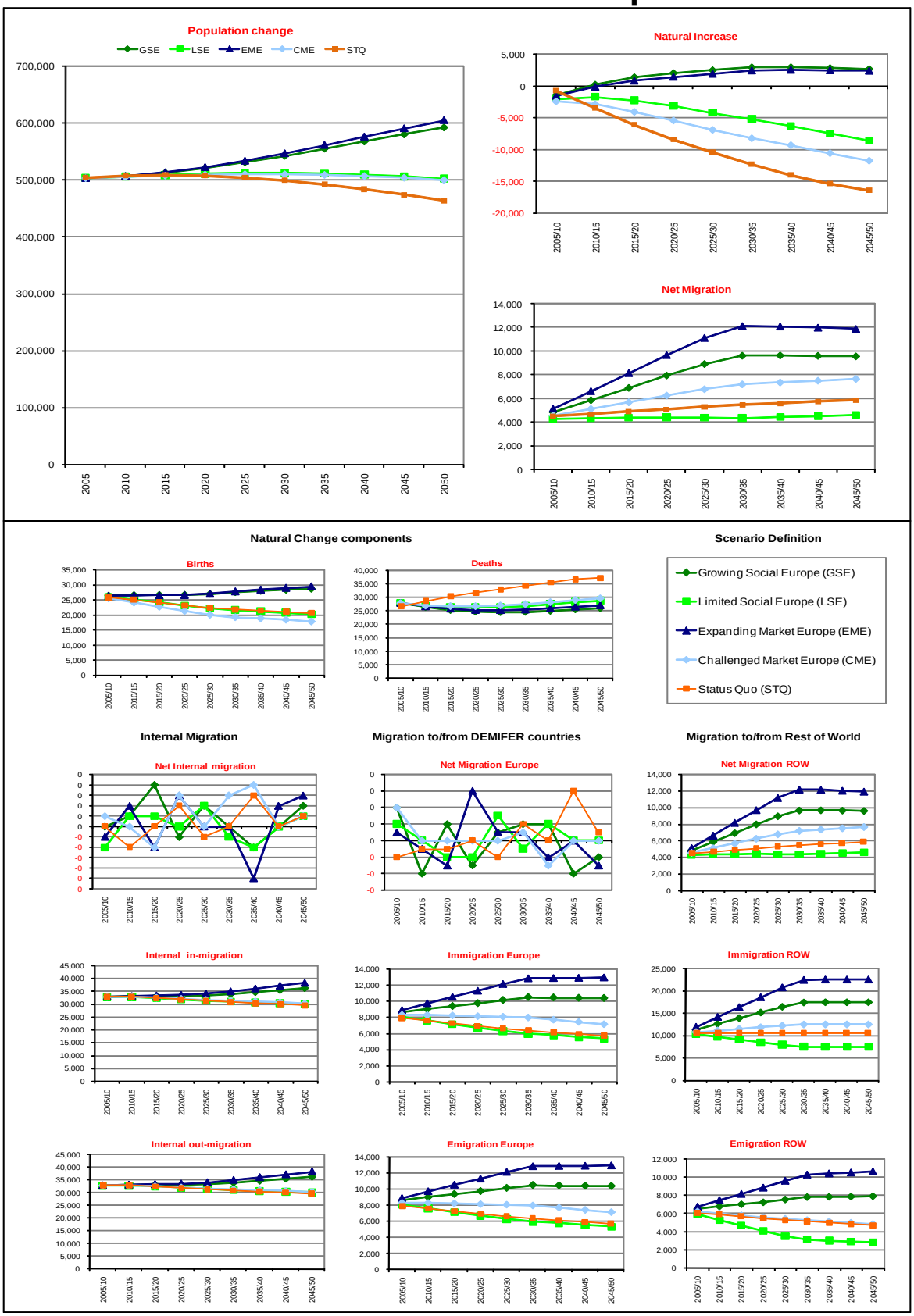


Figure 2-1: Scenario profile for population stocks and components of change, 2005-50: Europe

The other graphs in the bottom half of Figure 2-1 show a decomposition of these two summary components into their constituent parts. When we examine the natural change components we see that it is differences in fertility assumptions rather than mortality assumptions that differentiate the natural change numbers experienced. The deaths graph shows the biggest gap to be between the STQ and our policy scenarios. The second row of these graphs show that only net migration to/from the rest of the world is a contributor – the scales on the other graphs indicate just some small error noise. Note that when we look at the gross levels of migration, we see that total internal in-migration numbers are the same as total internal out-migration and that the same equality holds for inter-country migration within Europe.

Table 2-3 through Table 2-10 show the component contributions to the population changes in our scenarios for Europe as a whole. Under the status quo scenario births shrink by a quarter over the 45 years of the projection (Table 2-3). They shrink by about the same amount under our LSE scenario and further under the CME scenario. Although our GSE and EME scenarios are relatively optimistic with respect to fertility levels compared with most commentators, the increase in numbers born (because of the way the population of women in the fertile ages is changing) is modest, with only a 12% increase between 2005-10 and 2045-50 under the GSE scenario.

Table 2-3: Europe: projected births for the policy scenarios, 2005-2050

Scenario	2005-10	2015-20	2025-30	2035-40	2045-50
	Births (millions)				
Status Quo	25.9	24.2	22.4	21.5	20.7
Growing Social Europe	26.5	26.8	27.1	28.0	28.8
Expanding Market Europe	26.4	26.6	27.1	28.5	29.5
Limited Social Europe	26.0	24.2	22.3	21.2	20.2
Challenged Market Europe	25.6	22.8	20.2	19.0	17.9
	Time series (2005-10 =100)				
Status Quo	100	94	87	83	80
Growing Social Europe	100	101	102	106	109
Expanding Market Europe	100	101	103	108	112
Limited Social Europe	100	93	86	82	78
Challenged Market Europe	100	89	79	74	70

The future trends in total deaths are set out in Table 2-4. All policy scenarios show the same pattern: a fall in numbers to mid-way through the period and then a rise. This reflects two competing forces: changes in the older populations mainly at risk and improvements in survival probabilities to and within old age. The improvements keep deaths falling until the baby boomers move into their 70s and 80s in the third, fourth and fifth decades of the century. The main difference is between the deaths

under the four policy scenarios and those under the status quo scenario. Reducing mortality risks save about 10 million lives in 2045-50 in the policy scenarios compared with assuming no change in mortality in the status quo scenario. The corollary of this is increasing life expectancy, which we have discussed in Deliverable D6.

Table 2-4: Europe: projected deaths for the policy scenarios, 2005-2050

Scenario	2005-10	2015-20	2025-30	2035-40	2045-50
	Deaths (millions)				
Status Quo	26.6	30.3	32.9	35.5	37.2
Growing Social Europe	28.0	25.4	24.6	25.1	26.1
Expanding Market Europe	28.0	25.8	25.2	25.9	27.1
Limited Social Europe	28.0	26.5	26.5	27.5	28.8
Challenged Market Europe	28.0	26.9	27.1	28.3	29.7
	Time series (2005-10 =100)				
Status Quo	100	114	124	134	140
Growing Social Europe	100	91	88	90	93
Expanding Market Europe	100	92	90	93	97
Limited Social Europe	100	95	95	98	103
Challenged Market Europe	100	96	97	101	106

Table 2-5 presents the Europe natural increase totals. These are negative in the benchmark period for all scenarios but become positive in our optimistic GSE and EME scenarios. In the LSE and CME scenarios natural increase becomes increasingly negative though not as radically as in the status quo scenario.

Table 2-5: Europe: projected natural increase for the policy scenarios, 2005-2050

Scenario	2005-10	2015-20	2025-30	2035-40	2045-50
	Natural increase (millions)				
Status Quo	-0.7	-6.1	-10.5	-14.0	-16.4
Growing Social Europe	-1.4	1.4	2.5	3.0	2.7
Expanding Market Europe	-1.5	0.8	1.9	2.6	2.4
Limited Social Europe	-2.0	-2.3	-4.2	-6.3	-8.6
Challenged Market Europe	-2.4	-4.1	-6.9	-9.3	-11.8

Internal migration totals represent the sum over 23 countries of their inter-regional migration (Table 2-6). The table show that the volume of people migrating between NUTS2 regions in each five year interval is larger than the total number of births and total number of deaths. In Deliverable D6 we explained that we were not confident enough in the 2000-6 time series in each country of inter-

regional migration to propose any upwards or downwards trends. Therefore the overall numbers in the projections reflect the overall changes in the population at risk. So total internal migration numbers move up in the GSE and EME scenarios and down in the LSE and CME scenarios, as they do in the status quo scenario. That is not to say, however, that internal migration is not important in the demographic development of Europe, but that is expressed at regional rather than at national or European level (discussed later).

Table 2-6: Europe: projected internal migration for the policy scenarios, 2005-2050

Scenario	2005-10	2015-20	2025-30	2035-40	2045-50
Net migration (millions)					
Status Quo	32.8	32.4	31.2	30.4	29.5
Growing Social Europe	32.8	33.0	33.3	34.6	36.2
Expanding Market Europe	32.8	33.3	34.0	36.0	38.2
Limited Social Europe	32.7	32.4	31.3	30.7	30.1
Challenged Market Europe	32.8	32.4	31.6	30.9	30.2
Time series (2005-10 =100)					
Status Quo	100	99	95	93	90
Growing Social Europe	100	101	101	106	110
Expanding Market Europe	100	101	104	110	116
Limited Social Europe	100	99	96	94	92
Challenged Market Europe	100	99	96	94	92

Projected inter-country migration figures are presented in Table 2-7. They are, unsurprisingly, much lower than the figures for internal migration. The costs of and barriers to movement between countries in Europe are much higher than between regions within countries. Nevertheless the numbers are still large: under the GSE scenario inter-country migration is about a third of internal migration. Inter-country migration is a smaller proportion, a fourth, for the CME scenario. The successful scenarios stimulate inter-country migration while the unsuccessful scenarios depress the flows.

Table 2-7: Europe: projected inter-country migration for the policy scenarios, 2005-2050

Scenario	2005-10	2015-20	2025-30	2035-40	2045-50
Net migration (millions)					
Status Quo	7.9	7.3	6.6	6.2	5.7
Growing Social Europe	8.6	9.4	10.1	10.5	10.4
Expanding Market Europe	8.9	10.5	12.1	12.9	13.0
Limited Social Europe	8.1	7.2	6.3	5.8	5.4
Challenged Market Europe	8.3	8.3	8.1	7.7	7.1
Time series (2005-10 =100)					
Status Quo	100	92	84	78	72
Growing Social Europe	100	109	118	122	121
Expanding Market Europe	100	119	137	145	146
Limited Social Europe	100	89	78	71	66
Challenged Market Europe	100	99	97	93	86

The projected flows of immigrants from outside Europe (Extra-Europe) are set out in Table 2-8, with the counter flows of emigrants appearing in Figure 2-9. Both sets of flows vary strongly with scenario and therefore with our assumptions, which were discussed in Deliverable D6. This is a migration sphere where policy does have a considerable influence. Under the EME scenario, economic growth draws in more immigrants (89% more in 2045-50 than in 2005-10) and also sends out more emigrants (57% more in 2045-50 compared with 2005-10). By contrast the LSE scenario sees immigrant numbers fall to 73% of their benchmark values by 2045-50, while emigrants fall to 49% of their starting interval numbers. The GSE scenario sees rising extra-Europe migration, while the CME scenario sees falling extra-Europe migration. The balance between these two flows is presented in Table 2-10. All scenarios see a positive net inward balance to Europe. Our arguments for this were set out in Deliverable D6. There is substantial migration pressure in developing countries and considerable demand for labour in a successful Europe, given the potential reductions in working age population (discussed later).

Table 2-8: Europe: projected Extra-Europe immigration for the policy scenarios, 2005-2050

Scenario	2005-10	2015-20	2025-30	2035-40	2045-50
	Immigration (millions)				
Status Quo	10.6	10.6	10.6	10.6	10.6
Growing Social Europe	11.4	13.9	16.5	17.5	17.5
Expanding Market Europe	11.9	16.3	20.7	22.5	22.5
Limited Social Europe	10.2	9.1	8.0	7.5	7.5
Challenged Market Europe	10.8	11.5	12.2	12.5	12.5
	Time series (2005-10 =100)				
Status Quo	100	100	100	100	100
Growing Social Europe	100	123	145	154	154
Expanding Market Europe	100	137	174	189	189
Limited Social Europe	100	89	78	73	73
Challenged Market Europe	100	107	113	116	116

Table 2-9: Europe: projected Extra-Europe emigration for the policy scenarios, 2005-2050

Scenario	2005-10	2015-20	2025-30	2035-40	2045-50
	Emigration (millions)				
Status Quo	6.1	5.7	5.3	5.0	4.7
Growing Social Europe	6.5	7.0	7.6	7.9	7.9
Expanding Market Europe	6.8	8.2	9.6	10.4	10.6
Limited Social Europe	6.0	4.7	3.6	3.1	2.9
Challenged Market Europe	6.2	5.8	5.4	5.2	4.9
	Time series (2005-10 =100)				
Status Quo	100	94	87	82	78
Growing Social Europe	100	108	116	120	122
Expanding Market Europe	100	121	142	153	157
Limited Social Europe	100	79	60	51	49
Challenged Market Europe	100	93	87	82	78

Table 2-10: Europe: projected Extra-Europe net migration for the policy scenarios, 2005-2050

Scenario	2005-10	2015-20	2025-30	2035-40	2045-50
	Net migration (millions)				
Status Quo	4.5	4.9	5.3	5.6	5.9
Growing Social Europe	4.8	6.9	8.9	9.6	9.6
Expanding Market Europe	5.1	8.1	11.1	12.1	11.9
Limited Social Europe	4.3	4.4	4.4	4.4	4.6
Challenged Market Europe	4.6	5.7	6.8	7.3	7.6
	Time series (2005-10 =100)				
Status Quo	100	108	117	124	130
Growing Social Europe	100	143	184	199	198
Expanding Market Europe	100	159	217	236	232
Limited Social Europe	100	102	102	104	107
Challenged Market Europe	100	125	149	161	168

2.2 Country trends in population and components of change by scenario

The scenario projections generate all of the figures discussed at Europe level for the 31 countries and for the 287 regions. Our Scenario summary workbooks are set up to enable users to generate the equivalent of Figure 2-1 for any of the countries and any of the regions of Europe. As you drill down in scale the content of the graphs will change. At Europe scale neither internal nor inter-country migration alters directly the population numbers though both sets of flows may have some indirect effects because people are shifted from one demographic regime to another. At the country level inter-country migration within Europe does affect the future population and there will be gainers and losers. We described the estimated patterns in Deliverable D6, using the outputs of the MIMOSA project. At the region level both internal and inter-country migration will affect the future population directly. The sets of graphs constitute a huge amount of diagnostic information to digest, of which we discuss two examples here: the cases of Romania and the United Kingdom. These countries are at opposite ends of the projected population spectrum: Romania will experience the greatest population loss over the projection period (Figure 2-2) while the UK will experience the greatest gain (Figure 2-3). We have placed in the Appendix the equivalent graphs for the other 29 countries (Figure A.1 to Figure A.29). The reader can turn to his or her own country to learn more about its alternative demographic futures.

Scenario profile **:** **Romania**

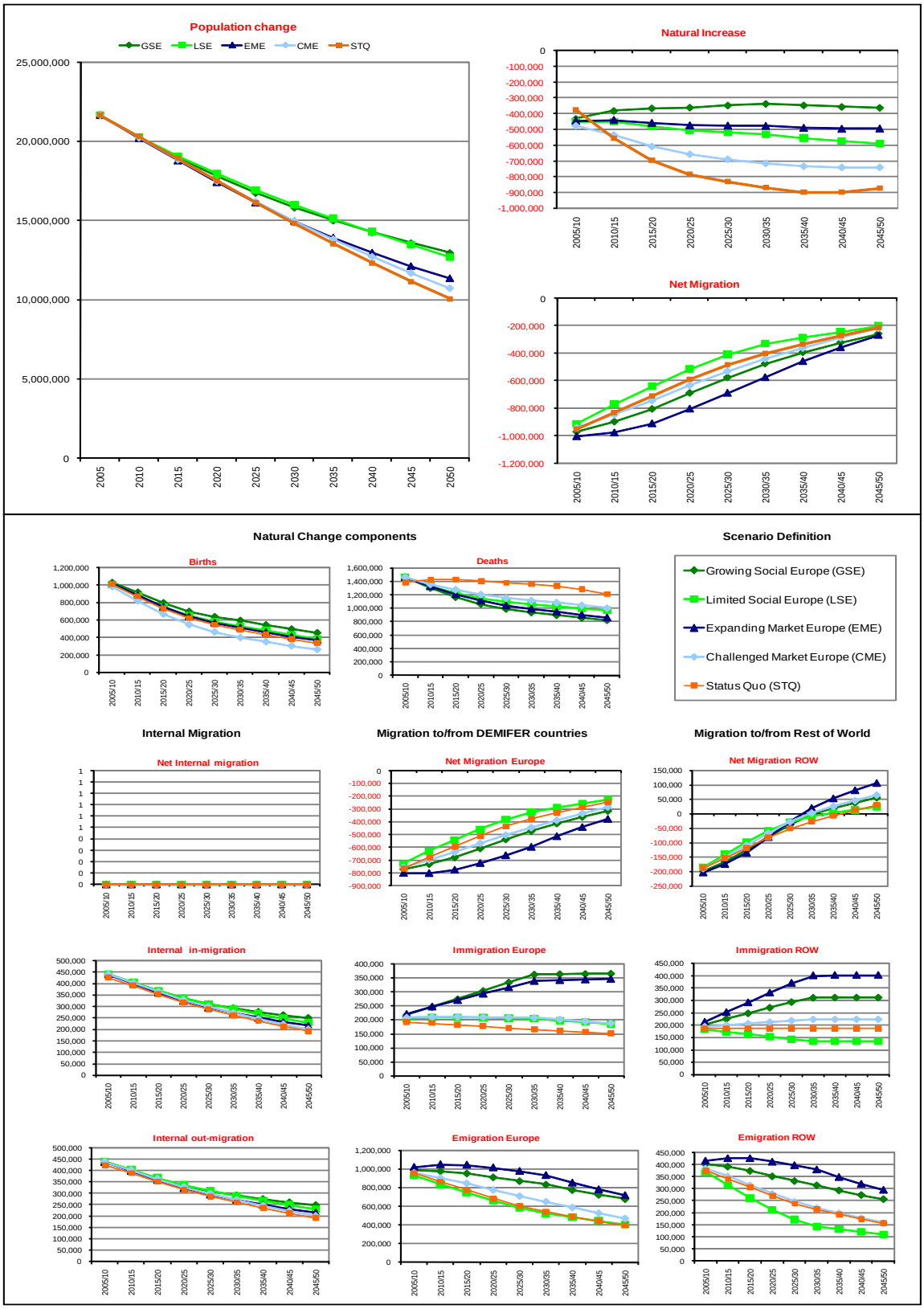


Figure 2-2: Scenario profile for population stocks and components of change, 2005-50: Romania

Scenario profile **:** **United Kingdom**

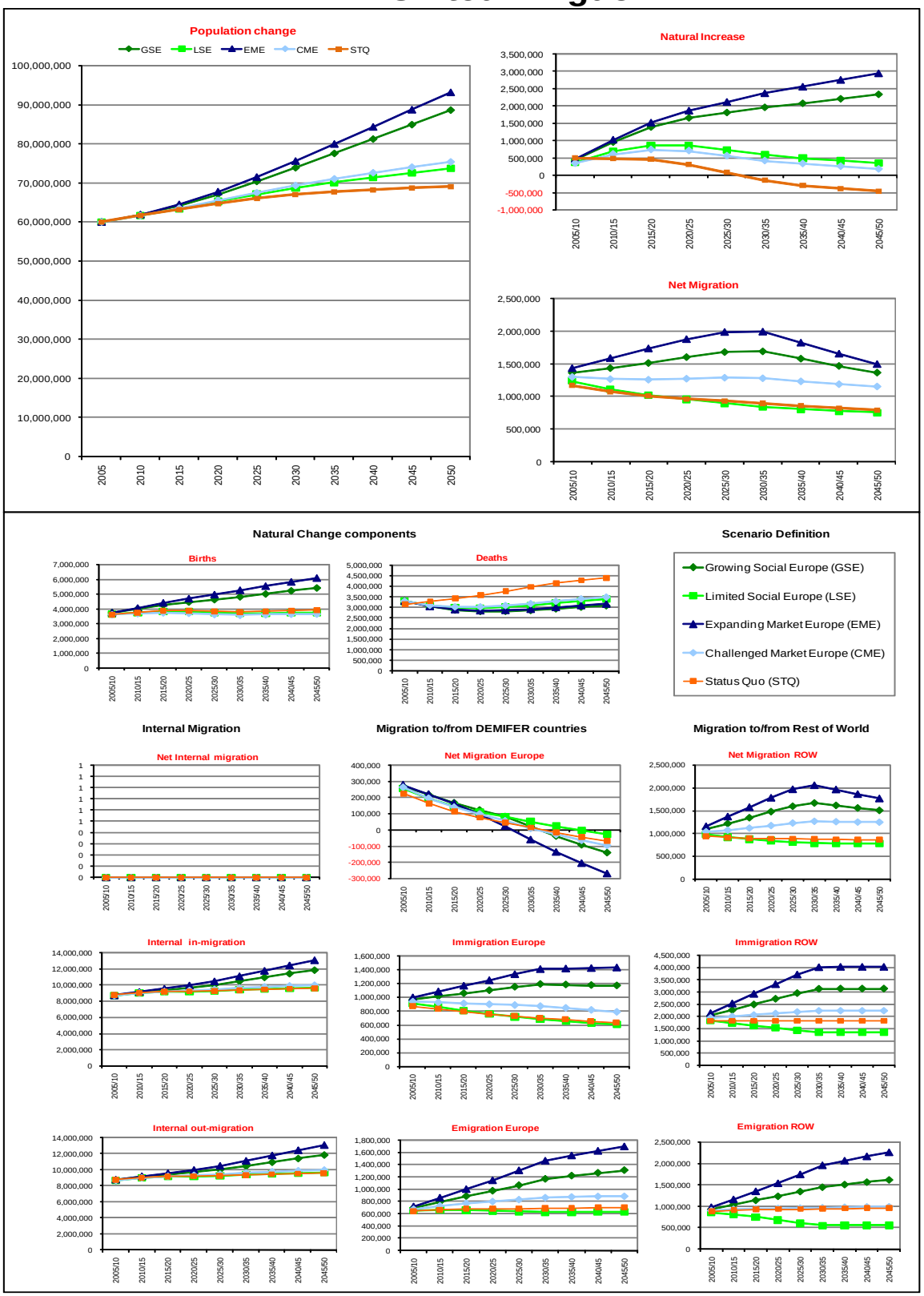


Figure 2-3: Scenario profile for population stocks and components of change, 2005-50: United Kingdom

Romania's projected population decline is severe. Across the four population scenarios plus status quo scenarios, the population halves over the 45 year projection horizon. This is a consequence of very large natural decreases combined with very large net migration losses. Note that the net migration losses do diminish over time as the population shrinks. Large numbers of Romanians have been leaving their country since the demise of their communist regime in late 1989. We envisage this continuing given Romania's membership of the European Union since 1 January 2007. Births are projected to fall in Romania at a faster pace than deaths in all but one scenario leading to the increasing natural decrease. Towards the end of the projection horizon the projections show some rises in immigration from Europe and Extra-Europe under the EME and GSE scenarios.

The growth of population in the UK is projected to be substantial and is the subject of ongoing political debate. Under the EME scenario the UK is projected to be the most populous state in the European Union. Substantial gains are made through natural increase under the GSE and EME scenarios and small gains turning to losses under the LSE and CME scenarios. Net international migration remains strongly positive under all scenarios including the status quo, although under that scenario and the LSE scenario the net number do fall.

We note that the enormous gap between demographically dynamic United Kingdom and demographically depressed Romania poses issues of cross-EU cohesion.

2.3 Region trends in population and components of change by scenario

We switch now to a discussion of the scenario outcomes at regional scale. These will be presented through the medium of maps rather than graphs and the time dimension is represented by computing change variables where that is appropriate. We focus on a comparison of the start and end years of the projection, 2005 and 2050, while recognizing that sometimes this may disguise intermediate behaviour where trends have ups and downs. The figures are arranged in pairs: the first figure maps the variable concerned for the status quo scenario; the second figure maps the variable for all four policy scenarios arranged in the following order: top left – GSE, top right – EME, bottom left – LSE and bottom right – CME.

We begin with the population stocks. Figure 2-4 shows the percentage change between 2005 and 2050 in the projected population of each region under the status quo scenario. Nine classes are used on the map: four representing population gains (blue shades) and five population losses (red shades). Only one region in "metropolitan" Europe falls into the greater than 50% growth class along with three overseas regions. The majority of regions in the Accession 8 states, Germany, northern France, Northern Scandinavia, Greece, southern Italy, north and west Spain and Portugal will lose population. Most of the rest of western Europe will experience small population gains.

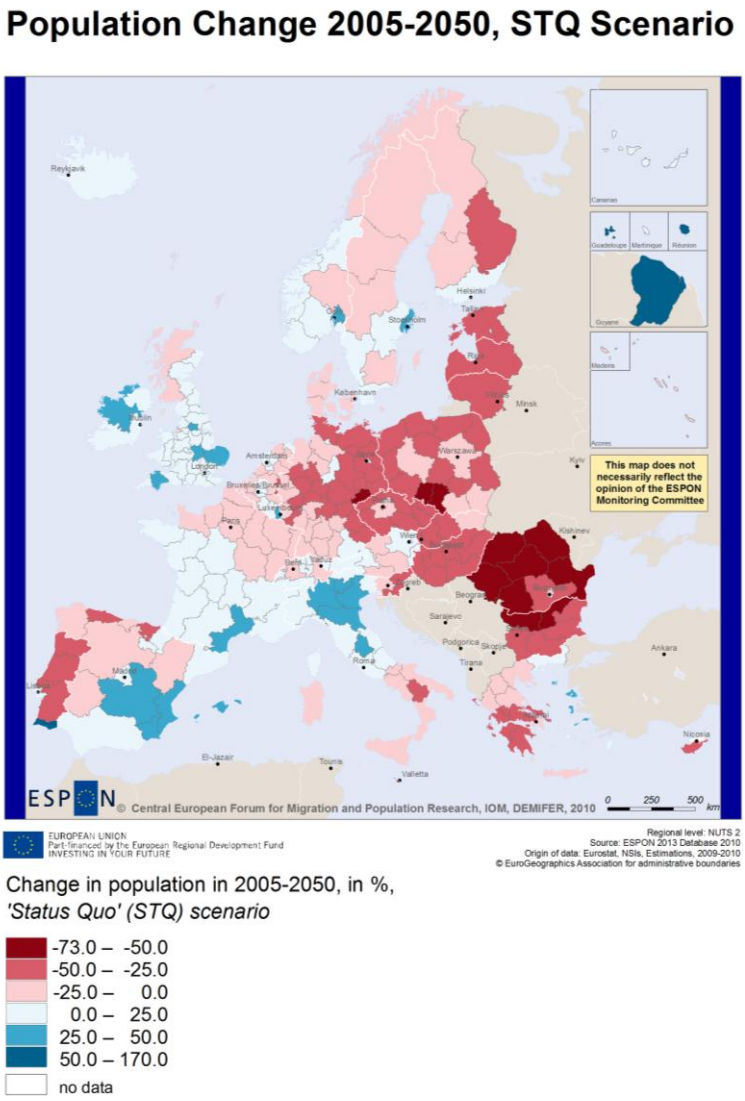


Figure 2-4: Percentage change in regional populations, status quo projection, 2005-50

The patterns of future population change under the four policy scenarios resemble the status quo pattern (Figure 2-5). This is not surprising as their benchmark data inputs are closely aligned though not exactly the same. What each policy scenario does is to shift the regions across the growth classification to a lesser or greater extent from their status quo position. The Expanding Market Europe lifts regions most and sees most regions in Scandinavia, the British Isles, France, north and central Italy and south and east Spain in the top growth class. Most of the former Iron curtain regions are projected to lose population but in the capital city regions of Warsaw, Prague, Budapest and Bucharest this loss is small. The regions of western Germany, parts of northern France and western Spain fall in the small loss class (0 to -25% change). The Growing Social Europe map is a smoothing of the EME map with fewer regions in the top or bottom classes and thus represents a gain in terms of cohesion. In the Challenged Market Europe scenario the majority of regions now show losses in

population while the Limited Social Europe shrinks the variation so that there are fewer regions in the highest loss category (less than -50%).

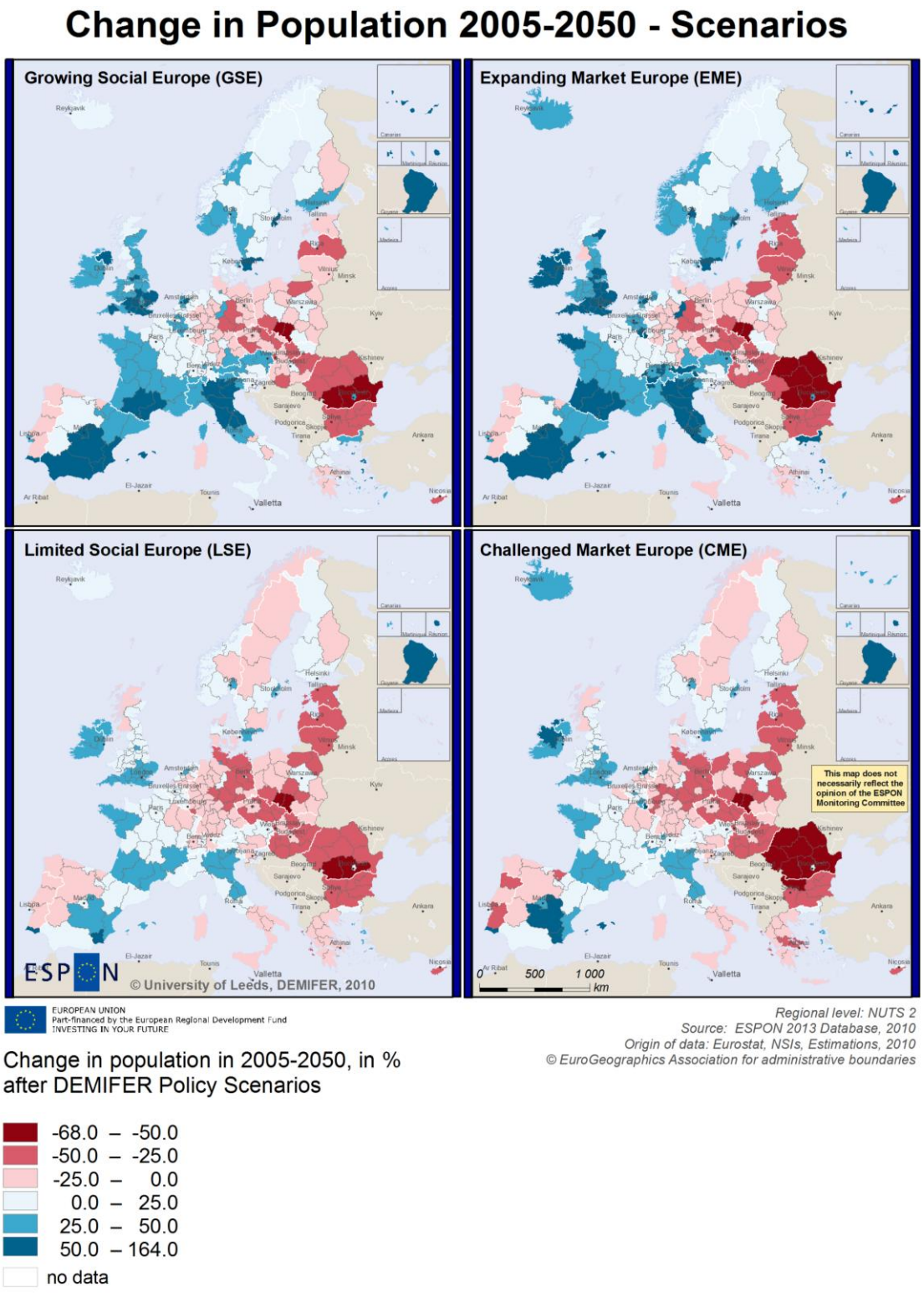


Figure 2-5: Percentage change in regional populations, four policy scenarios, 2005-50

The maps of change in births between 2005 and 2050 repeat the structures seen in the population change maps but with slightly narrower class intervals. Again the main differences are between the successful Europe scenarios (GSE, EME) and the unsuccessful (LSE, CME). In the latter scenarios hardly any regions see an increase in births, whereas about half of regions post gains in the former scenarios.

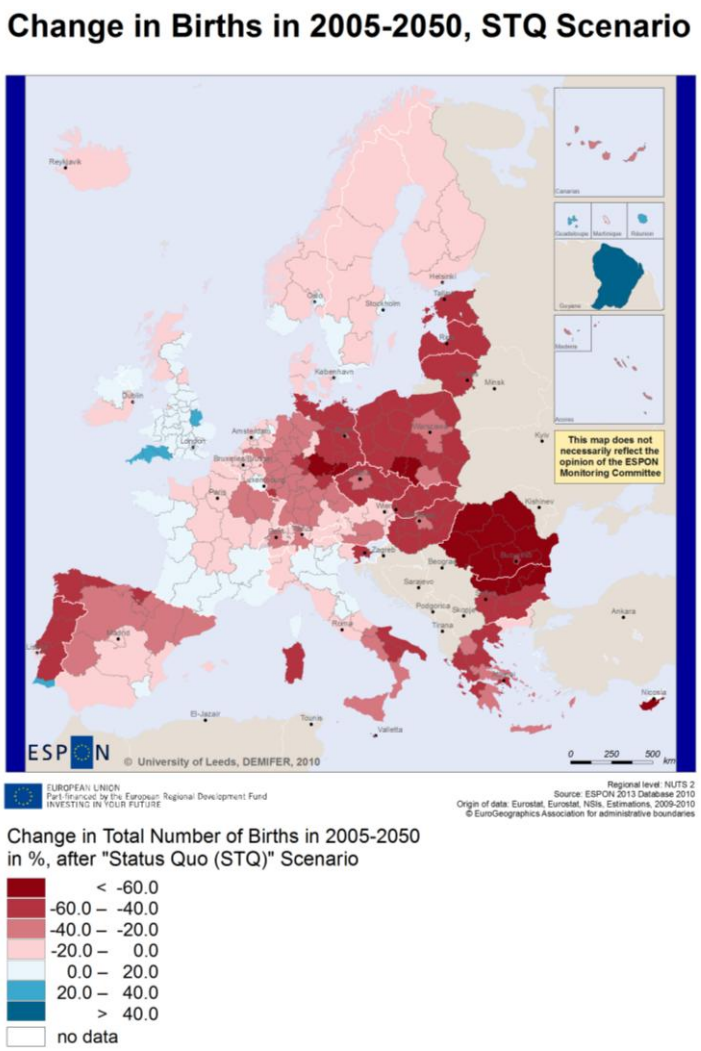


Figure 2-6: Percentage change in regional births, status quo projection, 2005-50

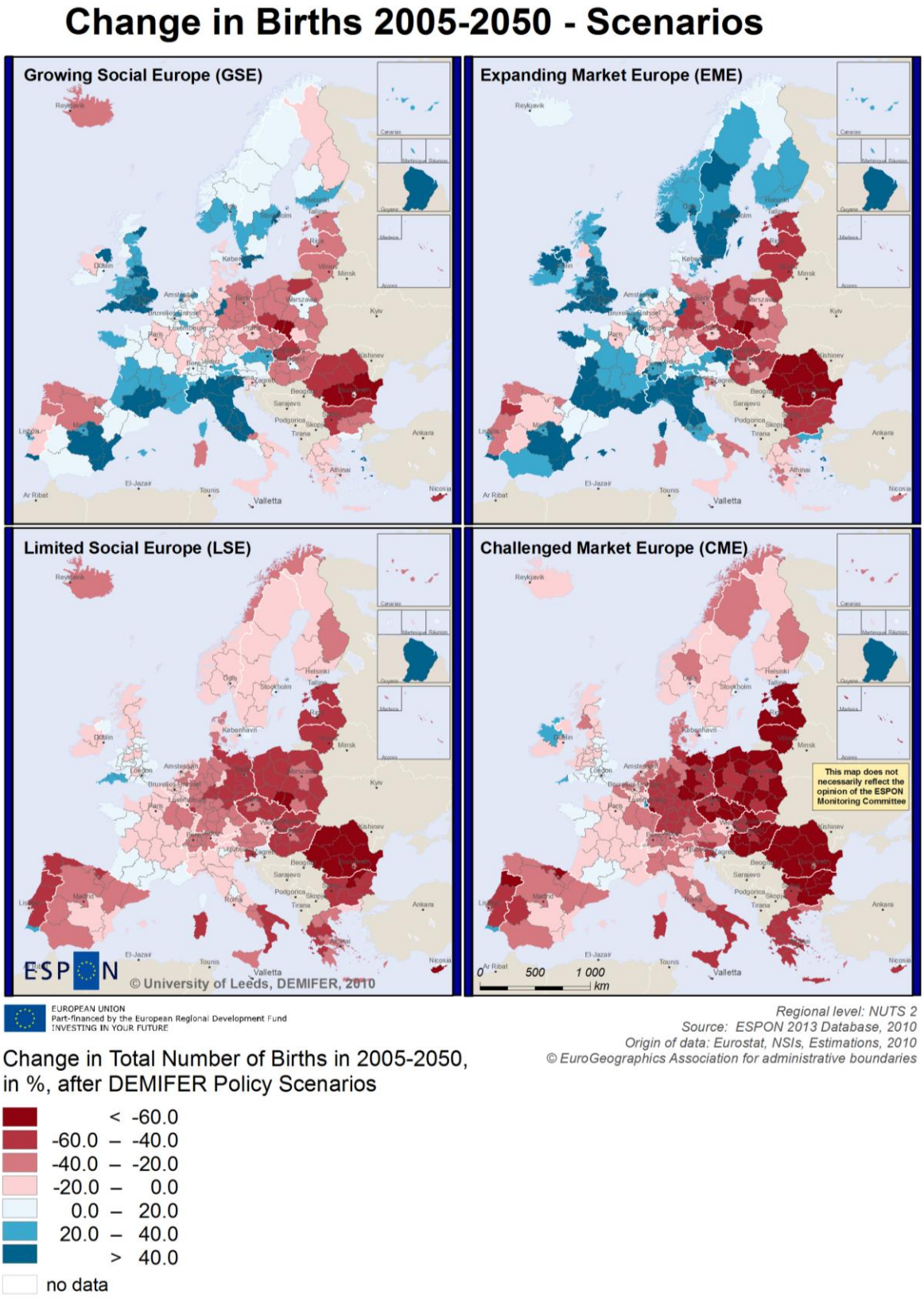


Figure 2-7: Percentage change in regional births, four policy scenarios, 2005-50

The maps of percentage change in deaths (Figure 2-8 and Figure 2-9) reveal the impact of our mortality improvement assumptions. Under the status quo scenario only a few regions experience falls in the number of deaths, while in all our policy scenarios a large number of regions show decreases in the numbers dying. This class contains the majority of regions in the GSE scenario and the largest number of regions in the EME scenario. The LSE and EME are slightly raised versions of their successful cousins.

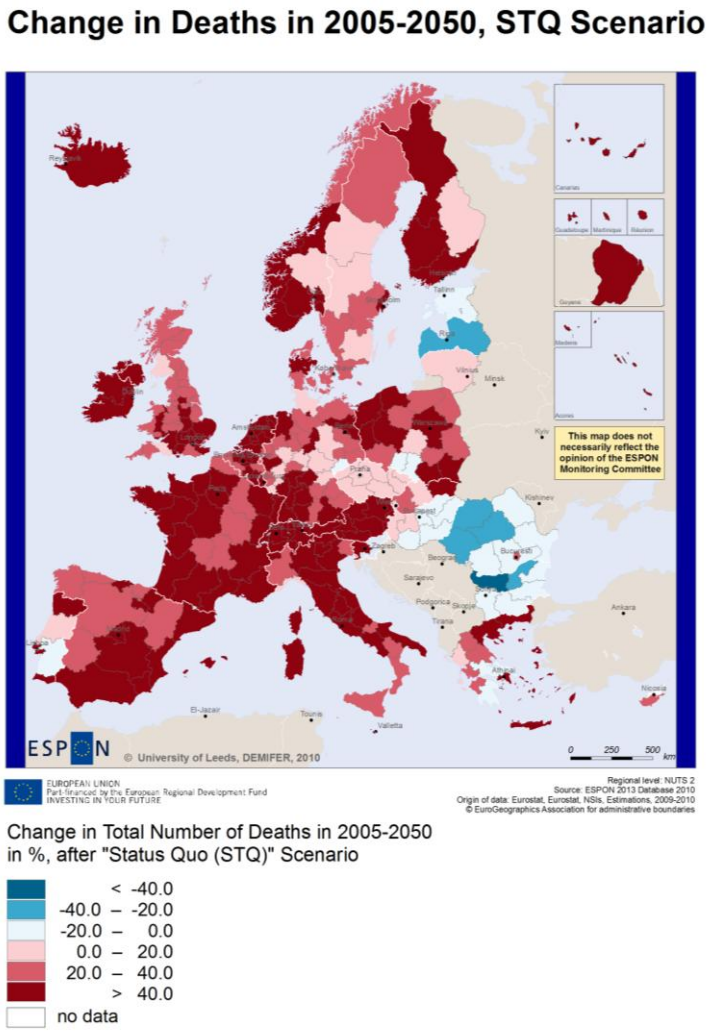


Figure 2-8: Percentage change in regional deaths, status quo projection, 2005-50

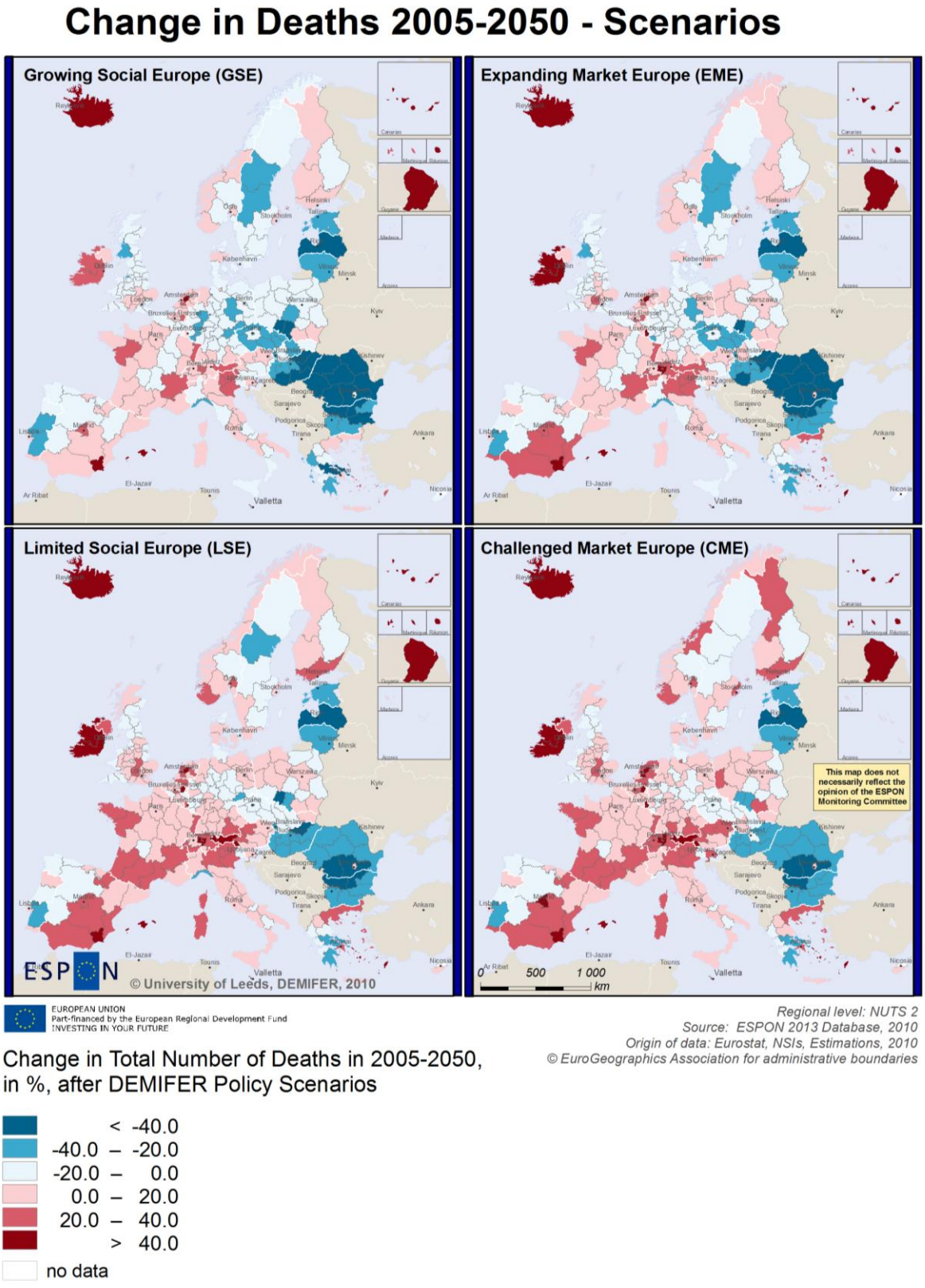


Figure 2-9: Percentage change in regional deaths, four policy scenarios, 2005-50

Figure 2-10 through Figure 2-13 present the net migration component results. Here we plot the actual rates per 1000 population in 2005-10 and 2045-50 because computing percentage changes is problematic if the sign attached to a variable can change. The maps of the reference scenario and the policy scenarios are virtually identical in 2005-10 as we assume no difference in the levels of internal migration between scenarios, only changing the destination attractiveness ratios after the first 5 year time interval. Any small difference is due to use of a 2003-6 base for the status quo scenario and an adjustment of this base to 2005-10 for the policy scenarios. The maps show that within each country there are regions in each class, making the map of Europe resemble a patchwork quilt. The preferred directions of migration differ from country to country depending on the structure of regional development. The pattern of net internal migration has changed by 2045-50 as a result of changes in the regional populations (the denominator) and the destination attractiveness factors which have been adjusted for each scenario (described in Deliverable D6). The maps are still patchworks reflecting the zero-sum nature of internal migration.

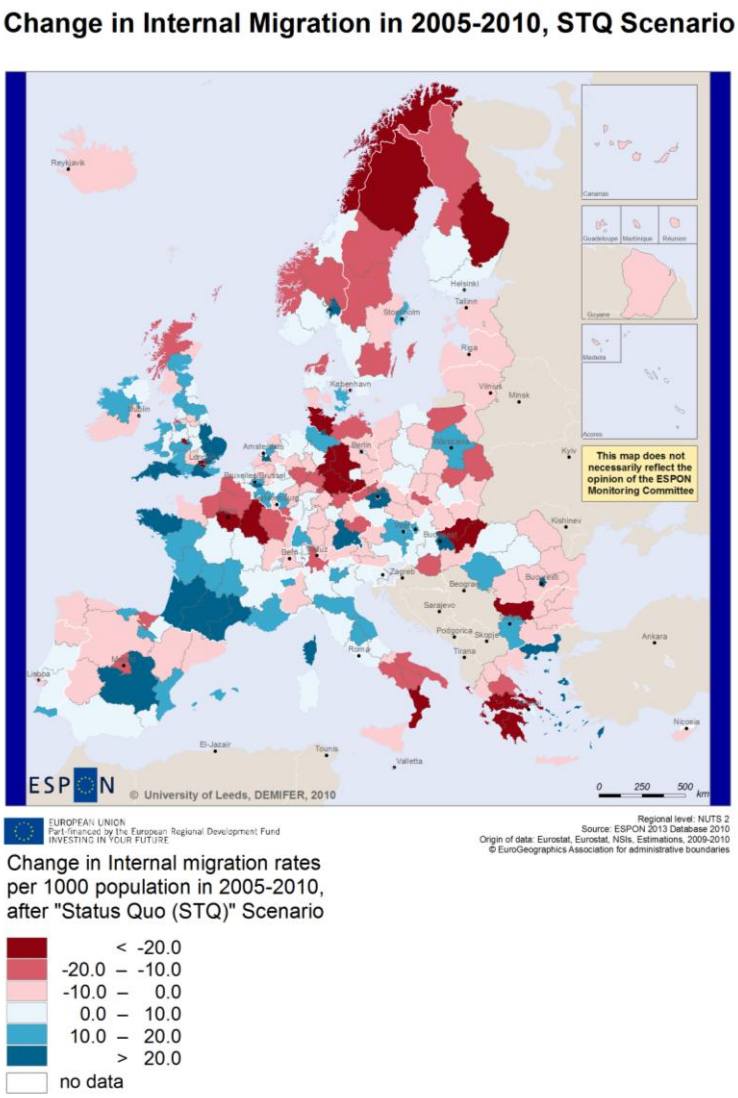


Figure 2-10: Net internal migration rates per 1000 population, status quo projection, 2005-10

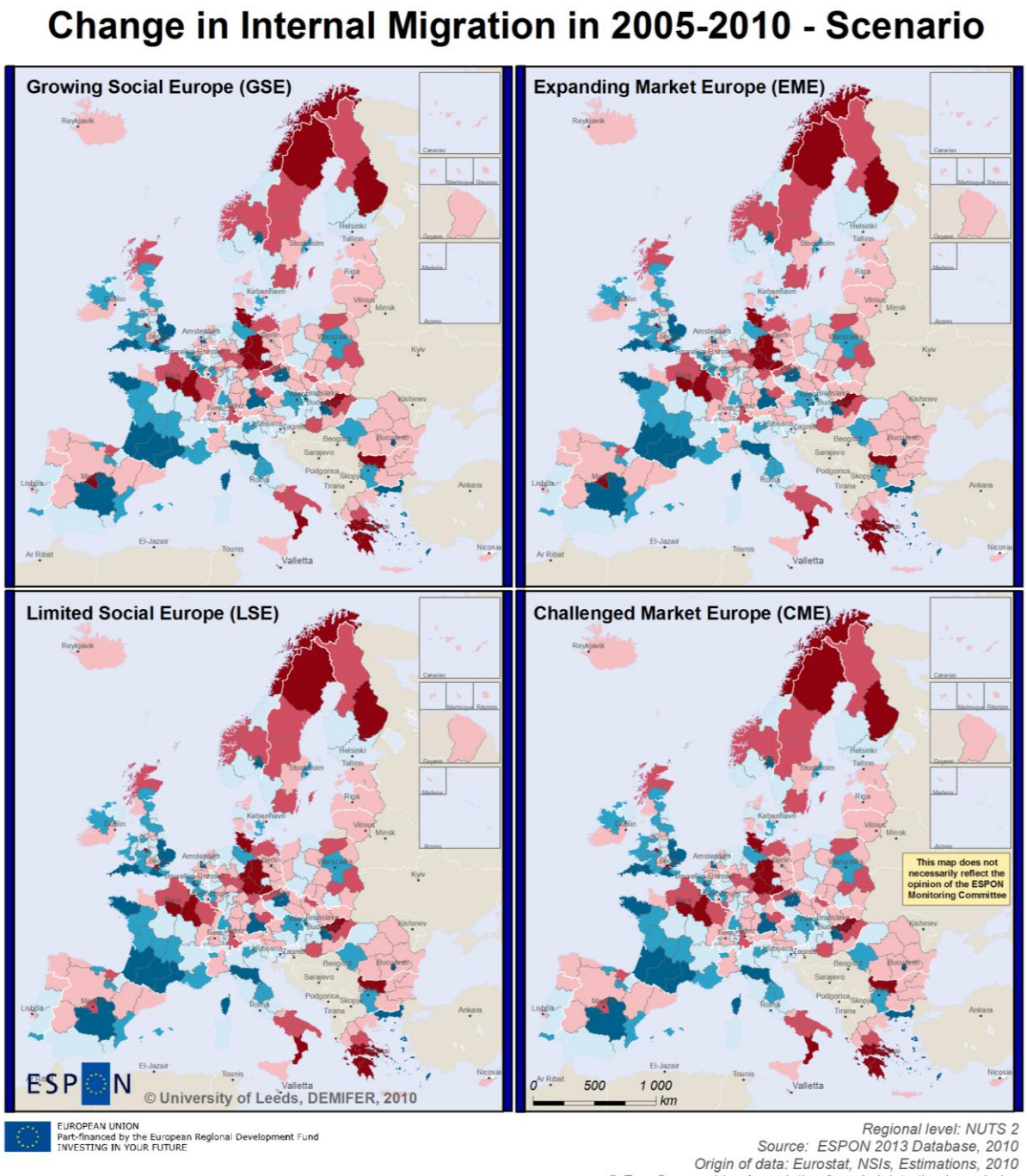


Figure 2-11: Net internal migration rates per 1000 population, four policy scenarios, 2005-10

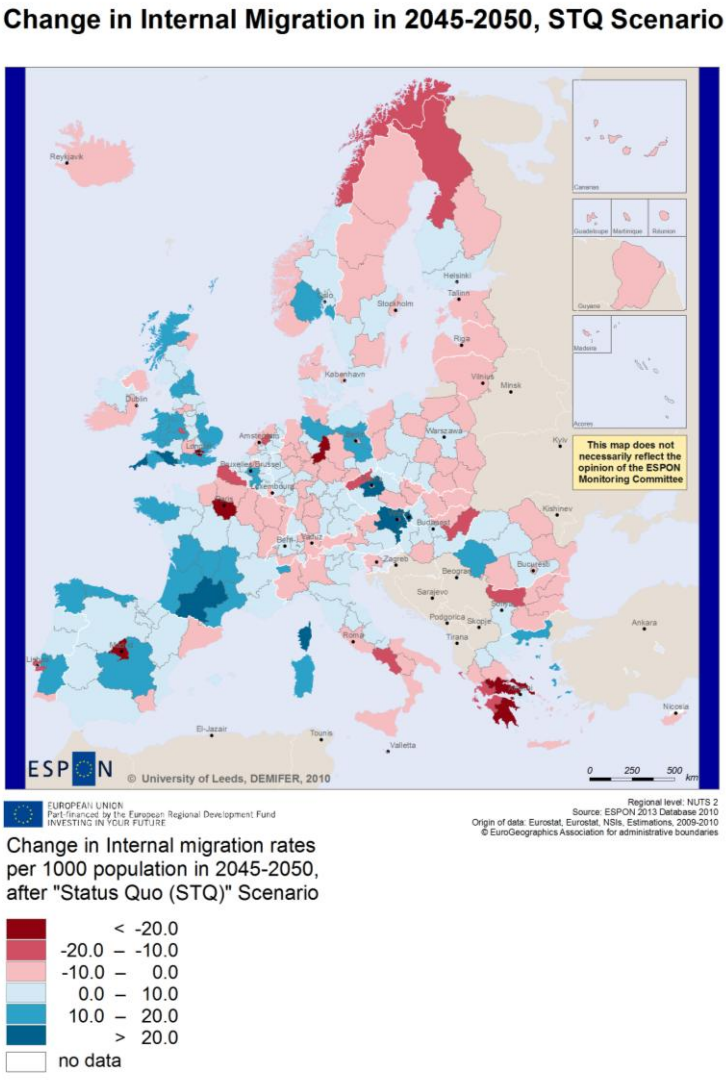


Figure 2-12: Net internal migration rates per 1000 population, status quo projection, 2045-50

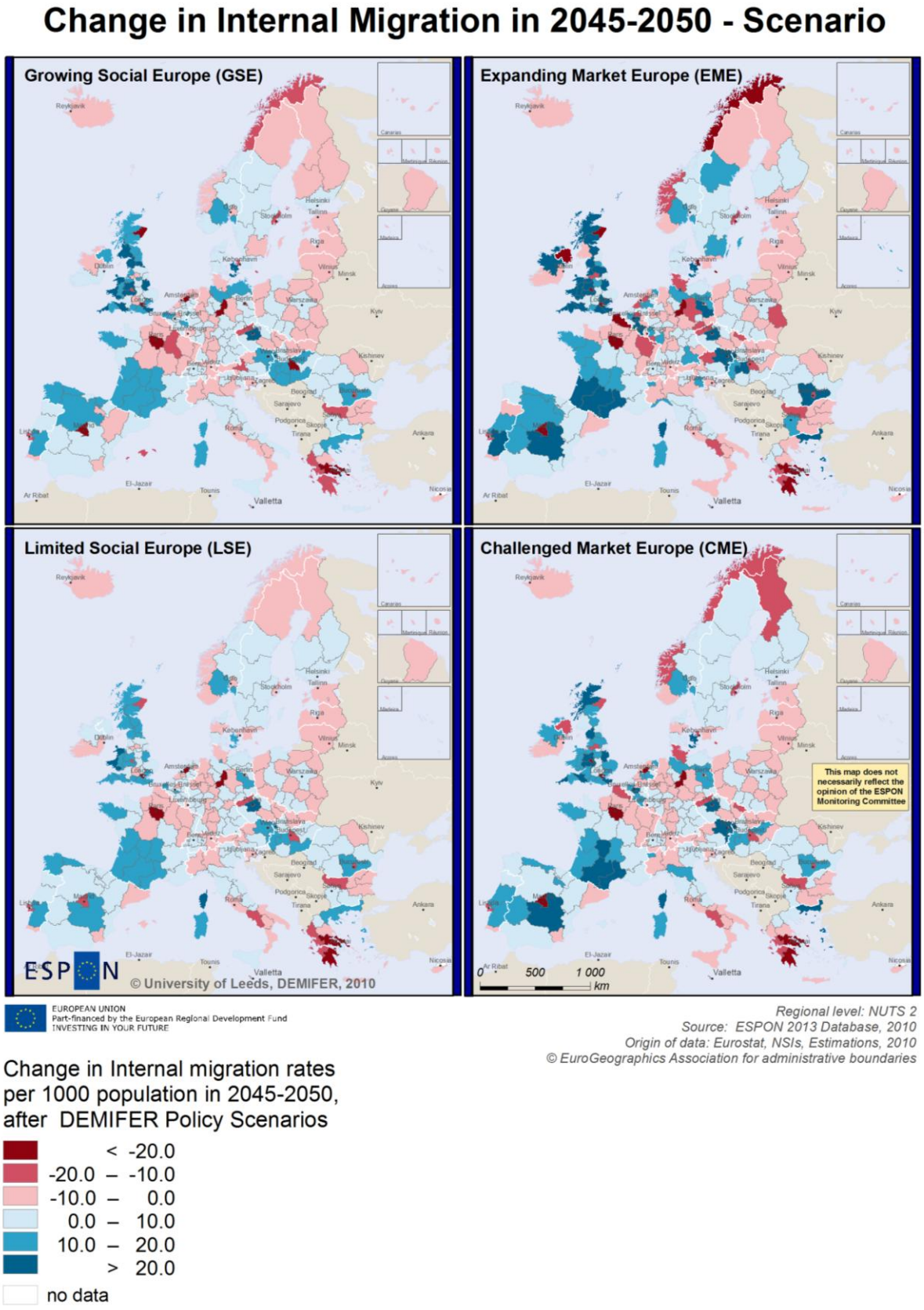


Figure 2-13: Net internal migration rates per 1000 population, four policy scenarios, 2045-50

Figure 2-14 maps net inter-country migration rates for 2005-10, Figure 2-15 maps the same rates for the four policy scenarios. Again the maps are virtually identical, as explained for internal migration. The regions with highest net in-migration rates are in northern Italy, parts of Austria, eastern Spain, Ireland and Budapest. France, Norway, Finland and Greece have low positive net migration rates. The regions of the Accession 8 countries, southern Italy, Portugal, Sweden, western and northern UK and some regions in Germany lose as a result of inter-country migration.

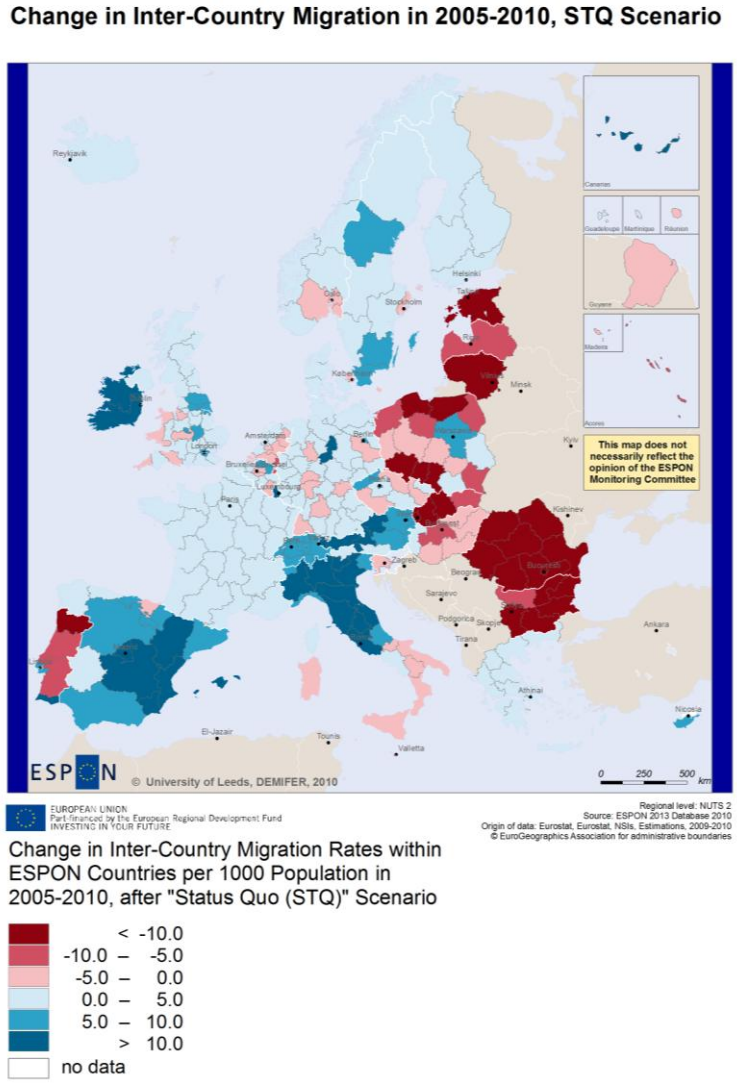


Figure 2-14: Net inter-country migration rates per 1000 population, status quo projection, 2005-10

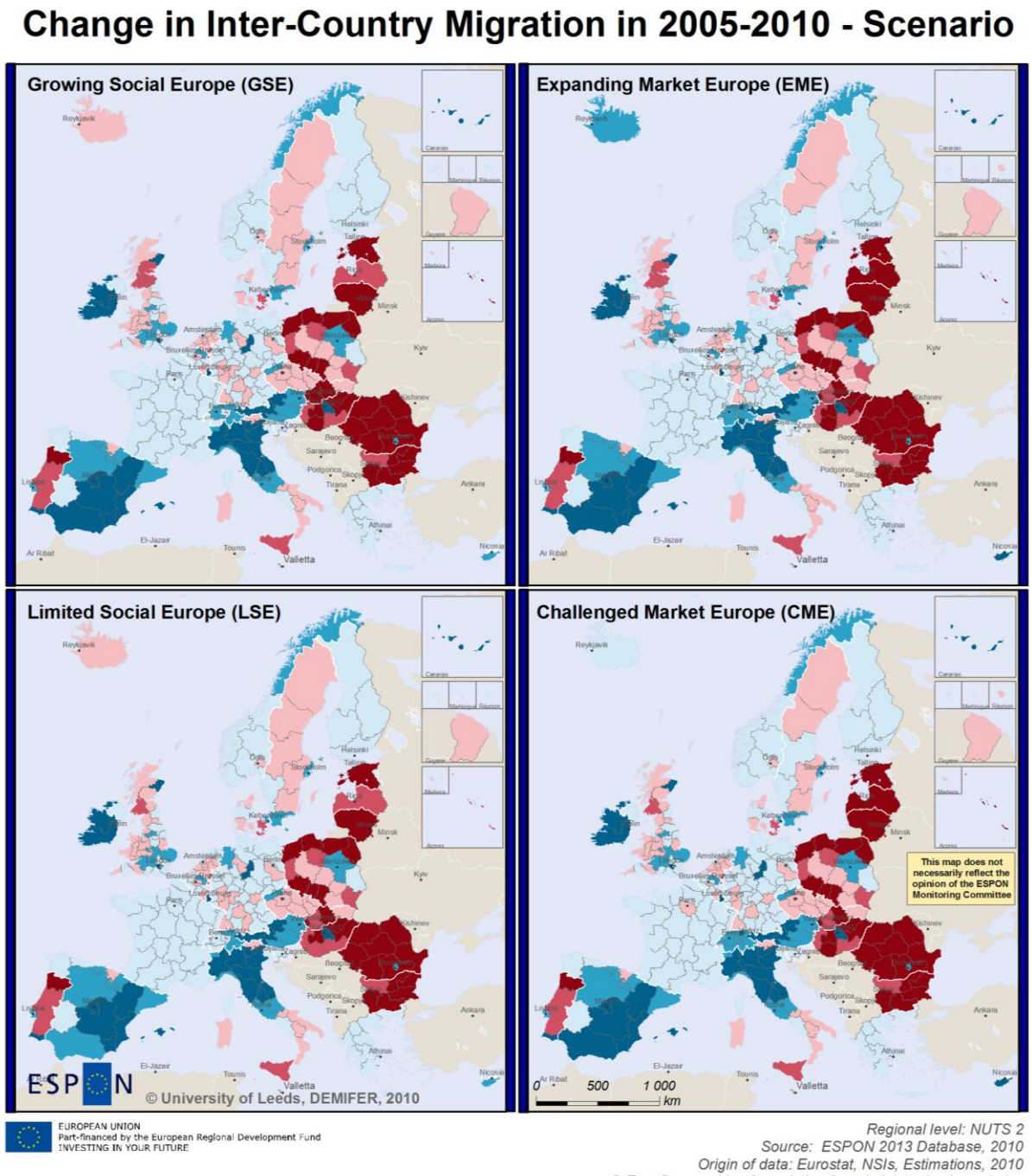


Figure 2-15: Net inter-country migration rates per 1000 population, four policy scenarios, 2005-10

The inter-country net migration rates for 2045-50 are plotted in Figure 2-16 and Figure 2-17. The scenario assumptions (see Deliverable D6) have dampened change but have also introduced contrasts between the social and market Europe scenarios. The rates in many regions in eastern Germany, Poland and the Czech Republic have become positive though Romanian rates remain firmly negative.

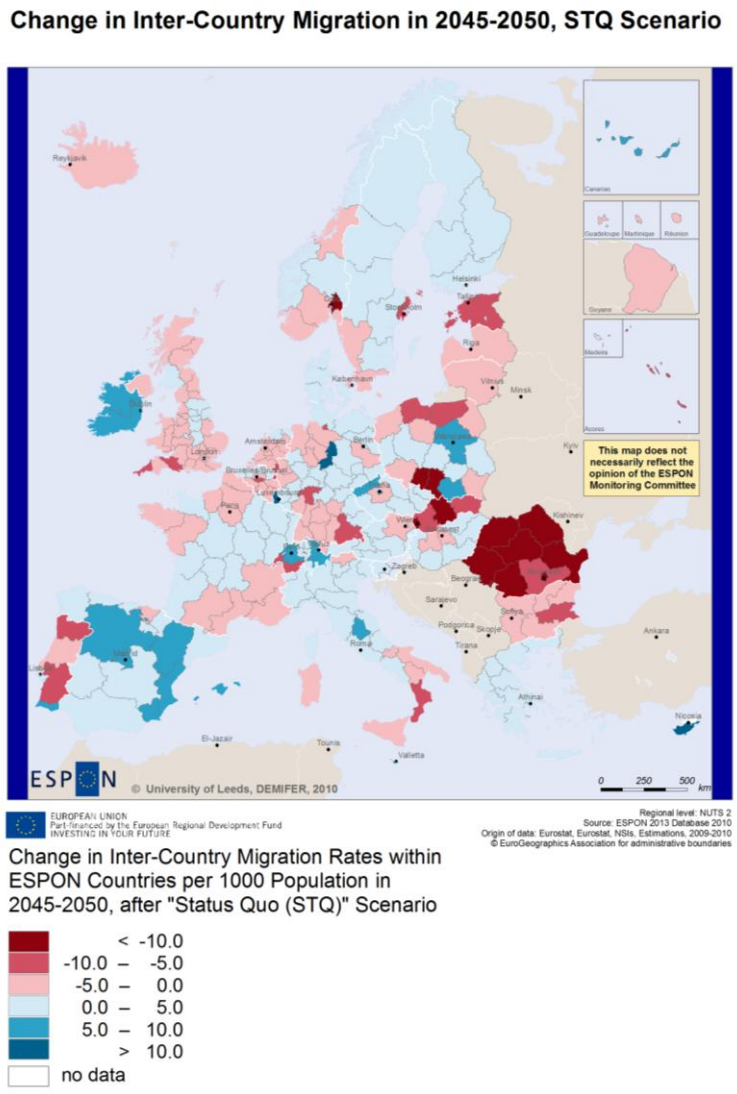


Figure 2-16: Net inter-country migration rates per 1000 population, status quo projection, 2045-50

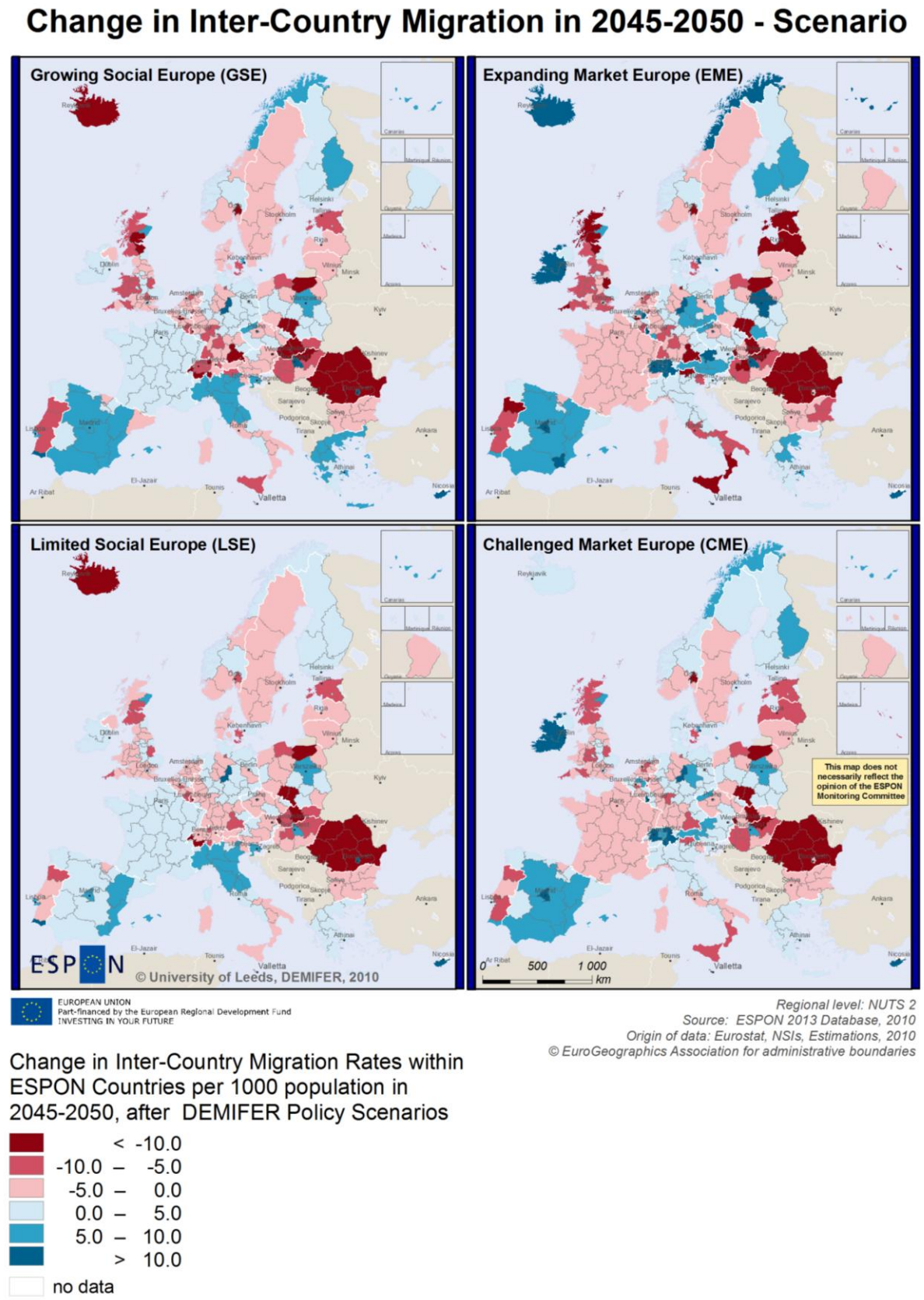


Figure 2-17: Net inter-country migration rates per 1000 population, four policy scenarios, 2045-50

Figure 2-18 and Figure 2-19 map the net extra-Europe migration rates in 2005-10 for the status quo and policy scenarios. The picture is predominantly a national one as international migration policy is still made differently at the country level. The countries of high net migration from outside Europe are Spain, Italy, Switzerland Sweden and the UK, all with very different migration histories. Most of the rest of Europe also experiences net extra-Europe migration. The only countries with strong negative rates are the Baltic republics, the Czech Republic, Hungary, Romania and Bulgaria and some regions in Poland.

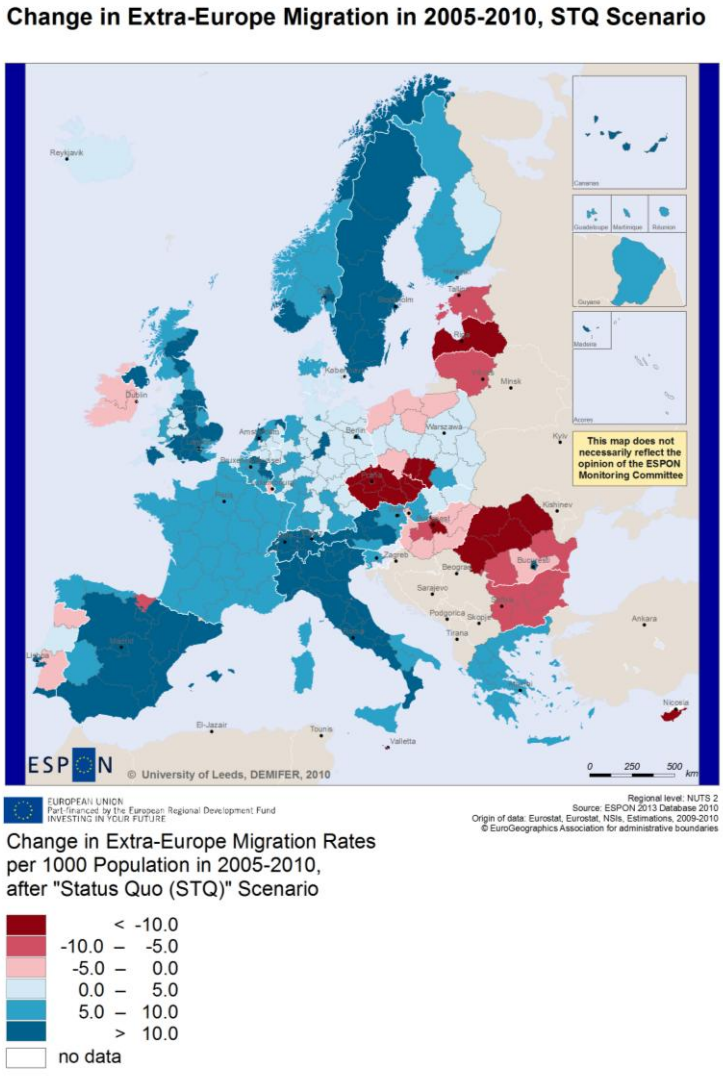


Figure 2-18: Net extra-Europe migration rates per 1000 population, status quo projection, 2005-10

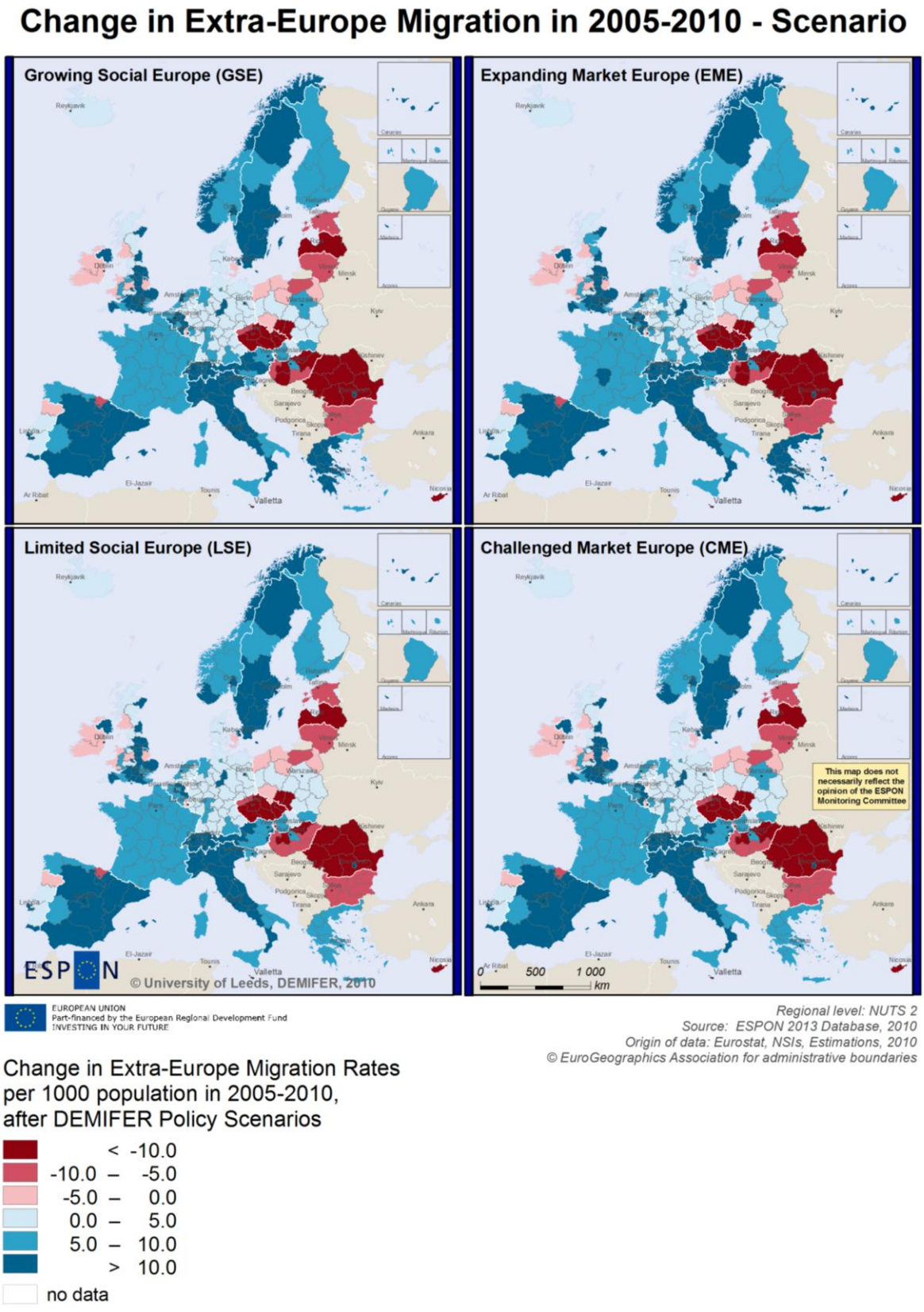


Figure 2-19: Net extra-Europe migration rates per 1000 population, four policy scenarios, 2005-10

By 2045-50 this situation has changed as we have assumed growing international migration under all four policy scenarios. In the GSE and EME scenarios most regions have rates greater than 10 per 1000 though the net losses of regions in Latvia, the Czech Republic, Hungary and Romania persist. The Limited Social Europe is still quite similar to the status quo scenario.

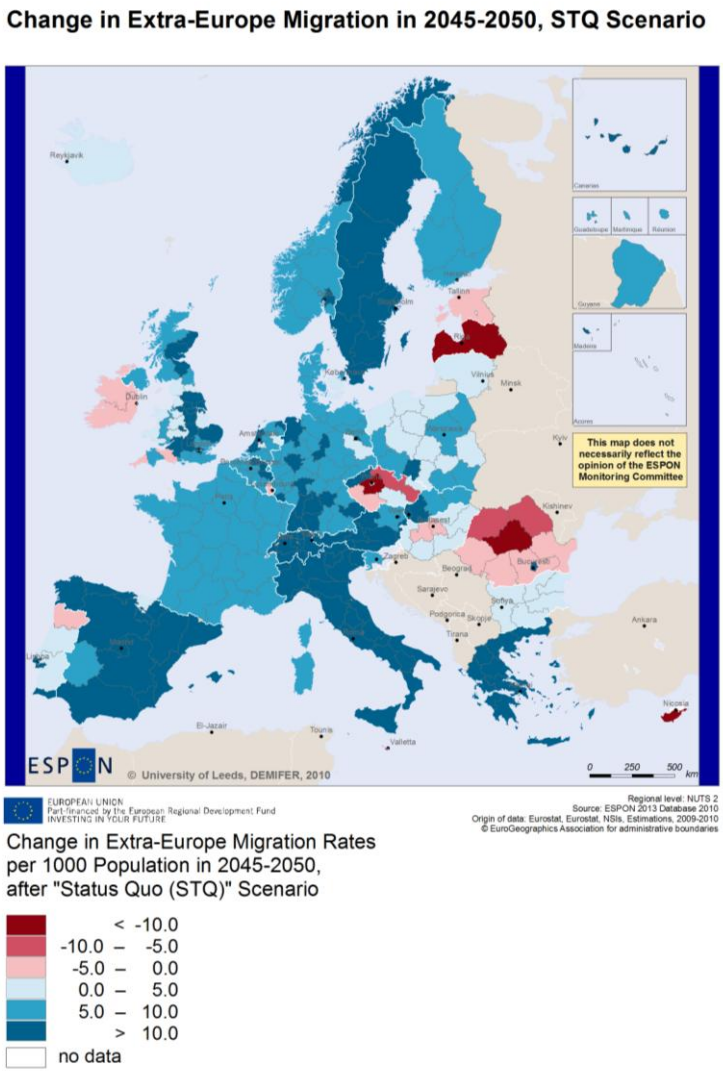


Figure 2-20: Net extra-Europe migration rates per 1000 population, status quo projection, 2045-50

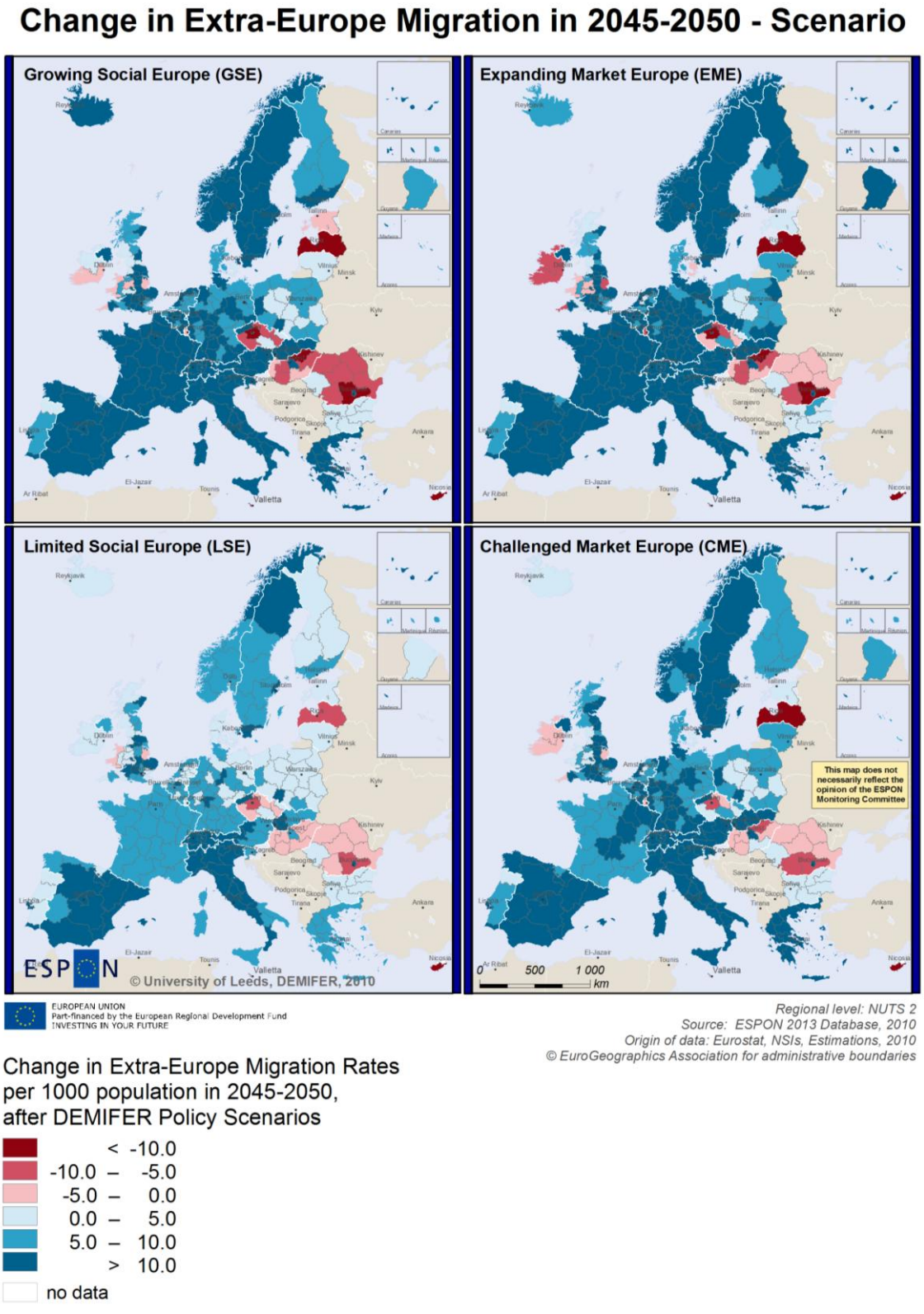


Figure 2-21: Net extra-Europe migration rates per 1000 population, four policy scenarios, 2045-50

2.4 Regional trends by cluster

Maps provide an excellent lens through which to view projected population changes but the complexity of the information depicted is considerable. To make sense of the patterns revealed it is sensible to classify regions into classes which share some characteristics. We begin by using the DEMIFER Typology described in Deliverable D3 which capture the demographic dynamics of Europe's regions around 2005. We ask how good are the types in summarising the projected demographic behaviour. Projected populations under the Status Quo and Policy scenarios are gathered together in Table 2-10. The table is organized as follows. There are seven panels corresponding to the seven types of regions idenitified in the Deliverable D3 analysis. Within each panel are rows for the five scenarios: Status Quo, GSE, EME, LSE and CME. The second to the seventh columns show the projected populations for each scenario. For ease of interpretation the right most columns convert the population information into time series indicator where the population in 2005 is set to 100.

Region Type 1, Eurostandard, is scattered in countries across western, central and northern Europe, with a concentration in the UK. In these regions live 25% of Europe's population. The Status Quo, LSE and CME scenarios see these regions staying roughly the same in population, with some natural decrease losses balanced by gains from international migration. The GSE and EME scenarios see the population of this cluster of regions growing by about a quarter.

Region Type 2, Challenge of Labour Force, groups together all the regions of Lithuania, Poland, Czech Republic, Slovakia, Slovenia, Romania with some regions in Hungary, Bulgaria, Greece, Italy and Spain. These regions are either in countries still in recovery from Soviet domination or the poor regions of southern Europe. In this cluster reside 23% of Europe's population. They are projected to experience population decline under all scenarios with the CME scenario close to the Status Quo. Their labour forces are under stress because of out-migration to other European states. People leave these countries because of the lack of opportunity coupled with the demand for labour further west in times of economic growth. There is a movement of capital eastwards that aims to exploit lower labour costs in the eastern states. So the major German, French and Italian automotive companies have established assembly plants in Accession 8 countries, followed by linked automotive parts manufacturers. Most of these plants have been established close to their parent companies so supply and control chains can be kept short. If these countries resume economic growth after the end of the current recession, we should expect faster growth in eastern than western Europe. The current imbalances in productivity and per capita incomes should eventually be removed but not before the population of the Challenges of Labour Force regions have seen their populations decline by 15 to 29%, depending on scenario.

Table 2-11: Clusters: projected populations for the policy scenarios, 2005-2050

Type, scenario	Population (millions)						Time series (2005=100)				
Type 1 – Euro Standard	2005	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
Status Quo	128	130	131	131	128	124	101	102	102	100	97
Growing Social Europe	128	130	134	141	148	155	101	105	110	116	121
Expanding Market Europe	128	130	135	142	151	160	101	105	111	118	125
Limited Social Europe	128	129	132	133	134	133	101	103	104	104	104
Challenged Market Europe	128	129	131	133	134	133	101	102	104	104	104
Type 2 – Challenge of Labour Force	2005	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
Status Quo	117	114	106	97	87	77	97	91	82	74	65
Growing Social Europe	117	114	109	105	102	100	97	93	90	87	85
Expanding Market Europe	117	114	108	103	99	96	97	92	88	84	82
Limited Social Europe	117	114	108	102	96	90	97	92	87	82	76
Challenged Market Europe	117	114	107	99	91	83	97	91	85	78	71
Tyoe 3 – Family Potentials	2005	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
Status Quo	105	107	111	112	112	110	102	106	107	107	105
Growing Social Europe	105	108	114	122	131	138	103	109	117	125	132
Expanding Market Europe	105	108	115	124	134	143	103	110	119	128	137
Limited Social Europe	105	107	112	115	117	118	102	107	110	111	112
Challenged Market Europe	105	107	112	116	118	119	102	107	111	113	114
Type 4 – Challenge of Ageing	2005	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
Status Quo	64	66	69	71	73	73	103	108	111	113	113
Growing Social Europe	64	66	72	79	87	95	103	112	123	136	148
Expanding Market Europe	64	66	72	80	90	99	103	113	125	140	154
Limited Social Europe	64	66	69	72	74	75	102	108	112	115	116
Challenged Market Europe	64	66	70	73	75	77	102	109	113	117	120
Type 5 – Challenge of Decline	2005	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
Status Quo	50	49	46	42	38	34	98	91	83	75	67
Growing Social Europe	50	49	47	46	45	44	97	93	91	89	88
Expanding Market Europe	50	49	47	45	44	43	97	93	89	87	86
Limited Social Europe	50	49	46	43	41	38	97	91	86	81	75
Challenged Market Europe	50	49	46	43	39	36	97	91	85	78	72
Type 6 – Young Potentials	2005	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
Status Quo	39	41	43	45	46	45	105	112	117	118	117
Growing Social Europe	39	41	45	50	54	58	105	117	129	140	151
Expanding Market Europe	39	41	46	51	57	63	105	118	132	148	164
Limited Social Europe	39	41	44	46	47	48	105	113	118	121	123
Challenged Market Europe	39	41	44	47	49	50	105	114	121	126	130
Type 7 – Overseas	2005	2010	2020	2030	2040	2050	2010	2020	2030	2040	2050
Status Quo	2	2	2	2	3	3	100	133	133	167	167
Growing Social Europe	2	2	2	2	3	3	100	133	133	167	167
Expanding Market Europe	2	2	2	2	3	3	100	133	133	167	167
Limited Social Europe	2	2	2	2	2	3	100	133	133	133	167
Challenged Market Europe	2	2	2	2	2	3	100	133	133	133	167

Regions of **Type 3, Family Potentials**, are lived in by 21% of Europe's population. Under all scenarios regional populations grow modestly over the 45 years of the projection under the Status Quo and all Policy Scenarios, between 5% (Status Quo) and 37% (EME scenario). Family potential

regions are found in France, the Netherlands, Switzerland, Austria, Norway, Finland and the United Kingdom.

Regions of **Type 4, Challenge of Ageing**, contain 13% of Europe's population. These regions are found predominantly in south-western France, northern Spain, Portugal, central and northen Italy with outliers in south west UK and western Greece. Despite their older population age structure, they will continue to grow mainly because of continuing net in-migration. The in-migration streams can be dominantly inter-regional (within countries) as in the South West of the UK and France or international in origin (Spain, Italy) mainly from outside Europe (Italy, Spain, Portugal).

Regions of **Type 5, Challenge of Decline**, are found in central and eastern Germany, in Bulgaria and Greece, in the Baltics (Estonia, Latvia), in central Sweden and eastern Finland, and contain 10% of Europe's population. These regions are characterised by net out-migration of younger people because of better opportunities elsewhere within the national space or in other European countries. The degree of population decline by 2050 in this set of regions is similar to the second type, Challenge of Labour Force. The population of this type in 2050 will be between 67% (Status Quo) and 88% (GSE Scenario). Halting the decline in these regions will not be easy. They include all the regions of the former East Germany except Berlin to which enormous infra-structure investment and subsidies have been directed for 20 years by the German Federal Republic. This investment has yet to turn round the population decline.

Regions of Type 6, Young Potentials, are found in only two countries, Spain (southern and eastern) and Ireland, where 8% of Europe's population live. These regions have attracted migrants from elsewhere in Europe and outside Europe in large numbers. In Spain the migration from Latin America has been important, helping build a New Spain, coupled with migration of retirees from northern Europe. The two streams are linked in Mediterranean Spain's housing boom. The Irish "Tiger Economy" boom stimulated net immigration (e.g. from the Irish diaspora) and as in Spain the boom was associated with a housing bubble. The bubbles have now burst leading to a downturn in immigration and a reduction in the "young potentials". So the substantial growth reported in our projections, from 17% (Status Quo) to 64% (EME scenario), may not be realised as the current recession is likely to take away a decade of economic growth. Growth is greatest under the Expanding Market Europe and Growing Social Europe scenarios. However, our optimism about growth prospects built into these two scenarios looks displaced in view of the current economic crisis. The 2008-2010 crisis has its roots in excessive speculation on property and the bubble of incautious loans to the housing sector. So for Type 6 regions the LSE and CME scenarios are more likely with growths some 30-40% lower than the optimistic scenarios.

The final cluster of regions, **Type 7, Overseas**, contains only 0.3% of Europe's population in 2005 and 0.5% in 2050. These regions are French colonies which have chosen to remain part of France rather than become independent (e.g. Martinique, Guadaloupe, Guyane, Reunion, Nouvelle Caledonie). They have a young age structure and higher fertility than metropolitan France. We can be pretty confident that they will be the region type with the greatest growth. The uncertainty associated with the projections is the extent to which young people will choose to migrate to metropolitan France. Note that we have not extended the Policy Scenarios to the Overseas regions but retained the Status Quo projection.

Thus, we see that the typology developed in Deliverable D3 predicts quite closely the projection outcomes for the 45 years of our projections.

2.5 Regional population re-distribution using density and income gradients

To understand some of the implications of the shifts in population recorded in the scenario projections, it is useful to carry out a regional gradient analysis. A gradient analysis classifies objects into classes using one significant indicator or more complex index. In the typology analysis we used four indicators simultaneously. In health inequality analysis this is a frequently used method when individual level data linking health to the gradient variable are not available. Here we define two gradient variables: GDP per capita and population density, using Eurostat data and computing region areas for the density computation from their digital representation in Arc-GIS. GDP per capita is a reasonable proxy for household and personal income. Population density serves as a continuous measure of the urban/rural continuum. We sort the regions into quintiles on the basis of their income and density and aggregate the projected regional populations to quintile classes. The populations are then converted in percentage shares in 2005 and in 2050, by scenario. The results are presented in Table 2-12.

Table 2-12: The regional redistribution of population across density and income gradients under four policy scenarios, 2005-2050

Density quintile	Q1 High Density	Q2	Q3	Q4	Q5 Low Density	Total
2005	28.6	23.0	19.9	17.2	11.3	100
2050 STQ	30.2	24.6	19.1	15.2	10.9	100
2050 GSE	30.7	24.7	19.1	14.9	10.7	100
2050 EME	30.9	24.7	18.9	14.7	10.9	100
2050 LSE	30.2	24.0	19.4	15.4	11.0	100
2050 CME	30.6	24.3	19.1	15.1	11.0	100
Income quintile	Q1 High Income	Q2	Q3	Q4	Q5 Low Income	Total
2005	25.4	19.5	18.6	15.8	20.8	100
2050 STQ	33.7	22.6	18.7	14.4	10.6	100
2050 GSE	34.1	22.7	18.7	14.2	10.3	100
2050 EME	34.4	22.8	18.4	13.9	10.5	100
2050 LSE	33.7	22.0	19.0	14.7	10.7	100
2050 CME	34.1	22.3	18.6	14.3	10.7	100

In 2005 the regional populations of Europe are concentrated in the higher density quintiles. This is simply a function of how the quintiles were defined. More interesting is the shifts by 2050 between the quintile classes (fixed at their definition in 2005). The changes are quite small and fairly uniform across density quintile. There are small falls in the lowest density quintiles (Q4 andQ5) and small gains in the highest density quintiles (Q1 and Q2). This indicates that, overall, the process of urbanization or peri-urbanization continues.

The redistribution is much stronger when we use the income quintiles. The percentages in the lowest quintile nearly halve and those in the highest quintile increase by 8-9% with smaller gains in Q2 and smaller losses in Q4. The scenarios are projecting substantial redistribution of the population from the poorest to the richest areas. **This is probably the most significant result of our Policy Scenario work.** By 2050 51 million fewer people will live in the poorest fifth of Europe's regions; by 2050 42 million more people will live in the richest fifth of Europe's regions and another 13 million will live in the second richest fifth. Such a major change in collective welfare is hidden in our cartographic analysis. We must be aware of this shift in the projected population when we analyse our maps of change.

3. THE AGEING OF EUROPE

3.1 Europe-wide trends in population ageing by scenario

The ageing of Europe's population is a longstanding process, which is a consequence of two demographic transitions: the first consisted of a mortality decline followed by fertility decline which reduced the populations of younger age groups and kept older age groups larger for longer. The second demographic transition took fertility rates in nearly all countries in Europe to new lows well below replacement total fertility rates (2.05-2.15 depending on female mortality regime). In between these transitions was a 1950s and 1960s baby boom which will precipitate "super-ageing" as the baby boomers move into the older ages from 2010 onwards. A third demographic transition is currently underway in which gaps in the populations and labour forces of Europe are being filled by new migrants, who are also contributing to natural increase as they form families. In northern Europe a small fertility rise has occurred in several countries driven by a catch-up among native-born women of postponed births and higher contributions by foreign-born women. We can expect to see the consequences of this fertility history playing out in various ways in our projections. In this section we examine the ageing projected by the status quo and policy scenarios.

Table 3-1 sets out the broad age group results of our scenario projections. The population is divided into three age groups, which are conventionally used with projection models employing five year age groups: 0-14, 15-64 and 65+, designated somewhat approximately as the childhood, working and retired ages respectively. In fact, the age of exit from compulsory schooling is usually higher than 15 (16, 17 or 18 depending on country). Adolescents continue in school, further education or university until age 21 or 22 taking first level qualifications and then until 25, 26 or older if taking second level qualifications or doctoral degrees. Students at these ages also work part-time. The working ages in fact hold populations who are working full-time, part-time, seeking work or being economically inactive. The same fuzziness occurs at the boundary between working ages and retirement. Large numbers of men and women have retired well before age 65 under favourable pension and social security arrangements which governments, firms and individuals are recognizing as unviable.

Table 3-1: Europe: projected age group populations for the policy scenarios, 2005-2050

Variable	Scenario	2005				2050			
		0-14	15-64	65+	Total	0-14	15-64	65+	Total
Population (millions)	STQ	81.5	338.6	83.4	503.5	64.1	282.1	117.0	463.2
	GSE	81.5	338.6	83.4	503.5	86.7	329.7	176.1	592.5
	EME	81.5	338.6	83.4	503.5	88.7	342.8	173.2	604.7
	LSE	81.5	338.6	83.4	503.5	63.0	280.5	158.9	502.4
	CME	81.5	338.6	83.4	503.5	56.8	287.1	156.1	500.0
Population time series	STQ	100	100	100	100	78.6	83.3	140.3	92.0
	GSE	100	100	100	100	106.4	97.4	211.3	117.7
	EME	100	100	100	100	108.8	101.2	207.8	120.1
	LSE	100	100	100	100	77.2	82.9	190.6	99.8
	CME	100	100	100	100	69.7	84.8	187.2	99.3
% ages	STQ	16.2	67.3	16.6	100	13.8	60.9	25.3	100
	GSE	16.2	67.3	16.6	100	14.6	55.6	29.7	100
	EME	16.2	67.3	16.6	100	14.7	56.7	28.6	100
	LSE	16.2	67.3	16.6	100	12.5	55.8	31.6	100
	CME	16.2	67.3	16.6	100	11.4	57.4	31.2	100

We see from Table 3-1 that the working age population shrinks between 2005 and 2050 in all scenarios except the Expanding Market Europe and then grows by only 1%. The populations aged 65+ by contrast expand by 87% to 111% depending on policy scenario but only by 40% in the status quo projection. The population of children expands a little under the Growing Social Europe scenario and the Expanding Market Scenario but falls considerably under the Limited Social Europe and Challenged Market Europe scenario with their lower fertility assumptions (see Deliverable D6 for details). The age composition of Europe's population changes radically over the 45 years: the working age population shrinks from 67% to 56% to 57% depending on policy scenario whereas the 65+ population expands from 17% to 29% to 32 % depending on policy scenario. There is little difference across the policy scenarios in the degree of ageing though collectively they exhibit additional ageing compared with the status quo scenario, mainly due to increased longevity. This degree of additional ageing in the projection horizon should be regarded as a triumph of human endeavour and social organization. The policy scenarios tell us that we will live 20-30 years further, depending on sex and scenario (as discussed in Deliverable D6), beyond the age, 65, at which Bismarck, the inventor of European social security in old age, set the retirement age. He was confident the social security system would not be expensive, having been told by his demographic experts that few people were expected to live beyond 65. So Bismarck has laid down a challenge for our societies: how to afford the transfer payments, health and social care.

This demographic challenge is made clear in diagrammatic form in Figure 3-1. The numbers are provided in Table 3-2. In the top panel of the figure we plot age-sex distributions of the population in 2005 and 2050 for the status quo and policy scenarios. These are conventionally called age-sex pyramids but for European population the time has long past when they had this shape. In 2005 there is clear evidence of the baby boomers born between 1955 and 1970 in the ages 35-49. By 2050 these cohorts are aged 80-94. The age distribution has lost its middle aged bulge and the numbers at older ages have grown substantially. Note the greater growth of older men than older women reflecting the catch up process as mortality risks reduce at older ages, that is, the survival curve shifts to the right.

The bottom panel of Figure 3-1 tracks the directions of change of four dependency ratios for the scenarios (see Chapter 1 of the report for definitions). Here we comment on the purely demographic ratios, the ODR and VODR. These all rise steadily, as expected but slightly more in the social scenarios (GSE, LSE) than in the market scenarios (EME, CME) and much more than in the status quo scenario. The gap between the ODR and VODR is larger in the successful scenarios (GSE, EME) than in the unsuccessful scenarios (LSE, CME). We will draw out the lessons for policy makers in the final chapter of the report.

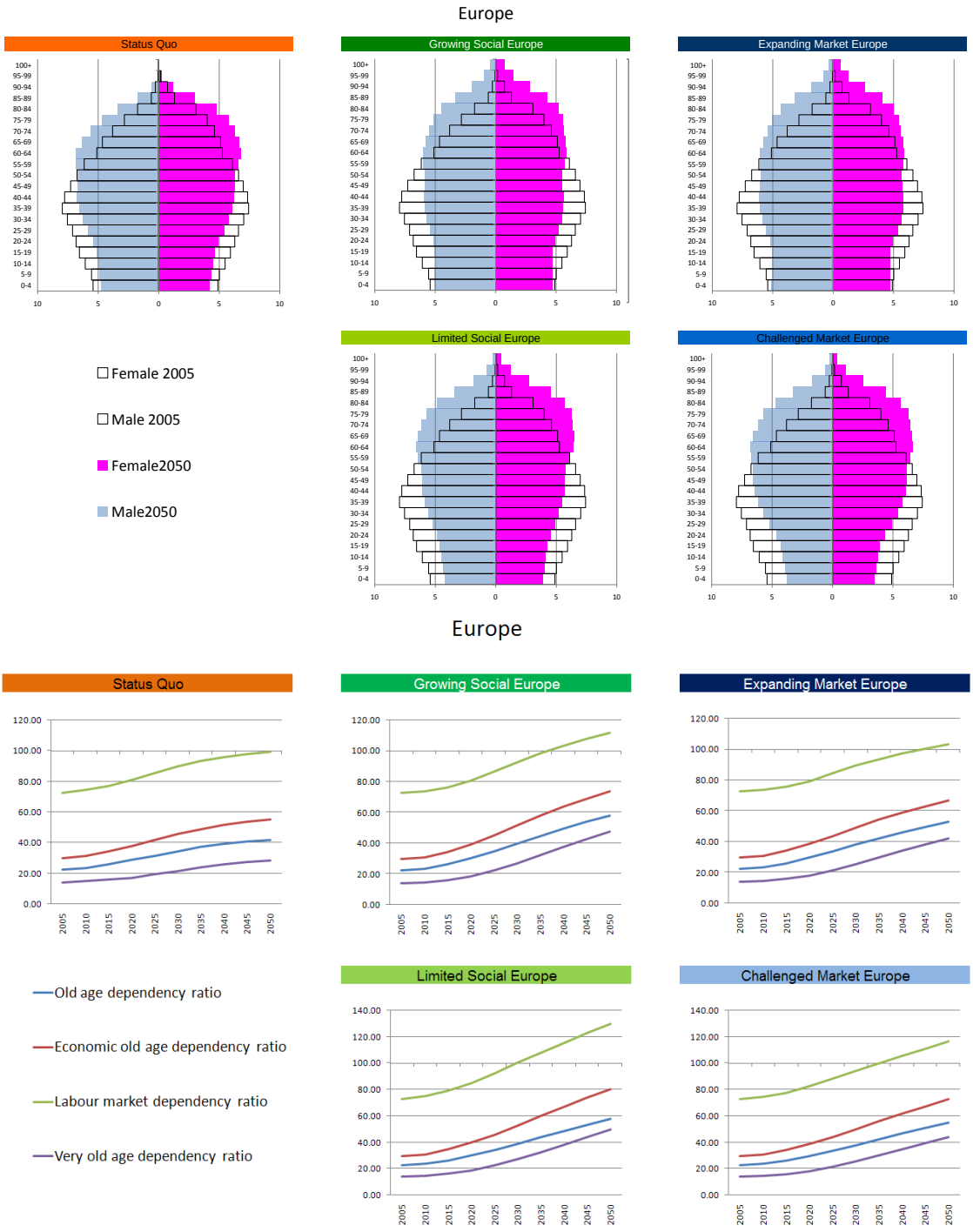


Figure 3-1: Scenario profiles for population ageing and dependency ratios, 2005-50: Europe

Table 3-2: Europe: projected age structure indicators for the status quo and policy scenarios, 2005-2050

Scenario		STQ	Status Quo								
		2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Old age dependency ratio	ODR	22.44	23.62	26.01	28.64	31.48	34.36	36.94	38.92	40.43	41.55
Economic old age dependency ratio	EODR	29.85	31.45	34.40	37.89	41.80	45.66	49.05	51.70	53.78	55.29
Labour market dependency ratio	LMDR	72.57	74.67	77.16	80.96	85.62	89.92	93.49	96.18	98.16	99.57
Very old age dependency ratio	VODR	13.98	15.09	16.03	17.08	19.31	21.66	23.95	25.94	27.51	28.59
Scenario		GSE	Growing Social Europe								
		2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Old age dependency ratio	ODR	22.44	23.33	26.25	30.07	34.60	39.58	44.68	49.45	53.83	57.86
Economic old age dependency	EODR	29.85	30.97	34.39	39.21	45.07	51.39	57.70	63.52	68.83	73.56
Labour market dependency	LMDR	72.59	73.76	75.94	80.26	86.22	92.38	98.18	103.24	107.67	111.53
Very old age dependency	VODR	13.98	14.70	16.03	18.23	22.22	26.93	32.18	37.55	42.75	47.53
Scenario		LSE	Limited Social Europe								
		2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Old age dependency ratio	ODR	22.44	23.34	26.19	29.80	34.10	38.94	44.01	48.88	53.55	58.07
Economic old age dependency	EODR	29.85	31.17	34.88	39.91	46.06	52.89	60.00	66.94	73.71	80.23
Labour market dependency	LMDR	72.59	74.82	78.70	84.66	92.26	100.18	108.05	115.60	122.82	129.79
Very old age dependency	VODR	13.98	14.80	16.21	18.37	22.33	27.05	32.43	38.16	43.96	49.61
Scenario		EME	Expanding Market Europe								
		2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Old age dependency ratio	ODR	22.44	23.31	26.10	29.67	33.80	38.16	42.46	46.40	49.96	53.23
Economic old age dependency	EODR	29.85	30.92	34.14	38.57	43.83	49.23	54.39	59.05	63.25	66.98
Labour market dependency	LMDR	72.59	73.62	75.44	79.18	84.26	89.19	93.54	97.25	100.45	103.25
Very old age dependency	VODR	13.98	14.67	15.89	17.84	21.43	25.53	29.92	34.28	38.42	42.16
Scenario		CME	Challenged Market Europe								
		2005	2010	2015	2020	2025	2030	2035	2040	2045	2050
Old age dependency ratio	ODR	22.44	23.32	26.05	29.43	33.38	37.75	42.25	46.58	50.79	54.98
Economic old age dependency	EODR	29.85	31.07	34.47	38.98	44.35	50.13	56.01	61.71	67.34	72.90
Labour market dependency	LMDR	72.59	74.37	77.35	82.16	88.18	94.17	99.98	105.57	111.05	116.57
Very old age dependency	VODR	13.98	14.75	15.99	17.85	21.32	25.36	29.85	34.55	39.28	43.91

3.2 Country trends in population ageing by scenario

The scenario workbooks contain versions of Figure 3-1 (age-sex distributions and dependency ratio graphs) for each of the 31 countries and 287 regions. We reproduce the country profiles in Appendix Figure A.30 to Figure A.58, so that readers can check out their own national situation in 2050. As in the previous chapter we examine two national profiles at the extremes of the ageing continuum, Romania (Figure 3-2) and the United Kingdom (Figure 3-3).

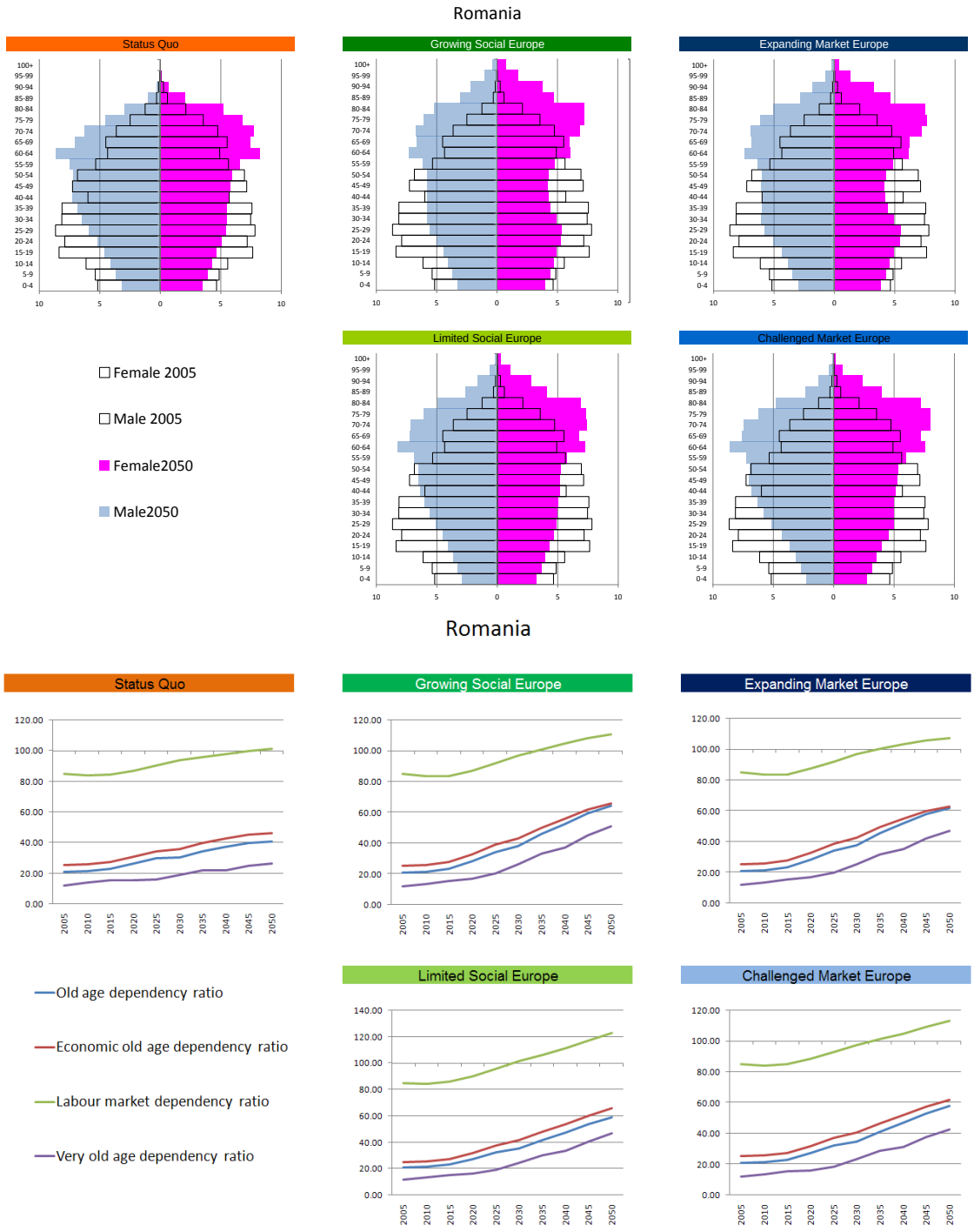


Figure 3-2: Scenario profile for population ageing and dependency ratios, 2005-50: Romania

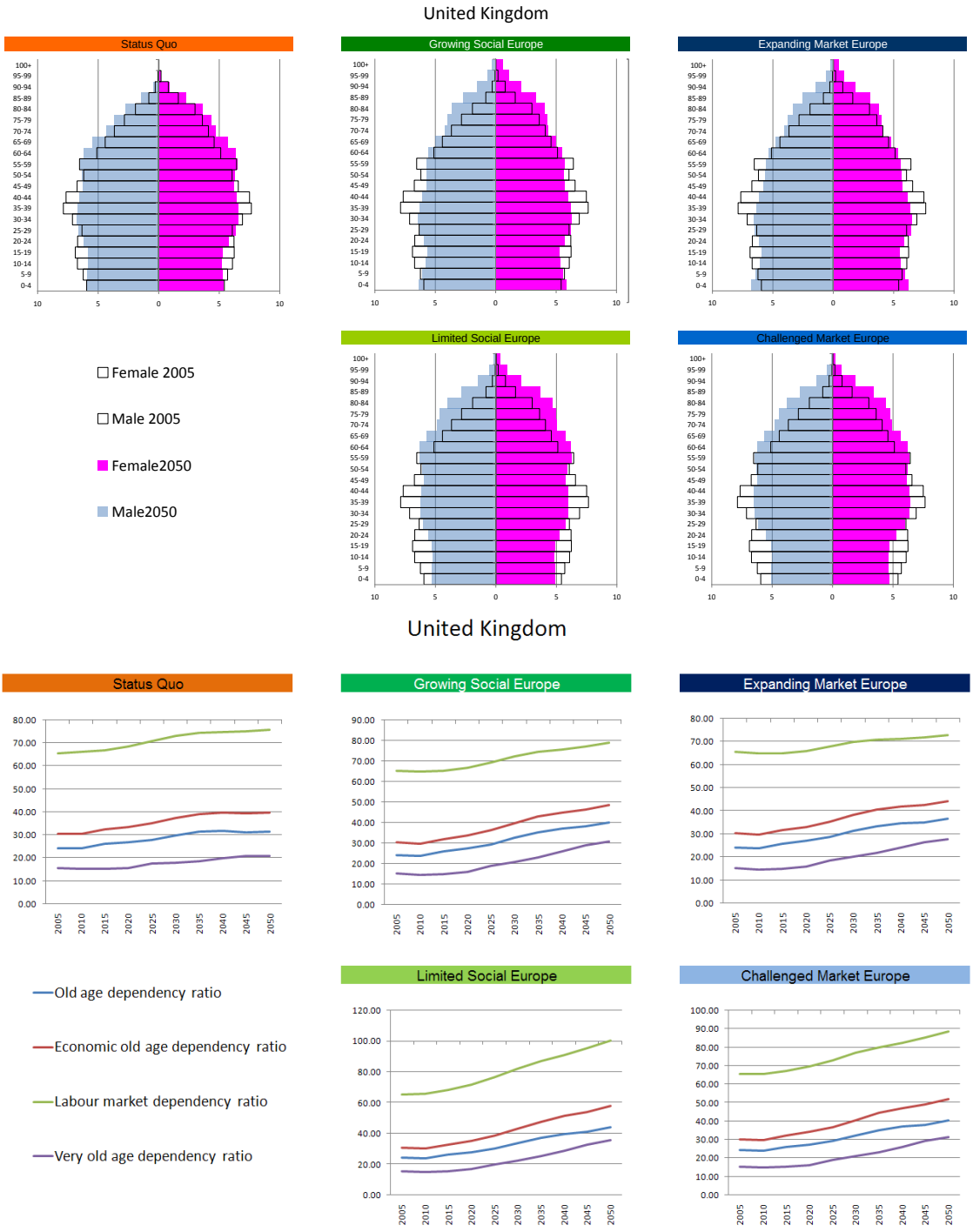


Figure 3-3: Scenario profile for population ageing and dependency ratios, 2005-50: United Kingdom

The Romanian age-sex distribution in 2005 already shows signs of a severe baby bust and gaps in the age structure in middle age, indicative of earlier fertility fluctuations in the 1960s and subsequent out-migration. The age-sex distribution in 2050 is uniquely top heavy, reflecting a high degree of ageing, and evidence of heavy out-migration of women in the 30-59 ages. As far we can judge this is a "real

scenario" effect not an artefact of poor data. The dependency ratios are very high compared with those of Europe as a whole.

The United Kingdom age-sex profile is much smoother and more balanced, particularly in the GSE and EME scenarios (Figure 3-3). We should point out that the age-sex distributions in the figures are all plotted on the same relative scale and in the case of the UK conceal the high population growth that we have commented on in Chapter 2. The dependency ratios grow as elsewhere but remain well below the European average.

3.3 Region trends in population ageing by scenario

We now examine the regional variation of population ageing in a series of maps that parallel those of Chapter 2. We begin by looking at the changes between 2005 and 2050 in the three broad ages. Figure 3-4 presents the status quo change as a reference while Figure 3-5 draws the maps for each policy scenario. The status quo, LSE and CME scenario maps are almost covered by regions experiencing decreases. Only southern UK, Ireland, western and southern France, north and central Italy and south central Spain will see small increases. The GSE and EME scenarios, with their higher fertility assumptions will have higher growth in child numbers in these regions and lesser decreases across the rest of Europe.

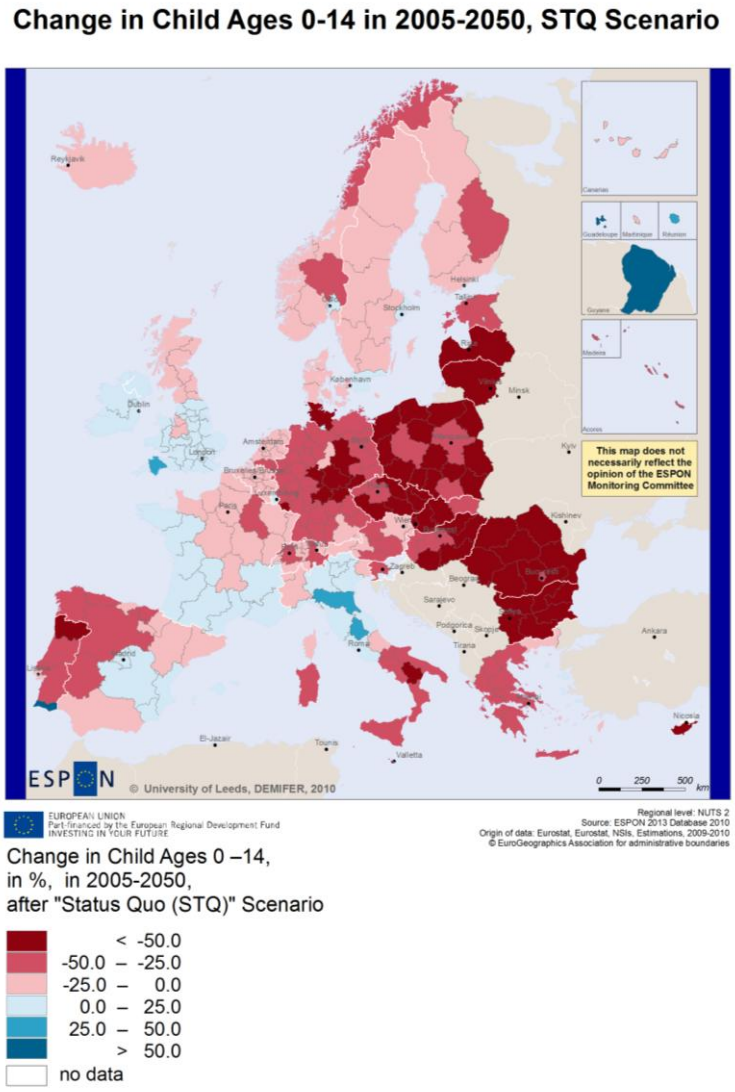


Figure 3-4: Percentage change in child ages (ages 0-14), status quo projection, 2005-50

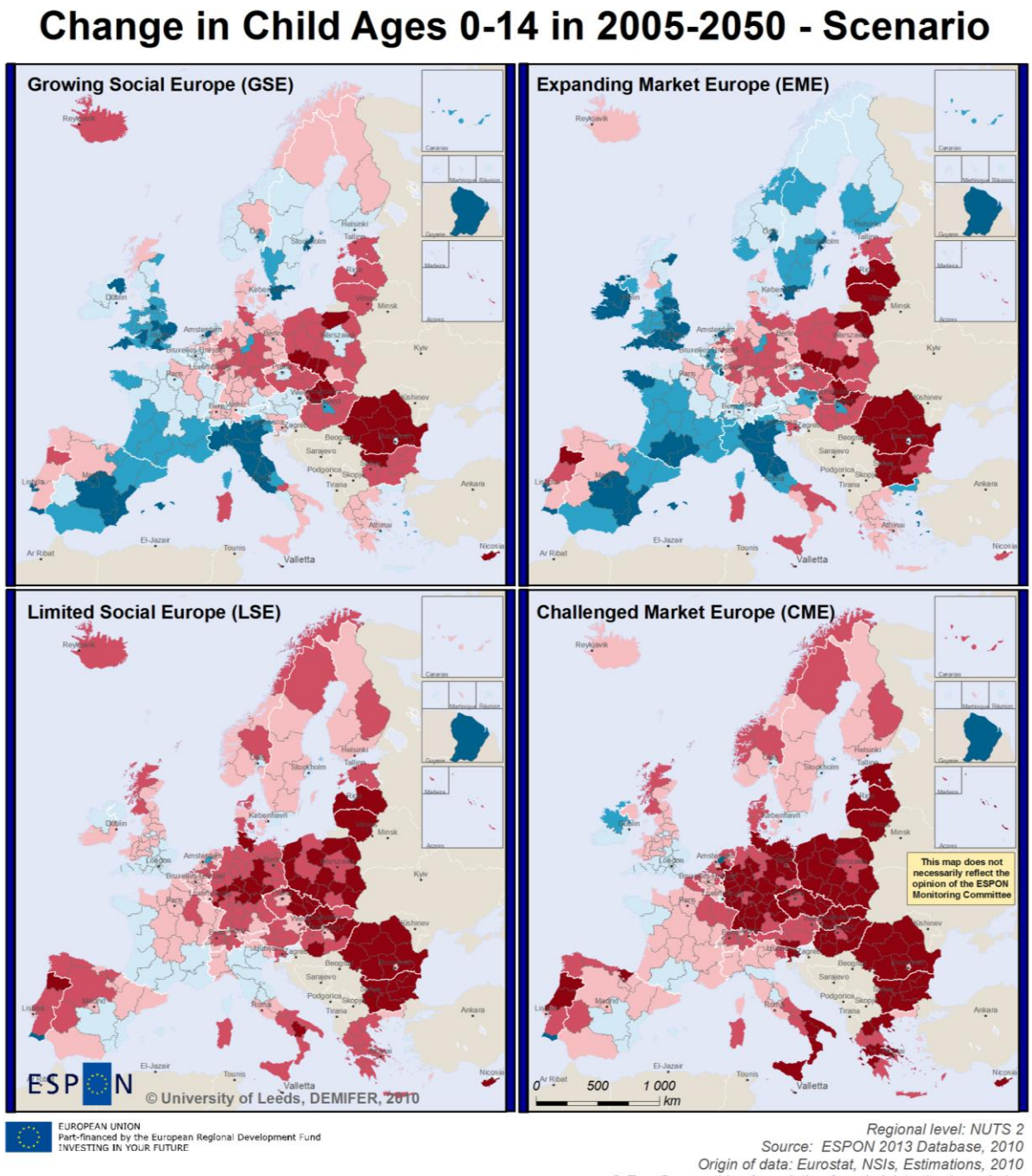


Figure 3-5: Percentage change in child ages (ages 0-14), four policy scenarios, 2005-50

The working age group changes are mapped in Figure 3-6 (status quo) and Figure 3-7 (policy scenarios). The most hot spots of growth in working ages occur in the EME scenarios in southern England, Ireland, north and central Italy and south central Spain with lesser growth in France, Austria, other regions in Spain, Austria and the southern populated parts of the Nordic countries (except Denmark). Regions in central and eastern Europe are projected to see declines in the working ages. These declines expand in extent as you move from EME scenario to GSE scenario to CME scenario to LSE scenario to STQ scenario.

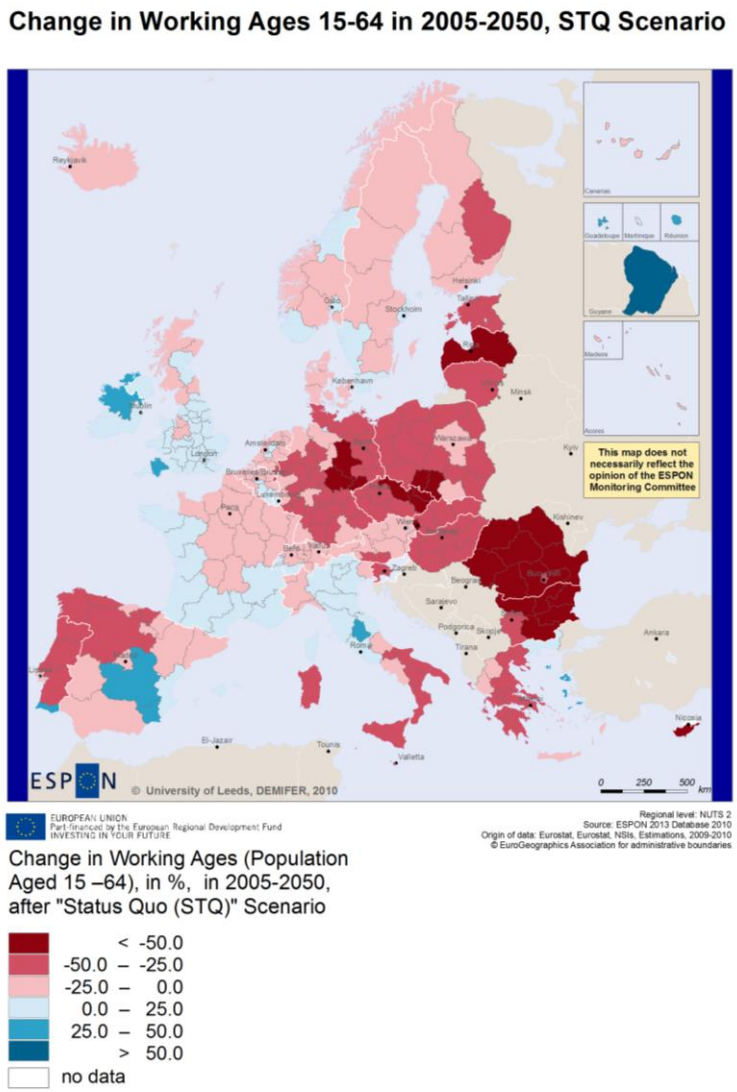


Figure 3-6: Percentage change in working ages (ages 15-64), status quo projection, 2005-50

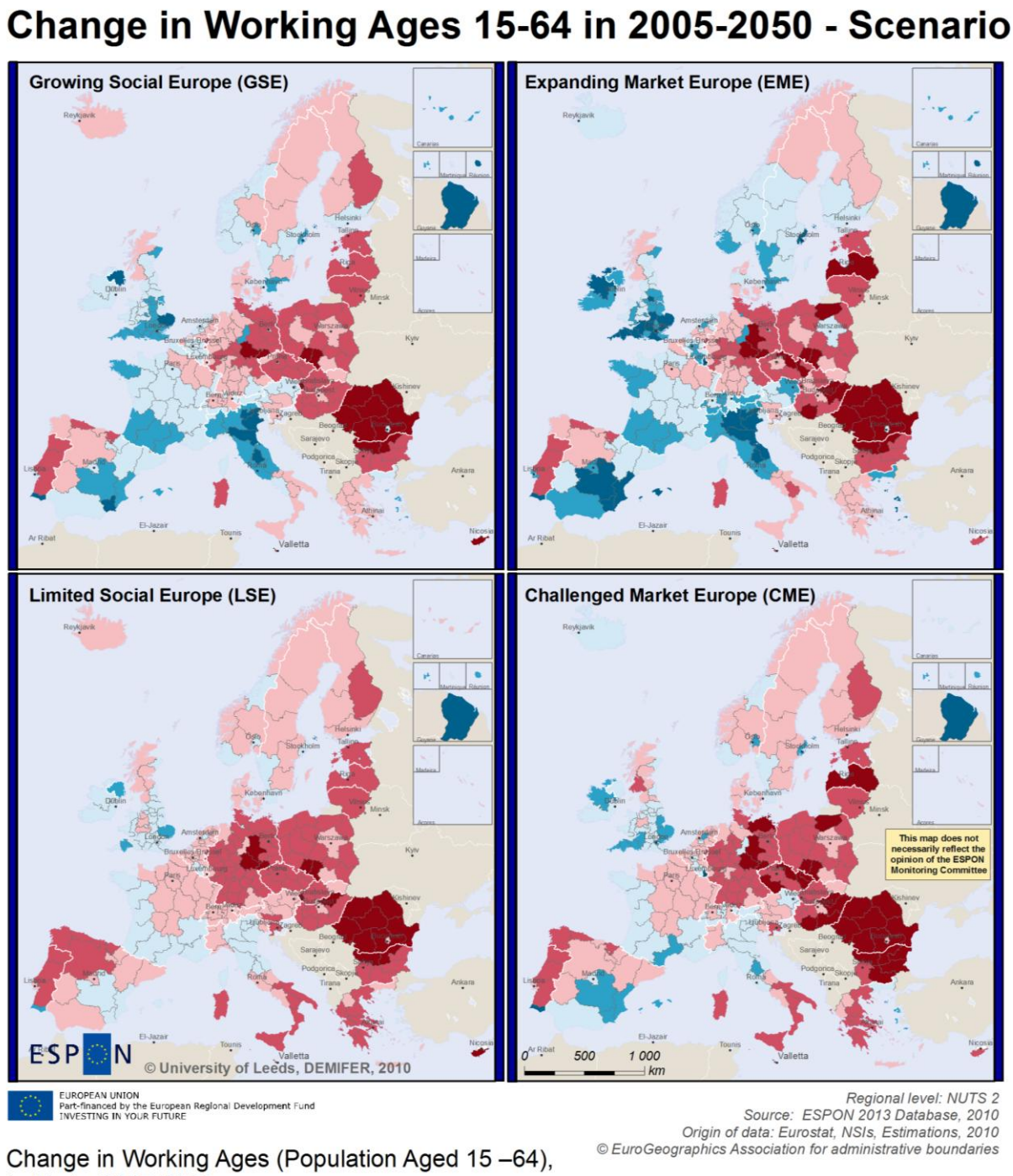


Figure 3-7: Percentage change in working ages (ages 15-64), four policy scenarios, 2005-50

The final age group changes we map are for the population aged 65 and over in Figure 3-8 and Figure 3-9. Here the main contrast is between the status quo scenario and all of the policy scenarios, which are a sea of hot spots of greater than 50% expansion in this age group over the 45 years of the projection. This is a consequence of the favourable mortality assumptions adopted in our policy scenarios (discussed in Deliverable D6). Only regions in Romania and Bulgaria fail to enjoy this societal success.

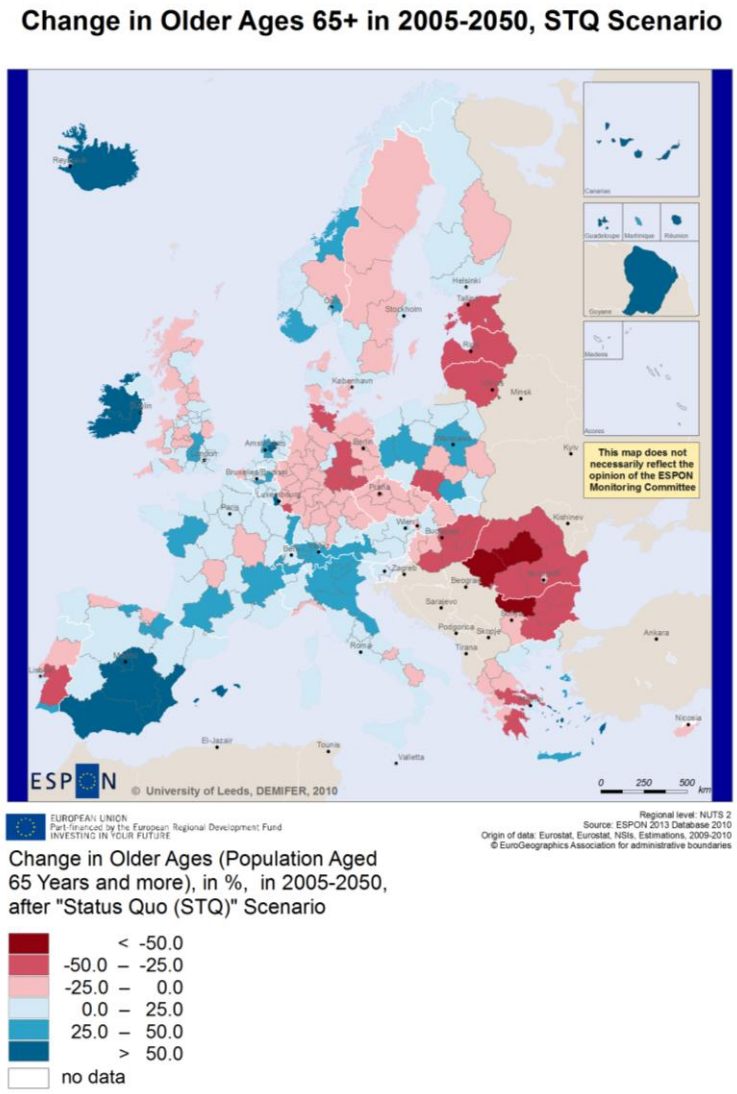


Figure 3-8: Percentage change in older ages (ages 65+), status quo projection, 2005-50

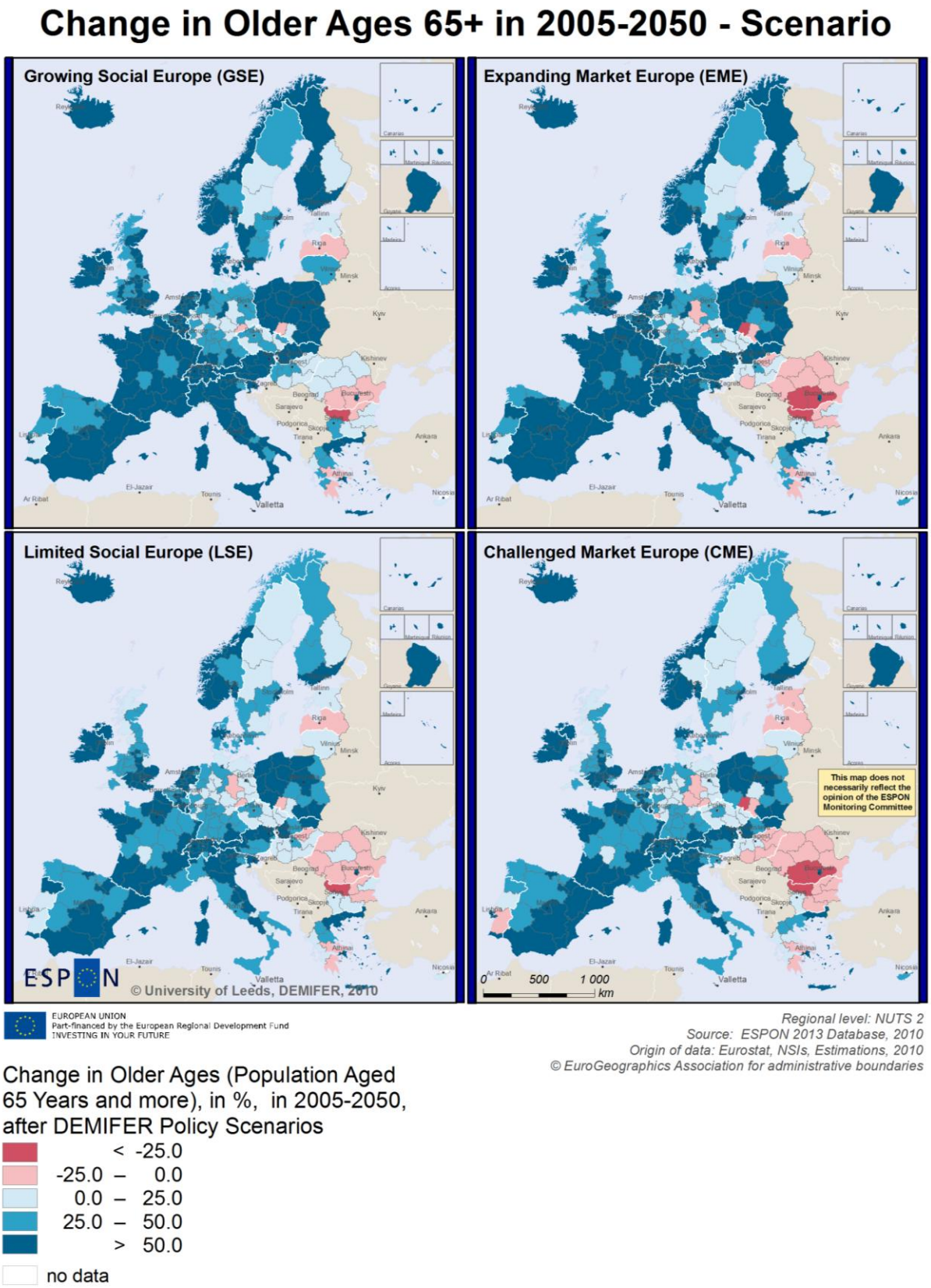


Figure 3-9: Percentage change in older ages (ages 65+), four policy scenarios, 2005-50

The maps of the ODR and VODR variables are presented in Figure 3-10 to Figure 3-13. Note that all classes on these maps are positive indicating increase in the dependency ratios. The successful scenarios (GSE and EME) come with higher increases in ODRs and more difference between regions. Hot spots will be in central and eastern regions, where many regions face increases in ODR and VODR of 200%. By mid-century this part of Europe will be a land of the old.

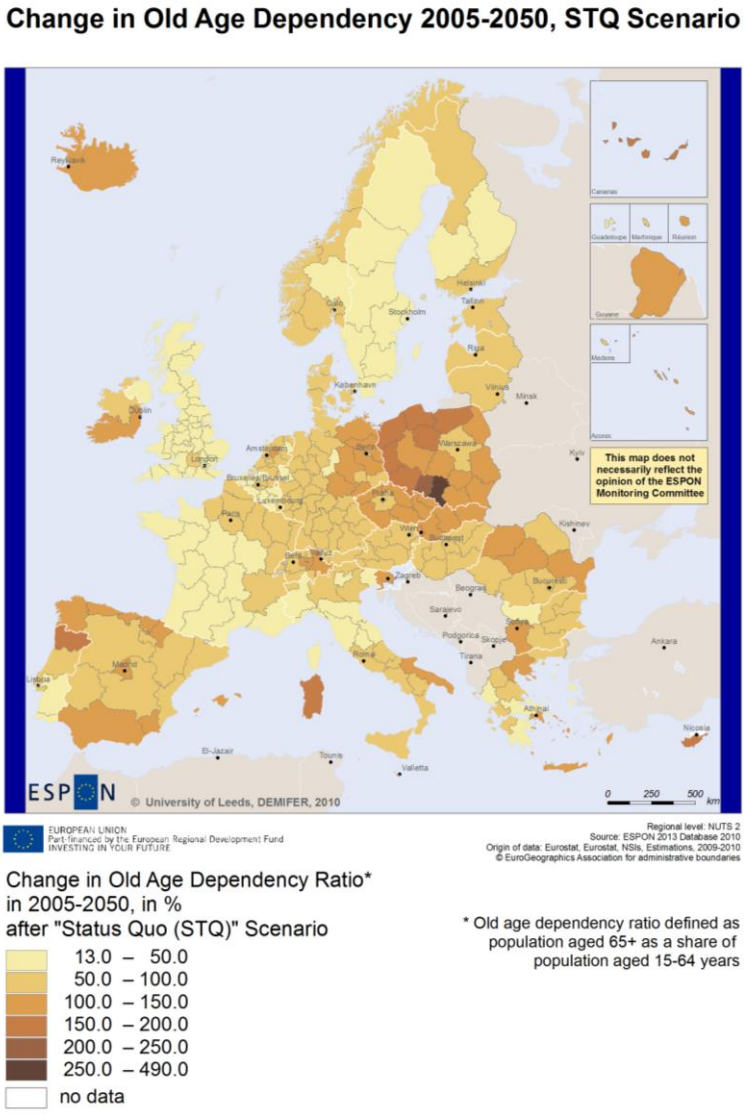


Figure 3-10: Percentage change in old-age dependency ratios, status quo projection, 2005-50

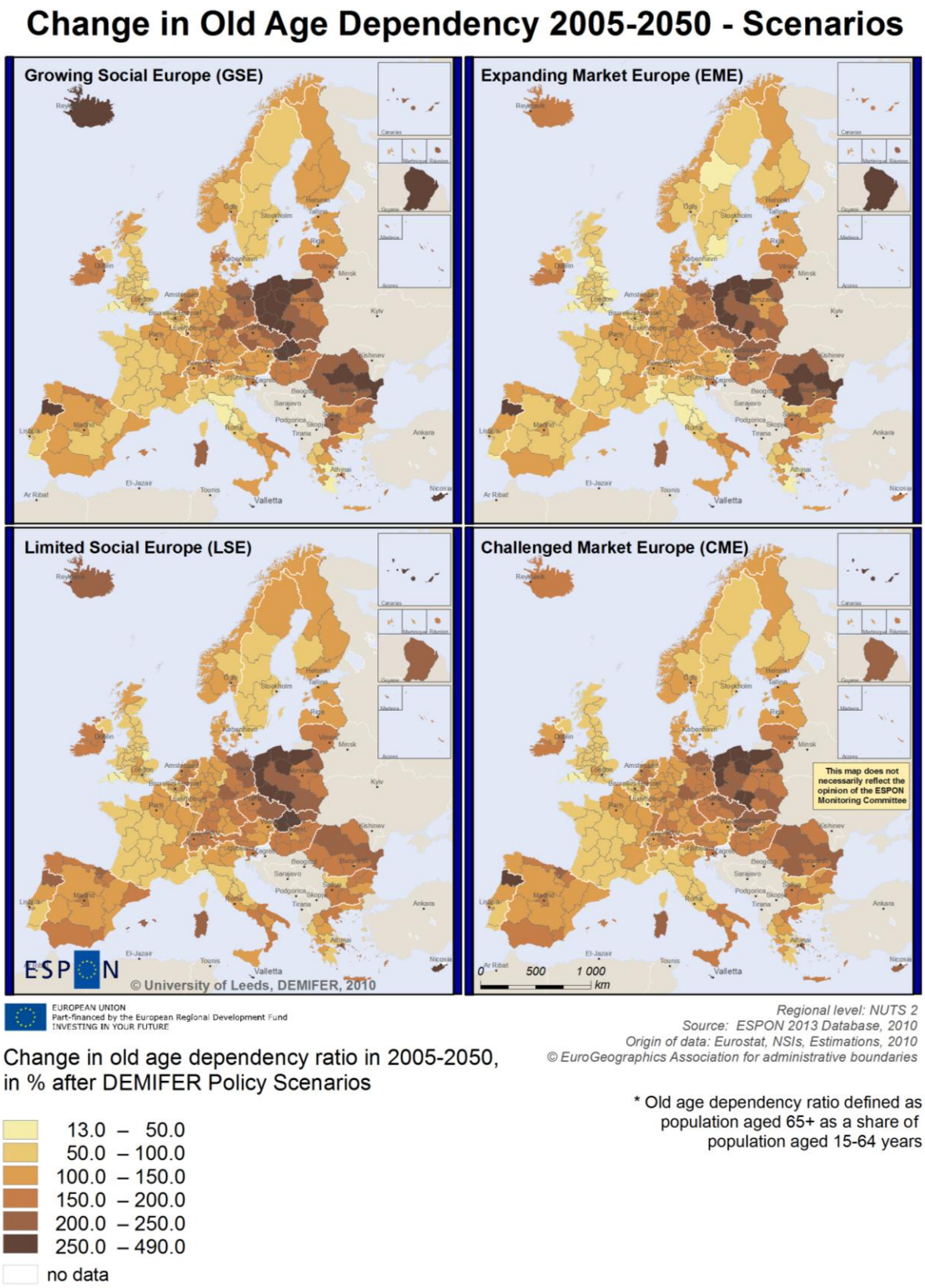


Figure 3-11: Percentage change in old-age dependency ratios, 2005-50

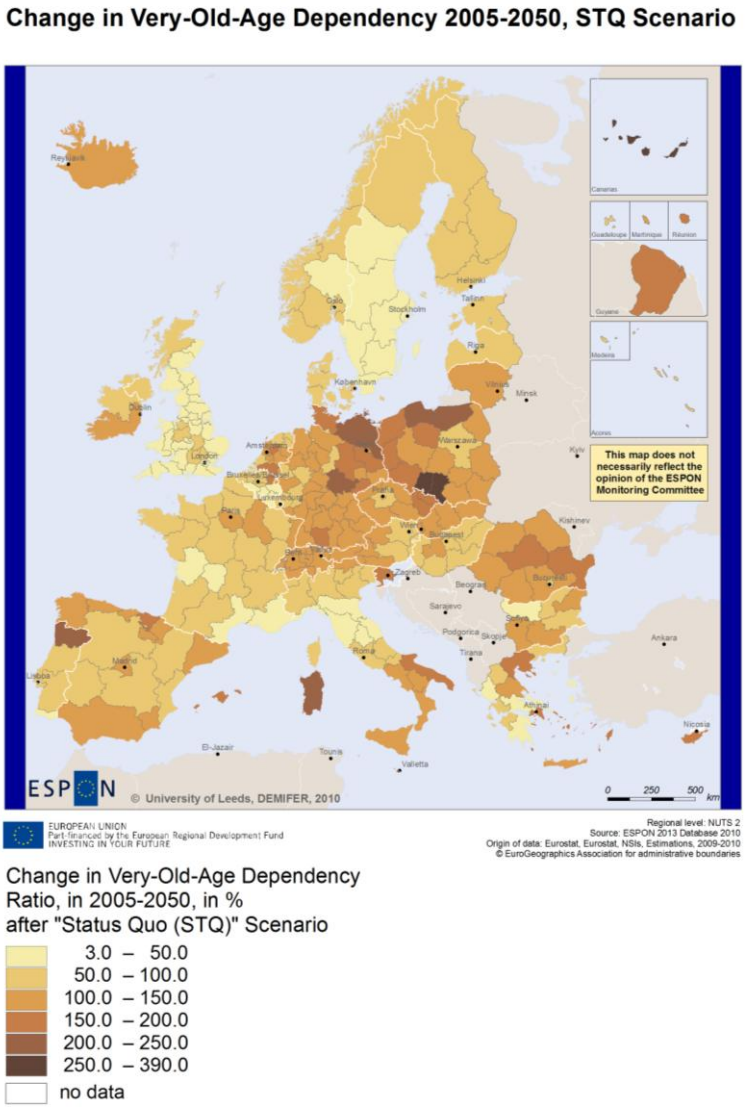


Figure 3-12: Percentage change in very-old-age dependency ratios, status quo projection, 2005-50

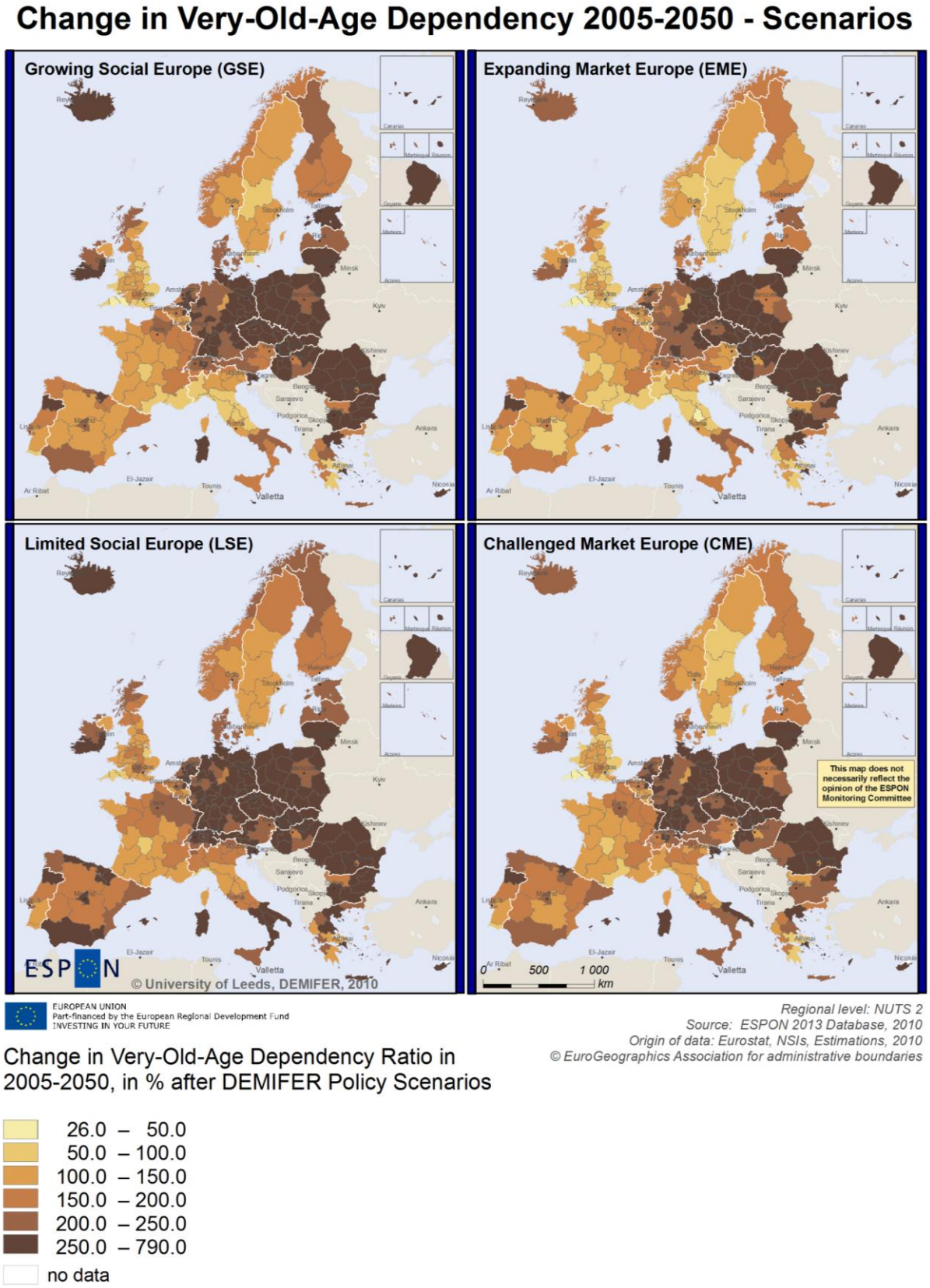


Figure 3-13: Percentage change in very-old-age dependency ratios, four policy scenarios, 2005-50

4. THE FUTURE LABOUR FORCE OR EUROPE

In this section the results of the four policy scenarios on the labour force will be presented. As the assumptions on labour force participation rates by sex and age group have been made at the spatial level of NUTS2 (see the section on labour force participation in Deliverable 6), the labour force participation rates at higher spatial levels are a result of the computations. In this section three aspects of the future labour force will be presented. Firstly, the labour force participation rates for the ESPON space, the countries and the clusters will be presented. Secondly, the results on the labour force will be analysed on all regional levels (including the regions). Thirdly, the effect of changes in the labour force in terms of dependency ratios will be discussed. Fourthly, a discussion is presented on the relationship between labour productivity and prosperity. Finally, dynamics in the age structure of the labour force are presented.

4.1 Labour force participation

4.1.1 Labour force participation rates: ESPON space

A comparison of the situation in 2050 according to the four policy scenarios with 2005 leads to the following conclusions. For men most age-specific activity rates of the Limited Social Europe scenario are somewhat below those observed in 2005. In contrast, all activity rates of the Expanding Market scenario are (substantially) above the latest observed figures. For the Growing Social Europe scenario a mixed pattern emerges, for young and older men the rates are well above the 2005 pattern and slightly above for men at prime age. For the Challenged Market Europe the rates quite similar to those of 2005.

The picture is slightly different for women. Again the Limited Social Europe scenario is well below that of 2005, especially at the prime working ages. A rather steep rise is projected for all ages in the Growing Social Europe and Expanding Market Europe. Again the pattern of the Challenged Market Europe scenario resembles that 2005.

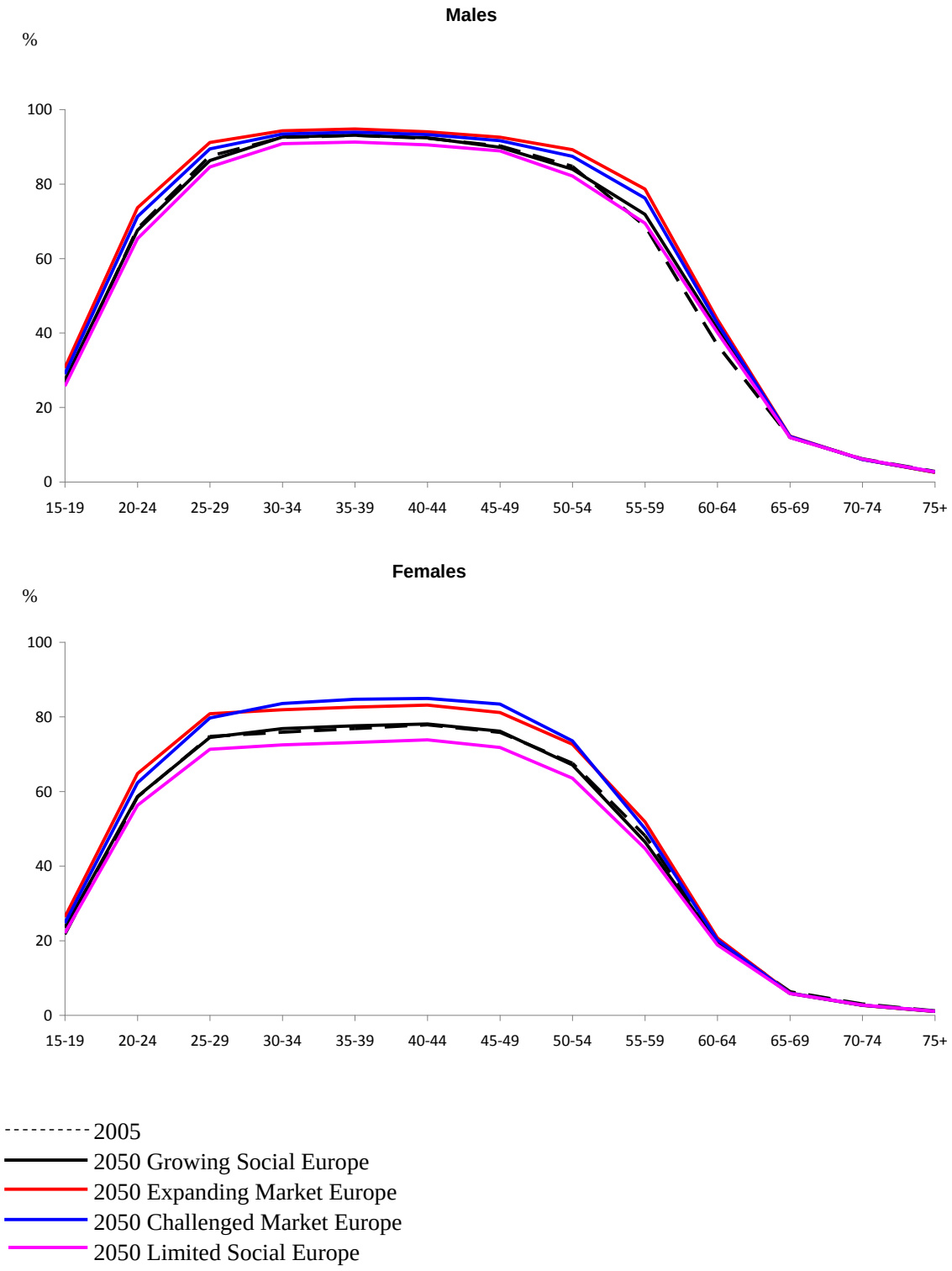


Figure 4-1: Labour force participation, ESPON countries, 2005 and 2050

4.1.2 Labour force participation rates: countries

Males

Four geographic clusters of countries can be distinguished on the basis of age patterns of participation rates, namely the northern, western, southern and eastern part of the ESPON space. In Figure 4-2 for each geographic cluster one country has been chosen as its representative.

In 2005 a large variability in male participation rates exist predominantly at both young and old ages. Denmark (representing the northern cluster) is characterised by high participation rates among young males. In contrast, in Germany, Italy and Poland (representing the western, southern and eastern cluster respectively) youth participation is fairly low. With respect to the prime working ages all four countries resemble each other. With respect to the participation at higher ages a fairly strong differentiation exists between the four countries. In Poland participation rates are already dropping in the age-group 40-44, while in Germany and Italy this drop starts in the age-group 50-44. In Denmark participation stays at a high level also in the older age groups, a severe drop in male participation is only visible in the age-group 60-64.

According to the four policy scenarios current differences between the countries will more or less persist. In the Growing Social Europe and the Limited Social Europe scenario the differences between the countries will be somewhat smaller, especially at higher ages. In contrast, in the Challenged Market Europe and the Expanding Market Europe the differences between the four countries are larger than in 2005. In the Expanding Market Europe scenario the participation at higher ages is raised, at a level quite similar to that of the prime working ages. Especially for Germany this implies a significant rise in elderly participation.

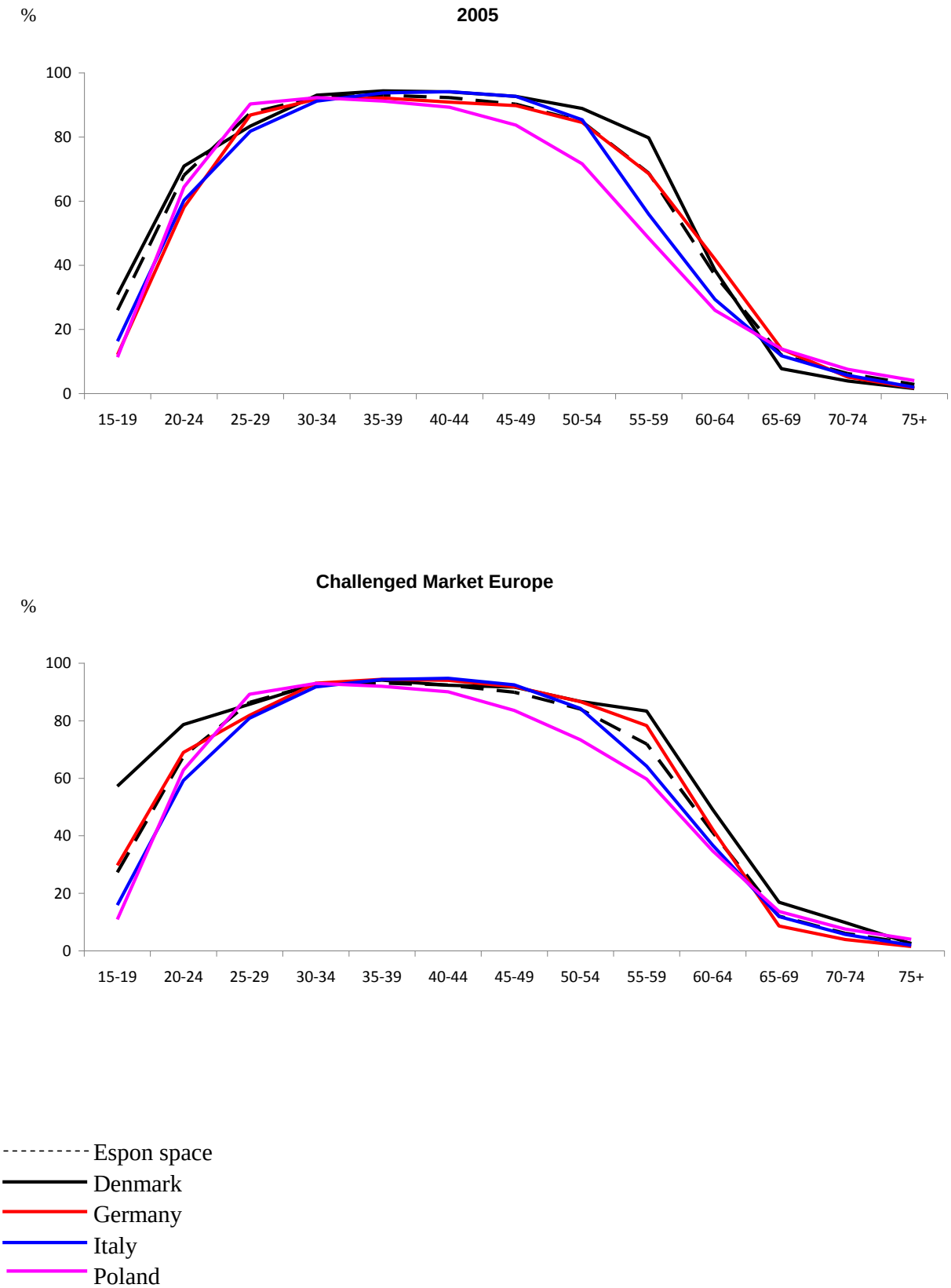
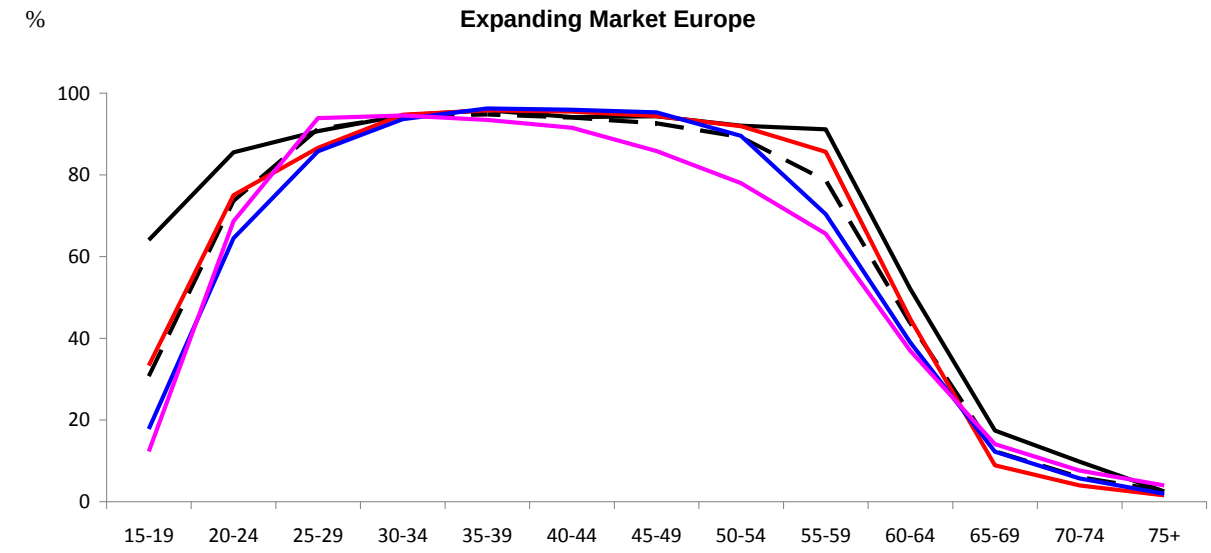
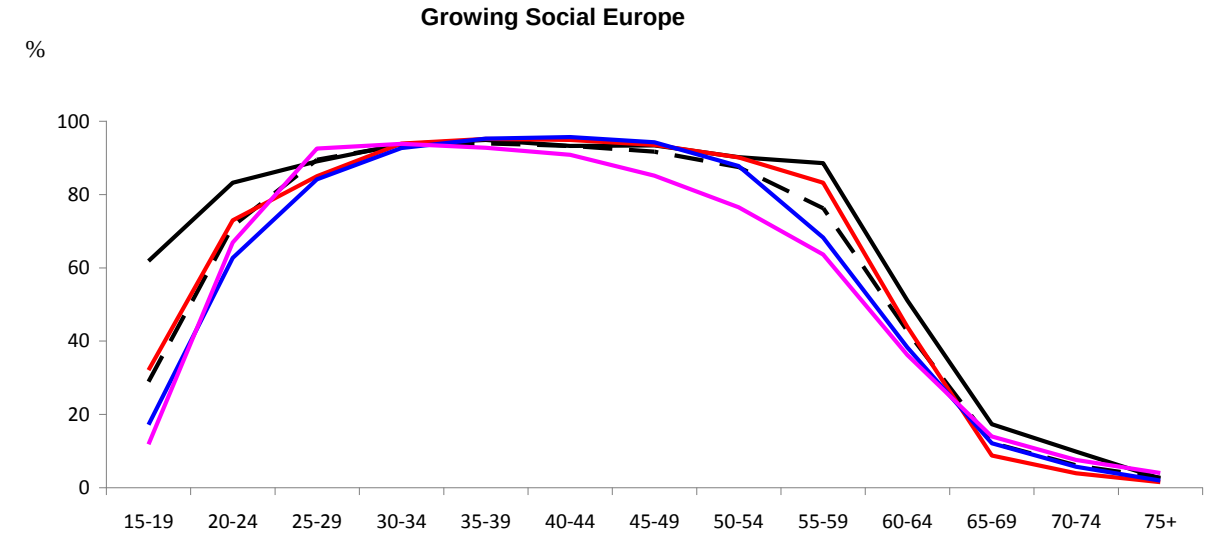


Figure 4-2: Labour force participation of males, four selected countries, 2005 and 2050





Espon space
Denmark
Germany
Italy
Poland

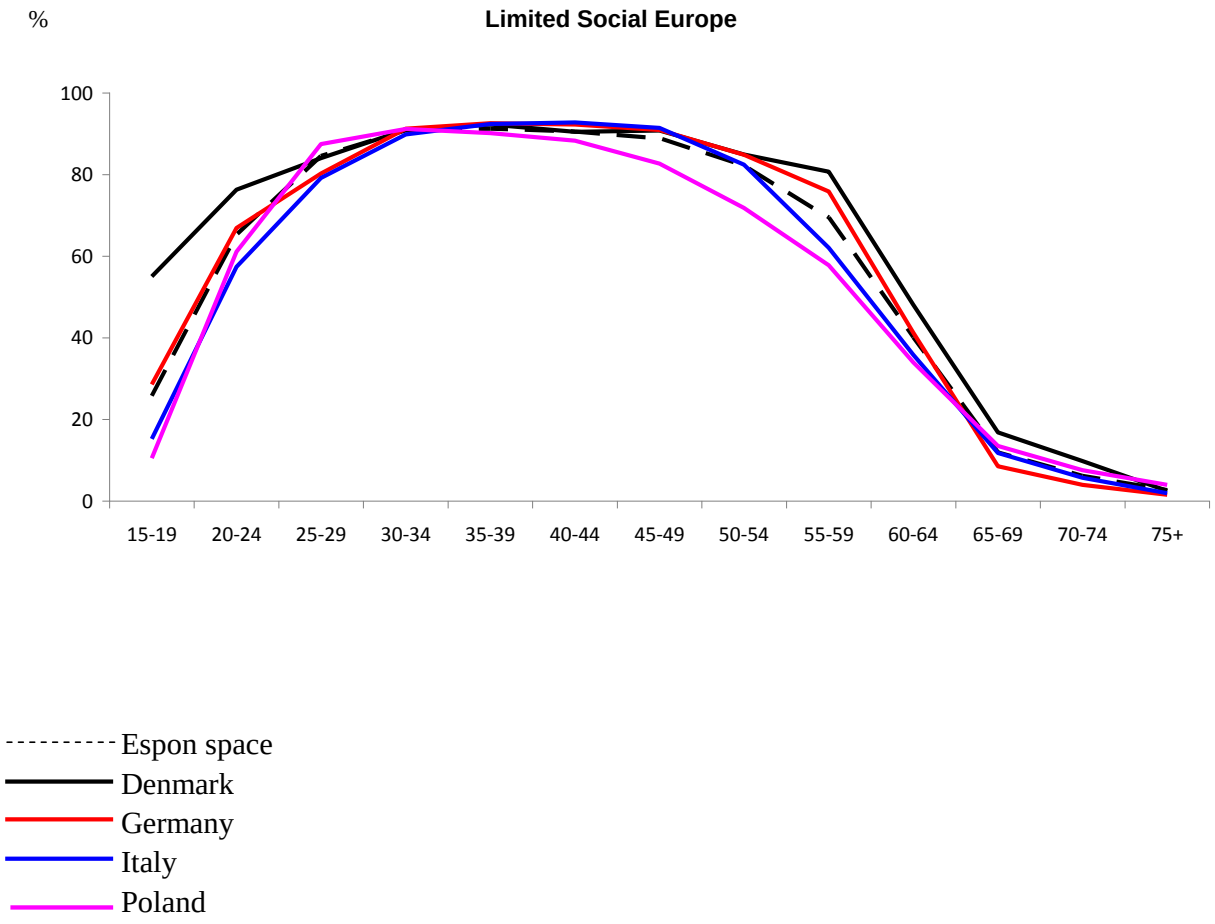

%
Limited Social Europe
100
80
60
40
20
0
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75+
Espon space
Denmark
Germany
Italy
Poland

Table 4-1: Labour force participation rates of males

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
	2005												
AT	46	77	88	93	94	93	92	85	64	17	7	4	2
BE	11	63	93	95	95	93	92	83	58	22	5	3	2
BG	7	59	79	85	85	83	80	76	61	30	9	4	2
CH	55	79	93	97	97	96	95	94	89	65	22	13	5
CY	13	75	96	97	96	96	95	93	85	62	28	18	12
CZ	9	66	93	97	97	96	94	91	82	33	11	6	2
DE	31	71	83	93	94	94	93	89	80	38	8	4	2
DK	60	81	87	93	94	92	93	89	88	50	18	10	3
EE	14	72	91	94	91	92	88	82	72	48	26	14	2
ES	26	71	89	95	95	94	92	88	75	48	6	2	1
FI	34	74	88	91	91	90	88	82	69	36	9	4	1
FR	18	64	91	94	93	93	92	88	63	15	4	2	0
GR	12	58	87	92	92	91	90	85	69	42	14	5	2
HU	6	52	87	90	89	85	79	72	57	20	6	2	0
IE	29	78	92	93	94	93	92	86	75	57	23	13	7
IS	74	83	89	94	97	94	96	94	92	87	62	24	6
IT	16	60	82	91	94	94	93	85	56	29	12	6	2
LI	55	79	93	97	97	96	95	94	89	65	22	13	5
LT	7	59	89	94	92	92	88	86	74	53	12	6	1
LU	10	52	91	98	98	97	94	92	58	15	2	1	1
LV	16	73	91	91	92	89	91	86	76	42	28	15	2
MT	36	81	96	97	96	95	91	88	73	24	8	3	1
NL	60	83	93	95	94	94	93	90	78	33	14	6	3
NO	45	74	86	90	90	89	88	86	80	58	23	13	3
PL	11	64	90	92	91	89	84	72	48	26	14	8	4
PT	23	68	91	94	95	93	93	87	73	51	36	25	17
RO	20	56	82	87	89	86	84	74	55	34	28	24	21
SE	28	72	87	93	93	91	90	88	84	64	18	9	2
SI	9	72	94	95	96	95	91	87	79	19	4	2	0
SK	18	67	91	97	97	94	91	81	63	22	16	11	6
UK	47	80	88	90	90	89	88	85	76	55	18	7	2
	2050 Challenged Market Europe												
AT	45	74	87	93	94	93	91	84	69	29	8	4	2
BE	10	61	91	95	95	93	91	82	65	32	7	3	2
BG	7	57	78	85	85	84	79	76	67	37	9	5	2
CH	53	76	91	97	97	96	94	90	84	58	20	13	5
CY	12	73	94	97	96	96	94	90	81	56	25	18	12
CZ	8	64	92	97	97	96	93	88	79	39	11	6	2
DE	30	69	82	93	94	94	92	87	78	42	9	4	2
DK	57	79	86	93	94	92	92	87	83	49	17	10	3
EE	14	70	90	94	91	92	87	81	74	48	23	14	1
ES	25	69	88	95	95	94	91	86	75	48	8	2	1
FI	33	72	86	91	91	90	87	81	72	40	9	4	1
FR	17	62	89	93	93	93	91	86	68	28	5	2	0
GR	12	56	85	92	92	91	89	83	72	44	14	5	2
HU	6	51	86	91	90	86	79	74	65	31	7	2	1
IE	28	75	90	93	94	93	91	85	76	53	21	13	7
IS	71	80	88	94	97	94	95	90	85	71	52	24	6
IT	16	59	81	92	94	95	92	84	64	37	12	6	2
LI	53	76	91	97	97	96	94	91	84	58	20	13	5
LT	6	57	88	94	92	92	88	84	75	51	12	6	1
LU	9	51	89	98	98	97	93	89	65	28	4	1	1
LV	15	71	89	91	92	89	91	84	76	44	25	15	1
MT	34	79	95	97	96	95	90	86	74	33	9	2	1
NL	58	80	91	95	94	94	92	87	77	39	14	6	3
NO	44	72	84	90	90	89	87	84	78	54	21	13	3
PL	11	63	89	93	92	90	84	73	60	35	14	8	4
PT	22	65	88	93	94	93	92	85	74	50	31	25	17
RO	19	54	79	86	88	86	83	74	63	39	24	24	21
SE	27	70	85	93	93	91	89	86	81	58	16	9	2
SI	9	70	92	95	96	95	90	85	78	30	6	2	0
SK	17	65	89	97	97	94	90	80	68	32	15	11	6
UK	45	78	87	90	90	89	87	83	76	52	17	7	2

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
	2050 Expanding Market Europe												
AT	50	81	92	95	96	95	94	89	76	31	8	4	2
BE	11	66	96	97	96	95	94	87	71	34	7	3	2
BG	7	62	82	87	87	85	82	81	74	40	10	5	2
CH	59	83	96	97	97	97	96	95	91	62	20	13	5
CY	14	79	96	98	98	97	96	95	89	60	25	18	12
CZ	9	70	97	98	98	98	96	94	87	41	12	6	2
DE	33	75	87	95	96	95	94	92	86	45	9	4	2
DK	64	86	91	95	96	94	94	92	91	52	17	10	2
EE	16	76	95	96	93	94	89	86	81	51	24	14	1
ES	28	75	93	96	96	96	94	92	83	51	8	2	1
FI	37	79	91	93	93	92	90	86	79	43	10	4	1
FR	19	67	94	95	95	95	94	91	75	30	5	2	0
GR	13	61	90	93	94	92	91	88	78	47	14	5	2
HU	7	56	91	93	92	88	82	79	71	33	7	2	1
IE	31	82	96	95	96	95	94	90	83	56	21	13	7
IS	79	87	93	95	99	96	98	96	93	76	54	24	6
IT	18	65	86	94	96	96	95	90	70	39	12	6	2
LI	59	83	96	99	99	98	97	96	92	62	20	13	5
LT	7	62	93	95	94	94	90	89	82	54	12	6	1
LU	10	55	94	98	98	99	96	94	72	30	4	1	1
LV	17	77	95	93	94	91	93	89	83	47	25	15	1
MT	38	86	96	99	98	97	93	91	81	36	9	2	1
NL	65	88	97	97	96	96	94	93	84	41	14	6	3
NO	49	79	89	92	91	91	90	90	86	58	22	13	3
PL	12	69	94	95	93	92	86	78	66	37	14	8	4
PT	25	71	92	95	95	94	94	89	81	53	32	25	17
RO	21	59	84	88	90	87	85	79	69	42	25	24	21
SE	30	76	90	94	95	93	92	91	88	61	17	9	2
SI	10	76	97	97	98	96	93	91	85	32	6	2	0
SK	19	71	94	99	98	96	92	85	75	34	15	11	6
UK	51	85	92	92	92	91	90	89	83	55	18	7	2
	2050 Growing Social Europe												
AT	48	79	90	94	95	94	93	87	73	31	8	4	2
BE	11	64	94	96	96	94	93	85	69	33	7	3	2
BG	7	61	81	86	86	84	81	80	71	39	10	5	2
CH	57	81	94	97	97	97	96	94	89	61	20	13	5
CY	13	77	98	98	97	97	95	93	86	59	25	18	12
CZ	9	68	95	98	98	97	95	92	84	40	12	6	2
DE	32	73	85	94	95	95	94	90	83	44	9	4	2
DK	62	83	89	94	95	93	93	90	89	51	17	10	2
EE	15	74	93	95	92	93	88	84	78	50	24	14	2
ES	27	73	91	96	96	95	93	90	80	50	8	2	1
FI	36	77	90	92	92	91	89	85	76	42	10	4	1
FR	18	66	93	94	94	94	93	89	72	29	5	2	0
GR	12	60	88	93	93	92	90	86	76	46	14	5	2
HU	7	54	89	92	91	87	81	77	69	32	7	2	1
IE	30	80	94	94	95	94	93	88	80	55	21	13	7
IS	77	85	91	95	98	95	97	94	91	74	53	24	6
IT	17	63	84	93	95	96	94	88	68	38	12	6	2
LI	57	81	95	98	98	97	96	94	89	61	20	13	5
LT	7	60	91	94	93	93	89	88	80	53	12	6	2
LU	10	54	93	98	98	98	95	92	69	29	4	1	1
LV	16	75	93	92	93	90	92	88	81	46	25	15	1
MT	37	84	98	98	97	96	92	89	79	35	9	3	1
NL	62	85	95	96	95	95	93	91	82	40	14	6	3
NO	47	77	88	91	90	90	89	88	83	56	21	13	3
PL	12	67	93	94	93	91	85	76	64	36	14	8	4
PT	24	69	91	94	95	93	93	88	79	52	32	25	17
RO	20	57	83	87	89	86	84	77	67	41	25	24	21
SE	29	74	89	93	94	92	91	89	86	60	17	9	2
SI	9	74	96	96	97	96	92	89	82	32	6	2	0
SK	19	69	92	98	98	95	92	84	72	34	15	11	6
UK	49	82	90	91	91	90	89	87	81	54	18	7	2

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
	2050 Limited Social Europe												
AT	43	72	85	91	92	91	90	82	67	29	8	4	2
BE	10	59	89	93	93	91	90	80	63	31	7	3	2
BG	6	56	76	83	83	82	79	75	65	37	9	5	2
CH	51	74	89	95	95	94	93	88	81	57	19	13	5
CY	12	71	93	95	95	94	93	88	79	55	24	18	12
CZ	8	62	90	95	95	94	92	86	77	38	11	6	2
DE	29	67	80	91	93	92	91	85	76	41	9	4	2
DK	55	76	84	91	92	90	91	85	81	48	17	10	2
EE	13	68	88	92	90	91	86	79	71	47	23	14	1
ES	24	67	86	93	93	92	90	84	73	47	8	2	1
FI	32	70	85	90	89	88	87	80	70	40	9	4	1
FR	16	60	87	92	91	91	90	84	66	27	5	2	0
GR	11	55	83	90	90	89	88	81	69	43	13	5	2
HU	6	49	84	89	88	84	79	72	63	30	7	2	1
IE	27	73	88	92	92	91	90	83	73	52	21	13	7
IS	68	78	86	92	95	92	94	89	83	70	52	24	6
IT	15	57	79	90	92	93	91	82	62	36	12	6	2
LI	51	74	89	95	95	94	94	89	81	57	19	13	5
LT	6	55	86	92	91	90	87	82	72	50	12	6	2
LU	9	49	88	97	97	95	92	87	63	27	4	1	0
LV	15	69	88	89	90	87	90	83	74	44	25	15	1
MT	33	77	93	95	94	93	89	84	72	33	9	2	1
NL	55	78	90	93	93	92	91	86	75	38	14	6	3
NO	42	70	83	88	88	88	86	83	76	53	21	13	3
PL	10	61	87	91	90	88	83	72	58	34	13	8	4
PT	21	63	86	92	93	91	91	83	72	49	31	25	17
RO	18	52	78	85	87	84	82	73	61	38	24	24	21
SE	25	68	84	91	91	90	89	84	78	57	16	9	2
SI	8	68	90	93	94	93	90	84	75	30	6	2	0
SK	16	63	87	95	95	92	89	79	66	32	15	11	6
UK	43	75	85	89	89	88	86	82	74	51	17	7	2

Females

The current international differences in female participation rates are considerably larger than for men. The northern cluster takes the lead at almost all ages while in the southern cluster female participation is still fairly low. In the southern cluster, except for Portugal, the traditional pattern of leaving the labour market after childbirth is still dominant. Most countries of the western cluster are in a transition stage, in which having children has a limited effect on the labour participation rate of women. In the northern cluster, family obligations no longer interfere with having a paid job. In the Eastern cluster the participation rates resembles those of the Western cluster at the prime working ages, while at young and high ages participation is much lower.

According to the four policy scenarios the participation rate for women in the western, southern and Eastern cluster will move substantially upwards in the direction of the northern cluster. However, the degree of this convergence differs between the four scenarios. A fairly close convergence is reached in the Growing Social Europe scenario. This will lead to a virtual disappearance of the traditional age pattern in the southern countries. In the Limited Social Europe scenario and the Challenged Market Europe scenario the degree convergence is much smaller (in the first due to harsh economic circumstances leading to falling participation rates and in the latter as a result of the market philosophy of this scenario). In the Expanding Market Europe scenario the degree of convergence is

intermediate: a booming economy leads to rising activity rates in especially low scoring countries. Between the western and northern cluster fairly small differences in participation rates will be left.

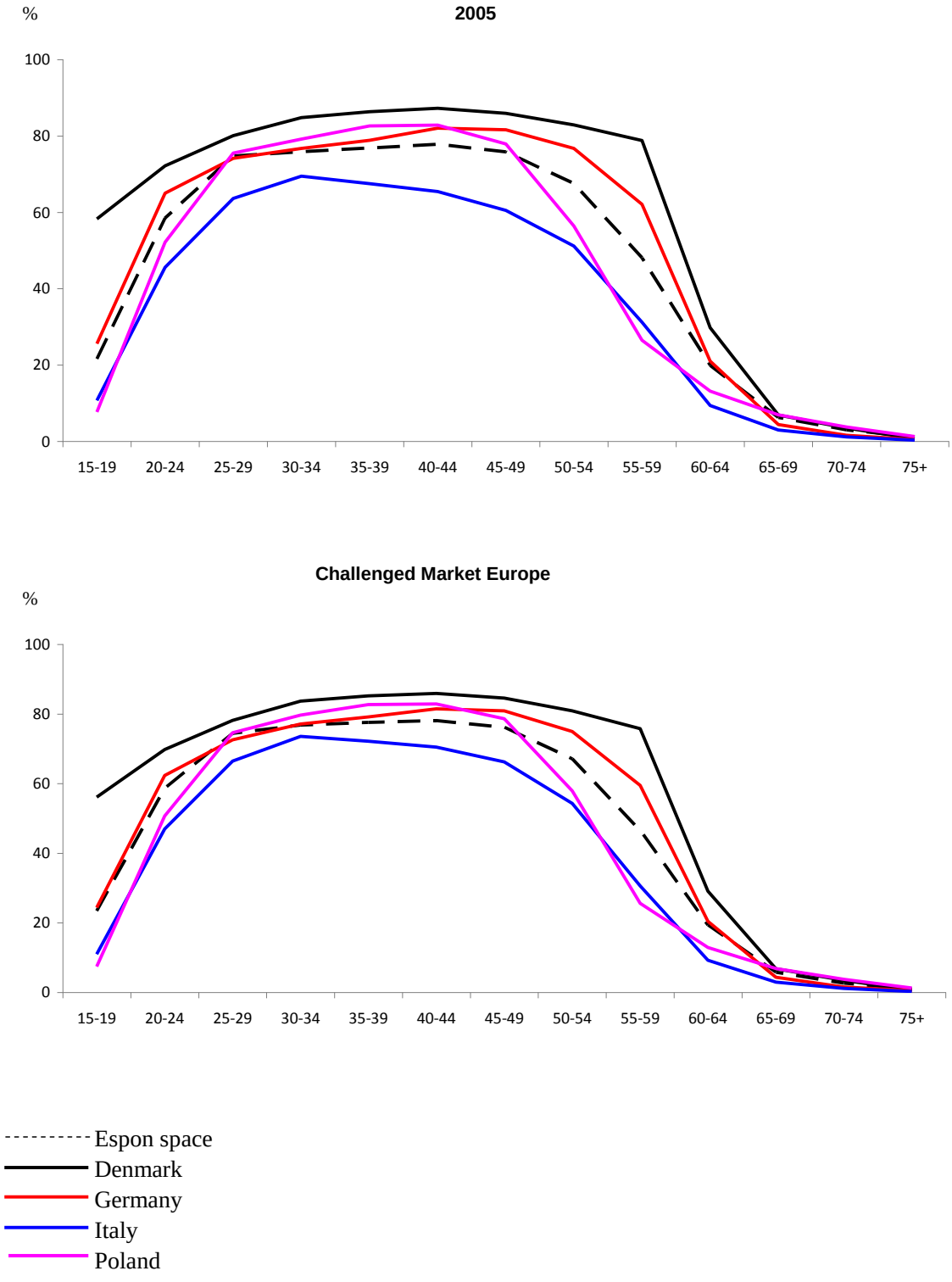
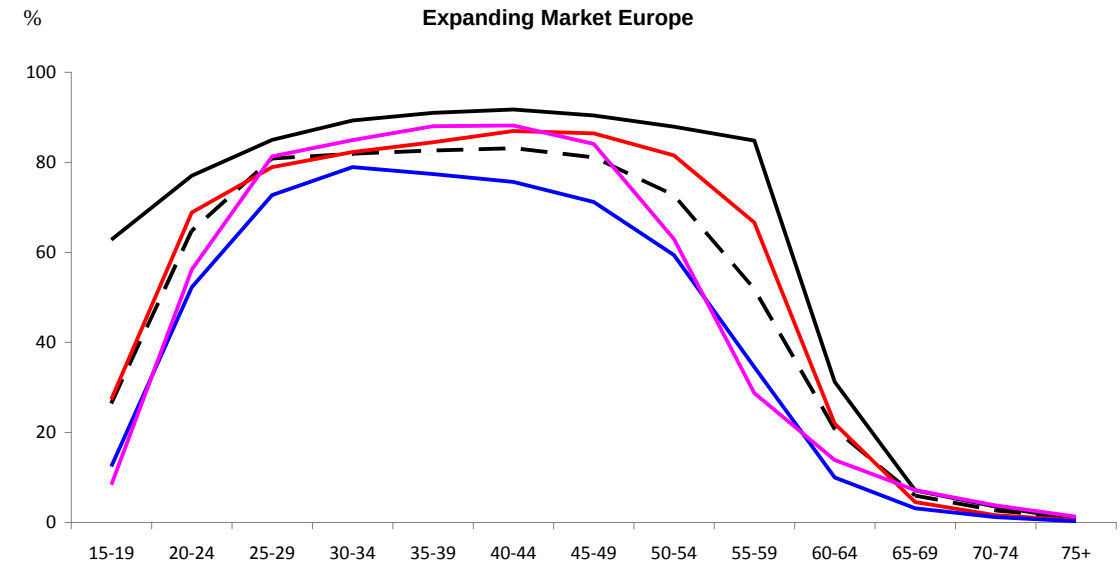
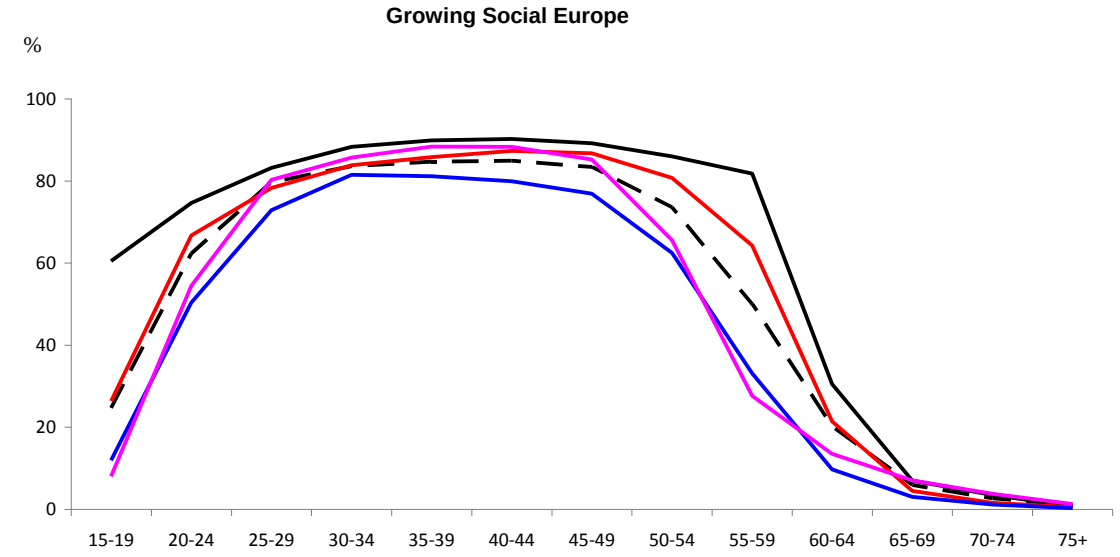


Figure 4-3: Labour force participation of females, four selected countries, 2005 and 2050





Espon space
Denmark
Germany
Italy
Poland

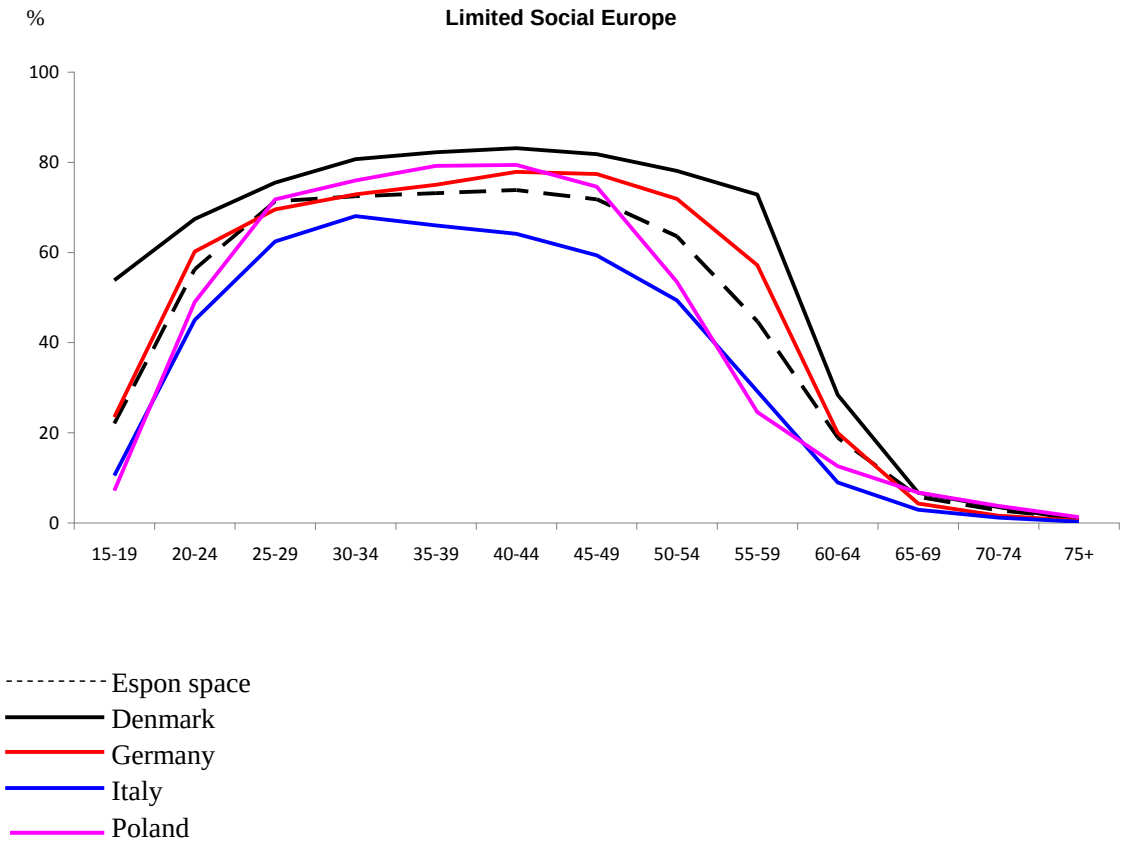

%
Limited Social Europe
100
80
60
40
20
0
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75+
Espon space
Denmark
Germany
Italy
Poland

Table 4-2: Labour force participation rates of females

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
	2005												
AT	34	70	80	79	81	83	80	71	36	8	3	2	1
BE	7	56	83	82	80	77	72	58	33	9	2	1	1
BG	7	45	65	75	81	83	80	72	44	8	3	2	1
CH	52	79	85	79	78	81	84	78	70	41	11	5	2
CY	9	68	82	81	79	79	73	67	42	23	9	6	1
CZ	7	51	64	74	86	91	91	87	47	13	6	2	1
DE	26	65	74	77	79	82	82	77	62	21	4	2	0
DK	58	72	80	85	86	87	86	83	79	30	7	4	1
EE	10	52	71	75	83	90	92	86	73	37	18	5	1
ES	17	60	80	74	70	68	62	51	36	20	3	1	0
FI	39	68	76	80	82	87	89	85	71	30	4	2	0
FR	11	56	80	79	81	82	81	75	52	13	2	1	0
GR	9	50	73	71	71	68	59	48	30	19	5	1	0
HU	4	42	65	65	74	79	76	69	42	9	3	1	0
IE	23	69	80	74	66	67	65	58	45	26	7	2	1
IS	77	76	80	82	86	90	84	88	85	71	38	4	1
IT	11	46	64	69	68	65	61	51	31	9	3	1	0
LI	52	79	86	79	78	81	84	79	70	41	11	5	2
LT	3	38	79	86	89	91	89	84	67	23	7	2	0
LU	6	46	82	77	73	71	69	55	36	10	2	0	0
LV	11	52	76	79	83	89	83	80	63	32	16	6	1
MT	31	72	63	44	34	32	29	22	17	3	1	0	0
NL	61	81	85	81	79	78	77	69	48	17	6	2	0
NO	51	71	78	81	83	83	82	80	69	48	16	7	1
PL	8	52	76	79	83	83	78	56	27	13	7	4	1
PT	16	58	85	87	85	83	78	69	53	37	22	14	7
RO	12	45	68	71	75	72	69	56	37	25	23	19	17
SE	34	66	81	84	87	88	88	85	79	57	9	3	0
SI	8	60	74	82	91	94	93	85	26	7	2	1	0
SK	12	53	81	88	86	85	82	65	26	10	8	5	2
UK	47	70	74	73	75	78	80	75	63	31	10	4	1
	2050 Challenged Market Europe												
AT	33	68	78	79	81	82	80	70	34	8	3	2	1
BE	7	54	81	82	80	78	74	59	32	9	2	1	1
BG	7	43	65	76	81	83	80	72	42	8	3	2	1
CH	50	76	83	79	78	81	83	77	67	40	10	5	2
CY	8	66	80	80	79	79	74	67	40	22	9	6	1
CZ	7	50	65	75	85	89	89	85	45	13	6	2	1
DE	24	62	73	77	79	82	81	75	60	20	4	2	0
DK	56	70	78	84	85	86	85	81	76	29	7	3	1
EE	9	50	70	76	82	88	90	84	71	36	18	5	2
ES	16	58	78	75	72	70	66	53	34	19	3	1	0
FI	37	66	75	80	82	86	87	83	69	30	4	2	1
FR	10	54	78	79	81	81	81	74	50	13	2	1	0
GR	9	48	72	73	73	71	63	51	29	19	5	1	0
HU	4	41	66	69	77	81	78	70	41	9	3	1	0
IE	22	66	78	75	69	70	68	59	43	26	7	2	1
IS	74	74	78	81	85	88	83	85	81	69	38	4	1
IT	11	47	66	74	72	71	66	54	31	9	3	1	0
LI	50	77	83	79	79	81	83	77	68	40	11	5	2
LT	3	37	77	84	87	89	87	82	64	23	7	2	0
LU	6	45	80	77	74	73	71	57	34	9	2	0	0
LV	11	51	75	79	82	87	83	78	61	31	15	6	2
MT	30	70	63	52	44	42	40	27	17	3	1	0	0
NL	59	78	83	81	80	79	78	68	46	17	6	2	0
NO	49	69	77	81	82	83	82	78	67	47	16	7	1
PL	7	51	75	80	83	83	79	58	26	13	7	4	1
PT	15	55	82	85	83	82	78	69	51	36	21	14	7
RO	12	43	67	73	76	74	71	57	36	25	22	19	17
SE	33	64	79	83	86	87	86	83	76	56	9	3	0
SI	8	58	73	82	89	91	90	83	25	6	2	1	0
SK	12	51	79	86	85	84	81	65	25	10	8	5	2
UK	45	68	73	75	76	79	80	74	60	30	10	4	1

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
	2050 Expanding Market Europe												
AT	37	75	85	85	86	88	86	76	38	8	3	2	1
BE	8	59	88	87	86	83	79	64	36	9	2	1	1
BG	8	48	71	81	87	88	85	78	47	9	3	2	1
CH	56	84	90	84	84	86	89	84	76	43	11	5	2
CY	9	72	86	86	85	84	79	73	45	24	9	6	1
CZ	8	55	70	80	91	94	94	91	51	14	6	2	1
DE	27	69	79	82	84	87	86	82	67	22	5	2	1
DK	63	77	85	89	91	92	90	88	85	31	7	3	1
EE	10	55	76	81	88	94	96	91	79	38	19	5	2
ES	18	64	84	80	77	75	70	57	38	21	3	1	0
FI	42	73	82	85	87	92	93	91	77	32	4	2	0
FR	11	60	85	84	86	87	86	80	56	13	2	1	0
GR	10	53	79	78	78	75	68	55	33	20	5	1	0
HU	4	46	72	74	82	86	84	76	46	10	3	1	0
IE	25	73	85	80	74	74	73	64	48	28	8	2	1
IS	83	82	85	87	91	94	88	93	91	74	39	4	1
IT	12	52	73	79	77	76	71	59	35	10	3	1	0
LI	56	84	90	84	84	87	89	84	76	43	11	5	2
LT	3	41	84	90	93	95	93	89	72	24	7	2	0
LU	7	49	86	83	79	78	76	62	38	10	2	1	0
LV	12	56	81	85	88	93	88	85	68	34	16	6	1
MT	34	77	69	55	47	45	42	30	19	3	1	0	0
NL	66	86	90	86	85	84	83	74	52	18	6	2	0
NO	55	76	83	86	88	89	87	85	75	51	17	7	1
PL	8	56	81	85	88	88	84	63	29	14	7	4	1
PT	17	61	88	90	88	87	83	74	57	38	22	14	7
RO	13	47	73	77	81	78	75	62	40	26	23	19	17
SE	37	71	86	88	92	93	92	90	85	60	9	3	1
SI	9	65	79	87	95	97	96	90	28	7	2	1	0
SK	13	56	85	91	90	90	86	70	28	11	9	5	2
UK	50	75	80	79	81	84	85	80	67	32	11	4	1
	2050 Growing Social Europe												
AT	35	73	83	85	87	88	86	76	37	8	3	2	1
BE	8	58	85	87	87	85	82	67	34	9	2	1	1
BG	8	46	71	83	87	88	86	78	45	8	3	2	1
CH	54	81	87	85	85	87	88	82	73	42	11	5	2
CY	9	70	85	86	86	86	82	73	44	24	9	6	1
CZ	7	53	71	82	90	92	92	89	49	13	6	2	1
DE	26	67	78	84	86	87	87	81	64	21	4	2	1
DK	60	75	83	88	90	90	89	86	82	31	7	3	1
EE	10	54	76	83	88	92	93	89	76	37	18	5	1
ES	18	62	83	83	81	80	76	61	37	20	3	1	0
FI	40	71	81	86	88	91	91	88	74	31	4	2	1
FR	11	58	83	85	87	87	87	80	54	13	2	1	0
GR	9	51	78	81	82	80	75	59	32	20	5	1	0
HU	4	44	72	78	84	87	85	76	44	10	3	1	0
IE	24	71	83	82	79	79	78	67	46	27	8	2	1
IS	80	79	83	87	90	92	88	90	88	73	39	4	1
IT	12	50	73	81	81	80	77	62	33	10	3	1	0
LI	54	82	88	85	86	87	88	83	73	42	11	5	2
LT	3	39	83	89	91	92	91	87	69	24	7	2	0
LU	7	48	85	84	83	82	80	65	37	10	2	0	0
LV	11	54	80	85	88	91	88	84	66	33	16	6	2
MT	33	75	70	67	62	61	59	38	18	3	1	0	0
NL	64	84	87	86	86	86	84	75	50	17	6	2	0
NO	53	73	82	86	88	88	87	83	72	50	16	7	1
PL	8	54	80	86	88	88	85	66	28	14	7	4	1
PT	16	59	86	89	89	87	85	75	55	38	22	14	7
RO	13	46	73	81	83	82	80	65	39	26	23	19	17
SE	35	69	84	88	90	91	90	87	82	58	9	3	0
SI	9	63	78	87	93	94	93	88	27	7	2	1	0
SK	12	54	83	90	90	89	87	72	27	10	8	5	2
UK	48	72	79	82	84	85	86	80	65	31	10	4	1

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
	2050 Limited Social Europe												
AT	31	65	76	75	77	79	77	67	33	7	3	2	1
BE	7	52	78	78	76	73	69	55	31	8	2	1	1
BG	7	42	61	72	77	79	76	68	40	8	3	2	1
CH	48	73	80	75	74	77	80	74	65	39	10	5	2
CY	8	63	77	77	75	75	69	63	39	22	8	6	1
CZ	7	48	61	70	82	87	87	82	44	12	6	2	1
DE	23	60	70	73	75	78	77	72	57	20	4	2	0
DK	54	67	76	81	82	83	82	78	73	28	7	3	1
EE	9	48	67	71	79	86	88	81	68	35	18	5	2
ES	16	56	75	71	66	64	59	48	33	19	3	1	0
FI	36	64	72	76	78	84	85	81	66	29	4	2	1
FR	10	52	75	75	77	78	77	71	48	12	2	1	0
GR	8	46	69	68	67	65	56	46	28	19	5	1	0
HU	4	40	62	63	72	77	74	66	39	9	2	1	0
IE	21	64	75	70	63	64	62	55	41	25	7	2	1
IS	71	71	76	78	82	86	80	83	78	67	37	4	1
IT	11	45	62	68	66	64	59	49	29	9	3	1	0
LI	48	74	81	75	74	77	80	74	65	39	10	5	2
LT	3	36	75	82	85	86	85	79	62	22	7	2	0
LU	6	43	77	73	69	68	66	52	33	9	2	0	0
LV	10	49	72	75	79	85	79	75	59	31	15	6	2
MT	29	67	59	42	32	30	28	21	16	3	1	0	0
NL	56	75	80	77	76	75	73	65	44	16	6	2	0
NO	47	66	74	77	79	80	78	75	64	46	16	7	1
PL	7	49	72	76	79	79	75	53	25	13	7	4	1
PT	14	53	79	82	80	78	74	65	49	35	21	14	7
RO	11	41	64	68	71	68	65	53	34	24	22	19	17
SE	31	62	77	80	83	84	84	80	73	54	9	3	0
SI	8	56	70	78	87	90	88	80	24	6	2	1	0
SK	11	49	76	83	82	81	77	61	24	10	8	5	2
UK	43	65	70	70	71	74	76	71	57	29	10	4	1

4.1.3 Activity rates: typology of regions

In compiling the four policy scenarios, differences between regions are due to differences in economic growth, leading to a general rise or fall of activity rates in all regions, although the extent of it differs between the specified age groups and the two sexes. Another main assumption of the scenarios concern the theme of divergence or convergence of labour participation between the regions. In the Challenged Market Europe scenario and the Expanding Market Europe scenario a (different) degree of divergence is assumed, while in the Growing Social Europe scenario and the Limited Social Europe scenario a (different) degree of convergence is envisaged. In this paragraph the consequences for the participation rates at the level of the 7 types of regional clusters are analysed.

With respect to males the results show that the differences in age participation rates between the type of regions are fairly small. Only the Overseas type of region stands out for having substantial lower participation rates. In the future, according to the Growing Social Europe scenario a process of integration will invoke economic convergence at the scale of type of regions, leading to shrinking differences in activity rates between the type of regions, although the age pattern of the Overseas type of region still deviates to a large degree from that of the other type of region. More or less the same applies to the Limited Social Europe scenario, with the main difference with the previous scenario that all age specific activity rates are much lower. According to the two market based scenarios (Challenged Market Europe and Expanding Market Europe) the contrast in the age pattern of

participation rates between the Overseas type and the other types will even become more impressive in the future.

With respect to females the age pattern of participation rates show more differences between the types than in case of the males. Again the Overseas type stands out for having much lower participation rates. But now, also the age pattern of the Young Potential type is quite deviant. It is characterised by a rather old fashioned age pattern of steep falling activity rates after childbirth. This pattern corresponds to a high degree to that of the southern countries (see above); as many of the regions belonging to this type are located in the Southern part of Europe. In the Challenge of Ageing and the Challenge of Labour Force type the activity rates at higher ages are significantly lower than in the Euro Standard and Challenge of Decline type.

In the future a strong convergence in age pattern will happen according to the Growing Social Europe scenario. As a result, the traditional age pattern of the Young Potential type will be transformed in a modern age pattern, with no signs of falling activity rates after childbirth. In the Limited Social Europe this tendency to convergence is blocked by the meagre economic circumstances. According to the two market based scenarios the type specific patterns of activity rates will not change significantly in the future.

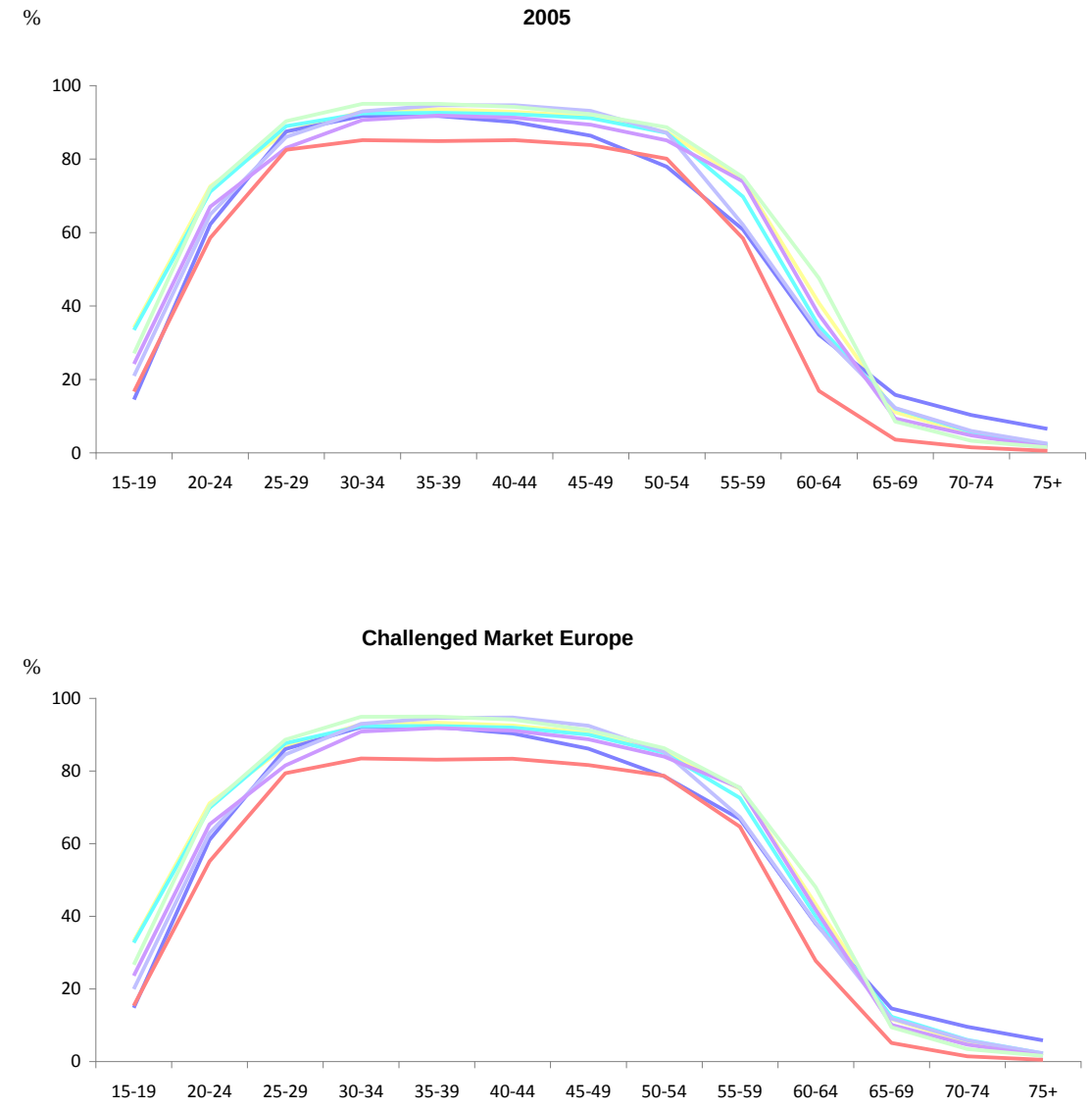
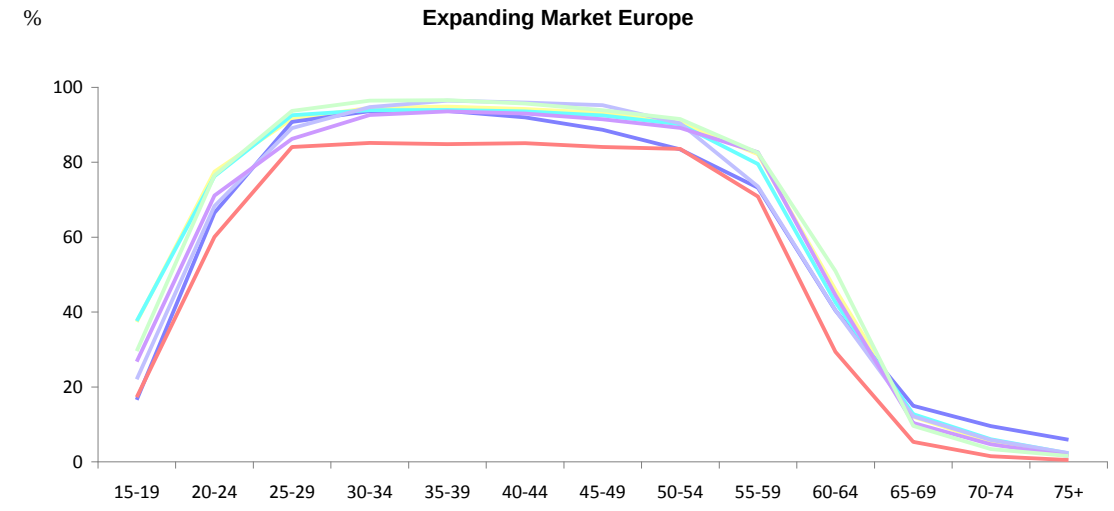
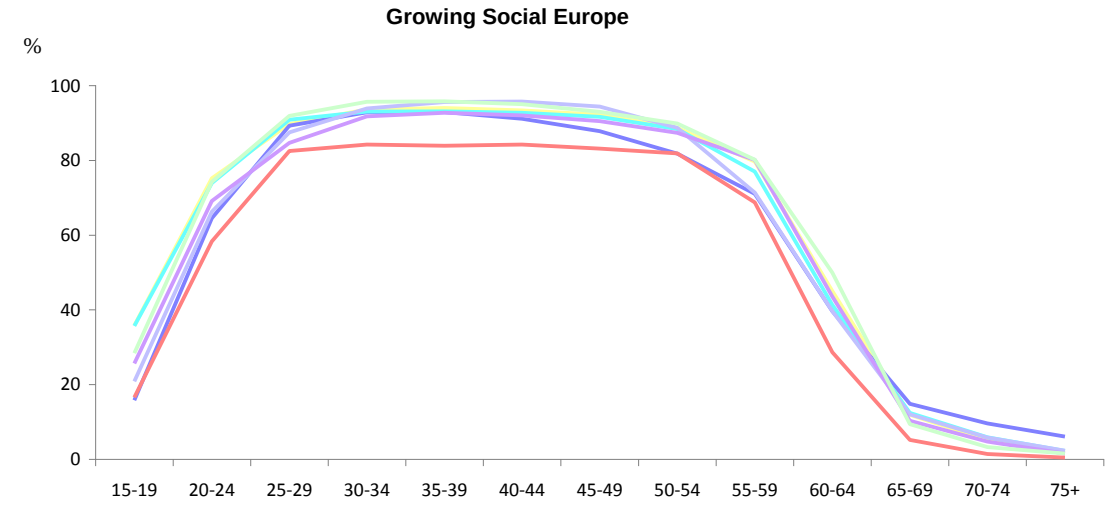


Figure 4-4: Labour force participation of males, types, 2005 and 2050





Euro Standard
Challenge of Labour Force
Family Potentials
Challenge of Ageing
Challenge of Decline
Young Potentials
Overseas

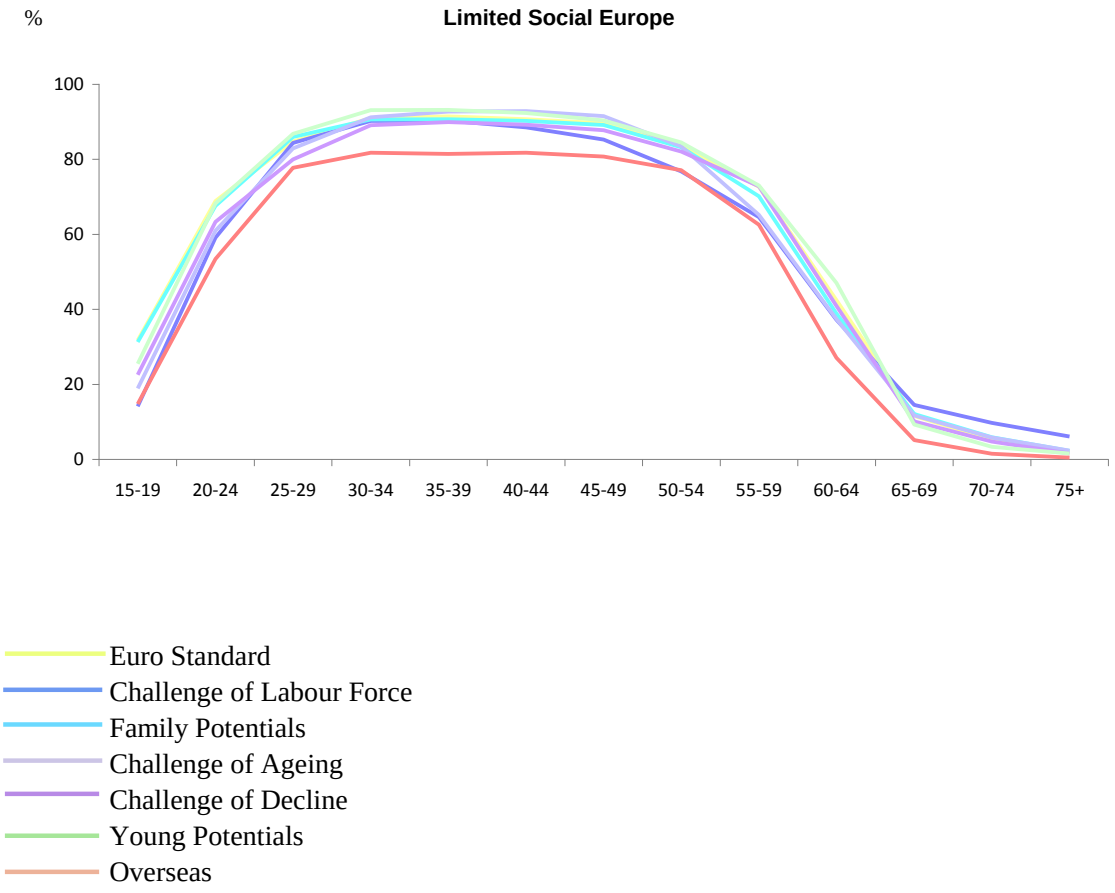

%
Limited Social Europe
100
80
60
40
20
0
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75+
Euro Standard
Challenge of Labour Force
Family Potentials
Challenge of Ageing
Challenge of Decline
Young Potentials
Overseas

Table 4-3: Labour force participation rates of males, types

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
	2005												
Euro Standard	34	73	87	93	94	93	92	87	74	41	11	5	2
Challenge of Labour Force	14	62	88	92	92	90	86	78	61	32	16	10	7
Family Potentials	33	71	89	92	93	92	91	87	70	34	12	6	2
Challenge of Ageing	21	65	86	93	95	95	93	87	62	33	12	6	2
Challenge of Decline	24	67	83	91	92	91	89	85	74	38	9	5	2
Young Potentials	27	72	90	95	95	94	92	89	75	48	8	3	1
Overseas	17	59	83	85	85	85	84	80	58	17	4	1	0
	2050 Challenged Market Europe												
Euro Standard	33	71	87	93	93	93	91	85	75	43	12	5	2
Challenge of Labour Force	15	61	86	92	92	90	86	78	67	38	15	10	6
Family Potentials	33	70	88	92	92	92	90	85	73	40	12	6	2
Challenge of Ageing	20	63	85	93	95	95	92	85	67	38	12	6	2
Challenge of Decline	24	65	82	91	92	91	89	84	75	42	10	5	2
Young Potentials	27	70	89	95	95	94	91	86	75	48	9	3	2
Overseas	15	55	79	83	83	83	82	79	65	28	5	1	0
	2050 Expanding Market Europe												
Euro Standard	37	77	92	95	95	94	93	91	82	46	12	5	2
Challenge of Labour Force	17	66	91	94	94	92	89	83	73	40	15	9	6
Family Potentials	38	76	93	94	94	94	92	90	80	43	13	6	2
Challenge of Ageing	22	68	89	95	96	96	95	90	74	40	12	6	2
Challenge of Decline	27	71	86	93	94	93	91	89	83	44	10	5	2
Young Potentials	30	76	94	96	97	96	94	92	83	51	10	3	2
Overseas	17	60	84	85	85	85	84	84	71	29	5	1	0
	2050 Growing Social Europe												
Euro Standard	36	75	90	94	94	93	92	89	80	45	12	5	2
Challenge of Labour Force	16	65	89	93	93	91	88	82	71	40	15	10	6
Family Potentials	36	74	91	93	93	93	92	88	77	41	12	6	2
Challenge of Ageing	21	66	87	94	96	96	94	89	71	40	12	6	2
Challenge of Decline	26	69	85	92	93	92	90	87	80	44	10	5	2
Young Potentials	28	74	92	96	96	95	93	90	80	50	9	3	2
Overseas	17	58	82	84	84	84	83	82	69	29	5	1	0
	2050 Limited Social Europe												
Euro Standard	32	69	85	91	91	91	90	83	73	42	12	5	2
Challenge of Labour Force	14	59	84	90	90	89	85	77	65	37	15	10	6
Family Potentials	31	68	86	91	91	90	89	83	70	39	12	6	2
Challenge of Ageing	19	61	83	91	93	93	92	83	65	37	12	6	2
Challenge of Decline	23	63	80	89	90	89	88	82	73	41	10	5	2
Young Potentials	25	68	87	93	93	92	90	84	73	47	9	3	2
Overseas	15	53	78	82	81	82	81	77	63	27	5	1	0

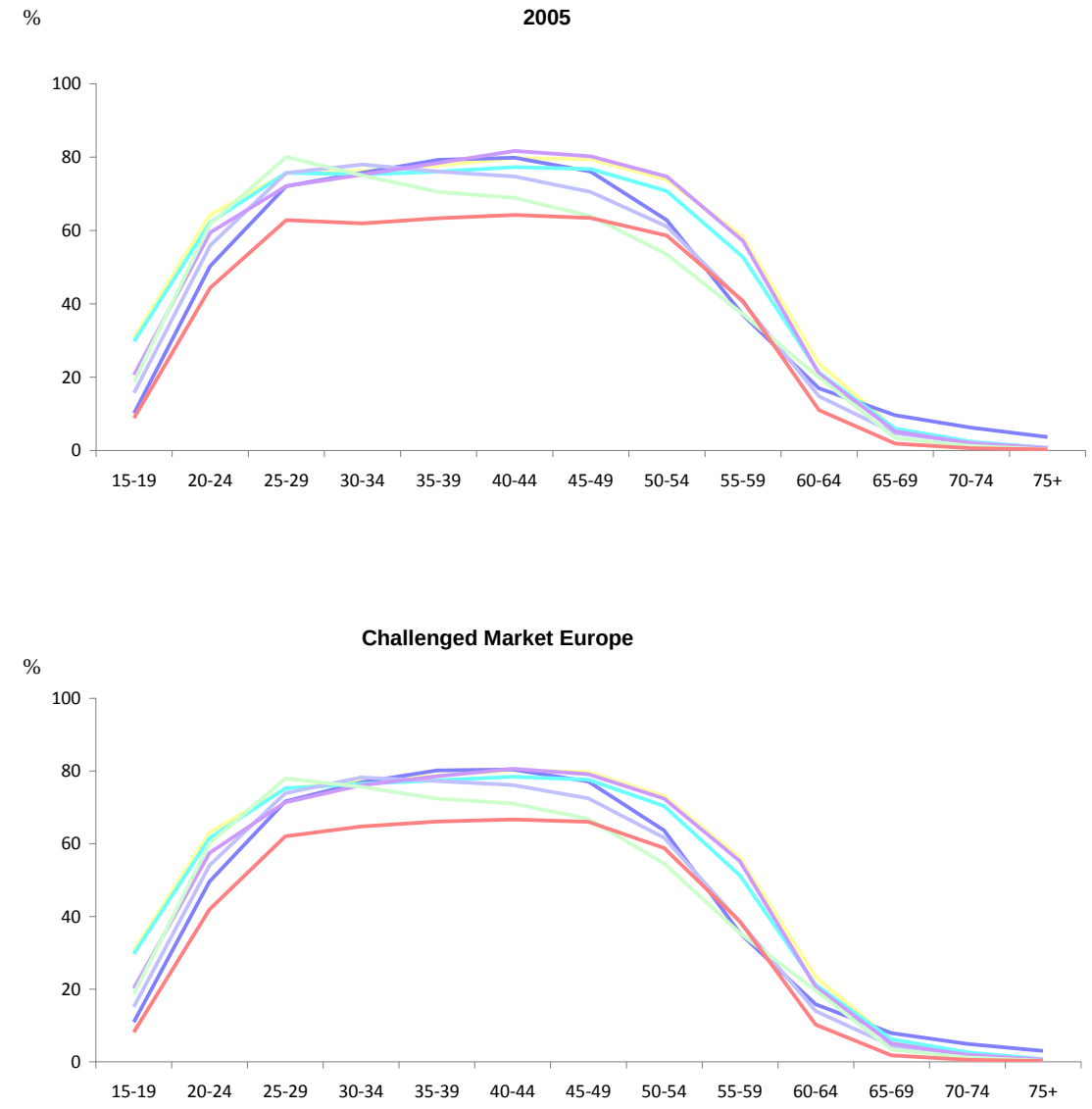
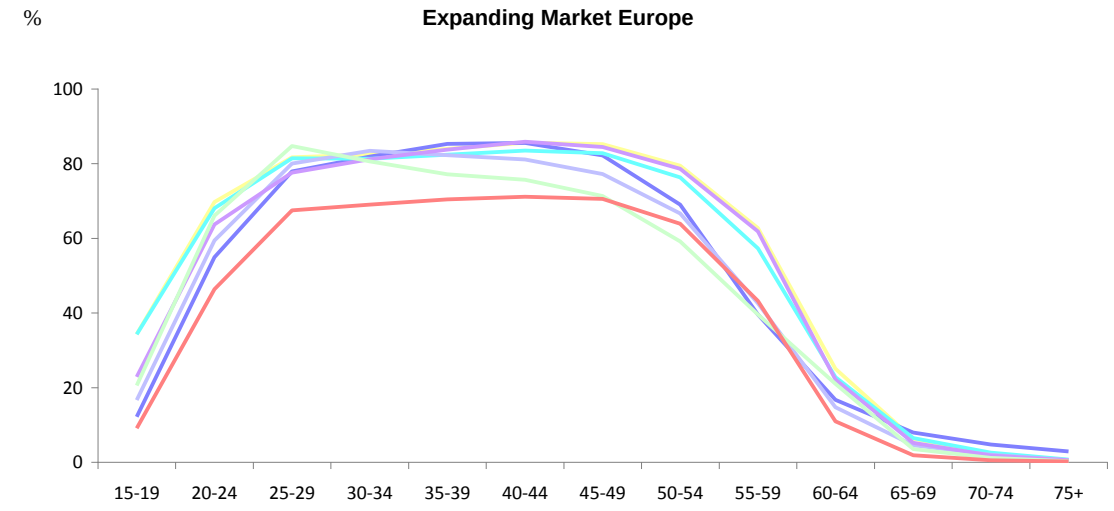
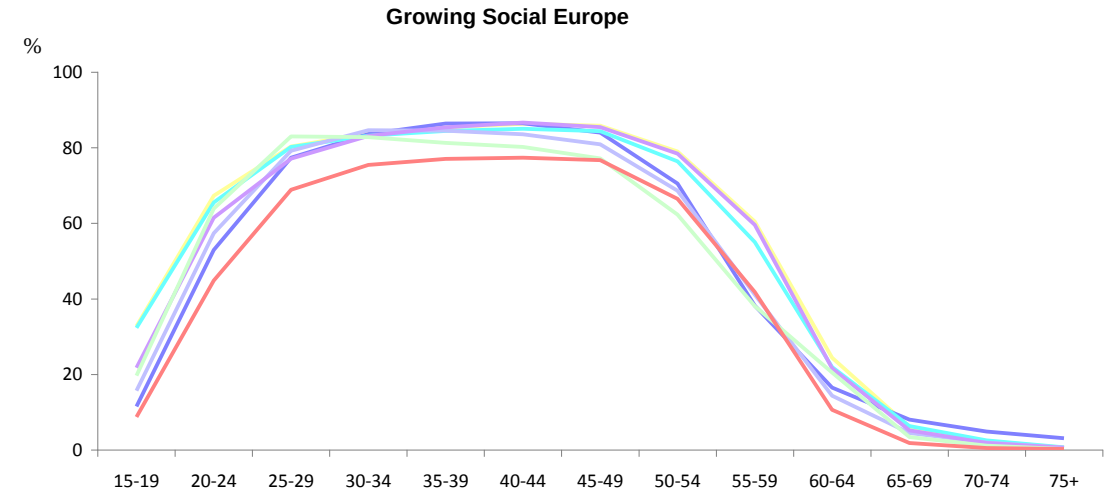


Figure 4-5: Labour force participation of females, types, 2005 and 2050





Euro Standard
Challenge of Labour Force
Family Potentials
Challenge of Ageing
Challenge of Decline
Young Potentials
Overseas

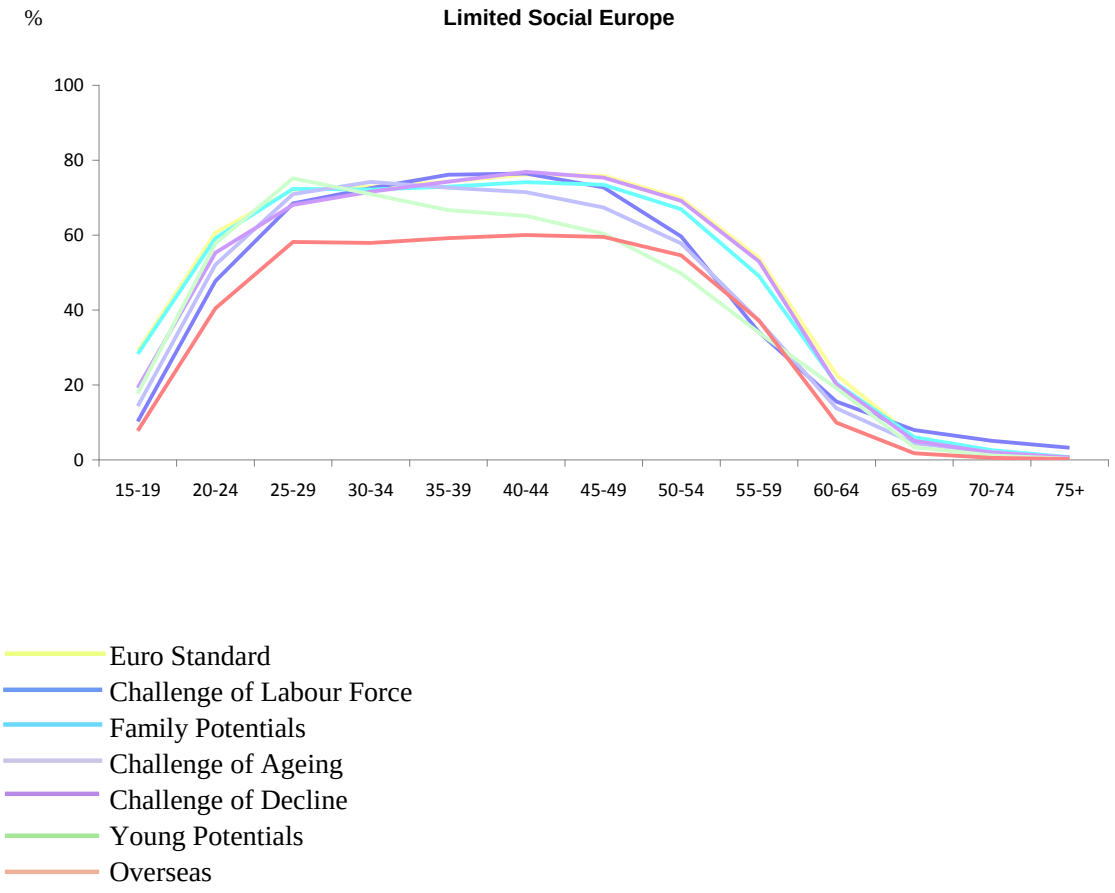

%
Limited Social Europe
100
80
60
40
20
0
15-19
20-24
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70-74
75+
Euro Standard
Challenge of Labour Force
Family Potentials
Challenge of Ageing
Challenge of Decline
Young Potentials
Overseas

Table 4-4: Labour force participation rates of females, types

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
	2005												
Euro Standard	31	64	76	76	78	80	79	74	58	24	6	2	1
Challenge of Labour Force	10	50	72	76	79	80	76	63	37	17	10	6	4
Family Potentials	30	62	76	75	76	77	77	71	53	21	6	2	1
Challenge of Ageing	16	56	76	78	76	75	70	61	40	15	5	2	1
Challenge of Decline	21	59	72	75	78	82	80	75	57	21	5	2	1
Young Potentials	19	62	80	75	70	69	64	53	37	20	3	1	0
Overseas	9	44	63	62	63	64	63	59	41	11	2	1	0
	2050 Challenged Market Europe												
Euro Standard	31	63	75	77	79	80	80	73	56	23	6	2	1
Challenge of Labour Force	11	50	72	77	80	80	77	64	35	16	8	5	3
Family Potentials	30	62	75	76	77	78	78	70	51	21	6	3	1
Challenge of Ageing	15	54	74	78	77	76	72	62	38	14	4	2	1
Challenge of Decline	20	57	71	76	79	81	79	72	55	21	5	2	1
Young Potentials	19	60	78	76	72	71	67	55	35	20	3	1	0
Overseas	8	42	62	65	66	67	66	59	39	10	2	1	0
	2050 Expanding Market Europe												
Euro Standard	34	70	82	82	84	86	85	79	63	25	6	2	1
Challenge of Labour Force	12	55	78	82	85	86	82	69	40	17	8	5	3
Family Potentials	34	68	81	81	82	83	83	76	57	23	6	3	1
Challenge of Ageing	17	59	80	83	82	81	77	67	43	15	5	2	1
Challenge of Decline	23	64	78	81	84	86	84	79	62	22	5	2	1
Young Potentials	21	66	85	81	77	76	71	59	40	21	4	1	0
Overseas	9	46	67	69	70	71	71	64	43	11	2	1	0
	2050 Growing Social Europe												
Euro Standard	33	67	80	84	85	86	86	79	60	24	6	2	1
Challenge of Labour Force	11	53	77	84	86	86	84	70	38	16	8	5	3
Family Potentials	32	66	80	83	84	85	84	76	55	22	6	3	1
Challenge of Ageing	16	57	79	85	85	84	81	69	41	14	4	2	1
Challenge of Decline	22	61	77	83	85	87	85	78	60	22	5	2	1
Young Potentials	20	64	83	83	81	80	77	62	38	21	3	1	0
Overseas	9	45	69	75	77	77	77	66	42	11	2	1	0
	2050 Limited Social Europe												
Euro Standard	29	61	72	73	74	76	76	70	54	23	6	2	1
Challenge of Labour Force	10	48	68	73	76	76	73	60	34	16	8	5	3
Family Potentials	28	59	72	72	73	74	73	67	49	20	6	3	1
Challenge of Ageing	14	52	71	74	73	71	67	58	37	14	4	2	1
Challenge of Decline	19	55	68	72	74	77	75	69	53	20	5	2	1
Young Potentials	18	58	75	71	67	65	60	50	34	19	3	1	0
Overseas	8	40	58	58	59	60	59	55	37	10	2	1	0

4.2 Trends in the labour force

4.2.1 Trends in the labour force: ESPON space

Labour force scenarios result from the multiplication of population numbers with labour force activity rates. The combination of quite divergent assumptions in the policy scenarios on population growth with significant divergent assumptions on labour force participation will lead to rather extreme divergent developments between the four scenarios in the size and composition of the labour force. In the Expanding Market Scenario the size of the labour force will grow between 2005 and 2050 with more than 20%. In the other three scenarios no important increase is foreseen. In the Growing Social Europe scenario the labour force will stay more or less the same in the future, while in the other two scenarios a considerable decline is expected. In the Limited Social Europe scenario the size of the

labour force will be about 20% smaller in 2050, against about 10% decline in the Challenged Market Europe scenario.

Over the last decades the male and female labour force has developed in different directions: the share of men in the labour force has declined while the share of women has risen. In the Expanding Market Europe scenario a gradual feminisation of the labour force is likely to happen: the growth of the female labour force is larger than that the male labour force (see Figure 4-6). In the Limited Social Europe scenario and the Challenged Market Europe scenario the opposite will happen: the decline in the female labour force is larger than that of the male labour force. In the Growing Social Europe scenario both the male and the female labour force will be confronted with a minimal decrease in the future.

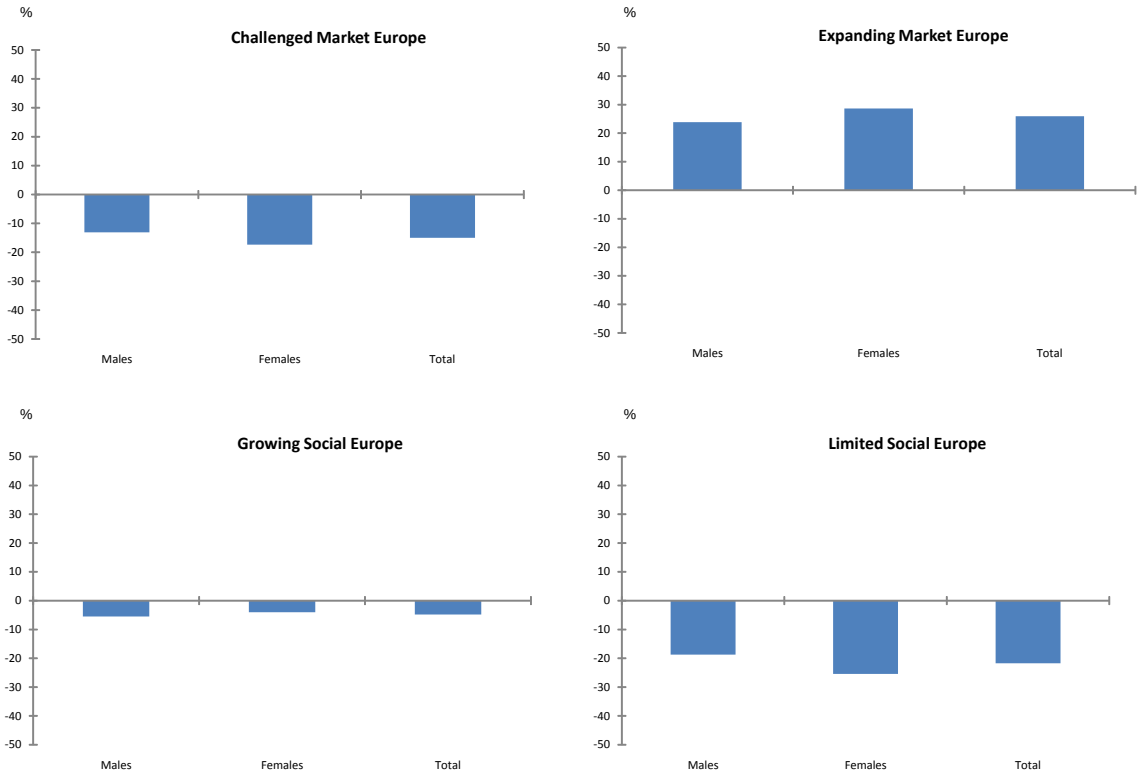


Figure 4-6: Females labour force change 2005-2050, ESPON space

Table 4-5: Labour force, ESPON space (x mln)

		2050			
	2005	Challenged Market Europe	Expanding Market Europe	Growing Social Europe	Limited Social Europe
Male	131	114	141	134	108
Female	106	87	112	108	80
Total	237	201	254	241	189

4.2.2 Trends in the labour force: countries

According to the Expanding Market Europe scenario up to 2050 the labour force will grow considerable in about half of the countries belonging to the ESPON space, while in the other half a considerable decrease will happen. In the other three policy scenarios the labour force is expected to shrink in most countries. The Challenged Market Europe scenario and the Growing Social Europe scenario show almost the same pattern of countries with a declining and growing labour force. Also the extent of decrease and increase is quite similar. In the Limited Social Europe scenario a quite dramatic shrinking labour force is envisaged: in nearly half of the countries the decline will amount to almost 40%.

In all four policy scenarios the trends in the labour force are more or less alike for men and women, although in general the degree of growth or decline is somewhat larger for women.

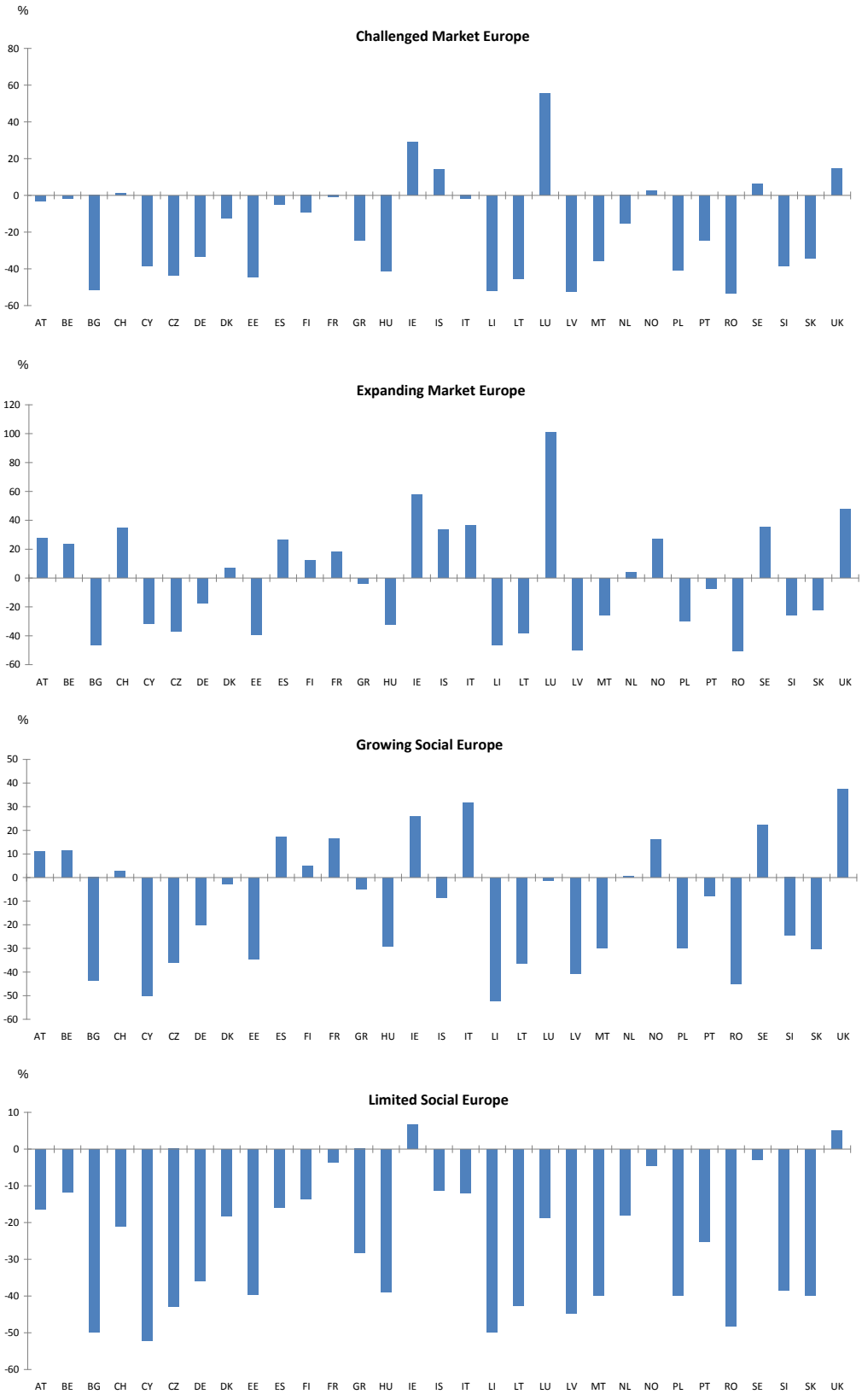


Figure 4-7: Labour force change 2005-2050, countries

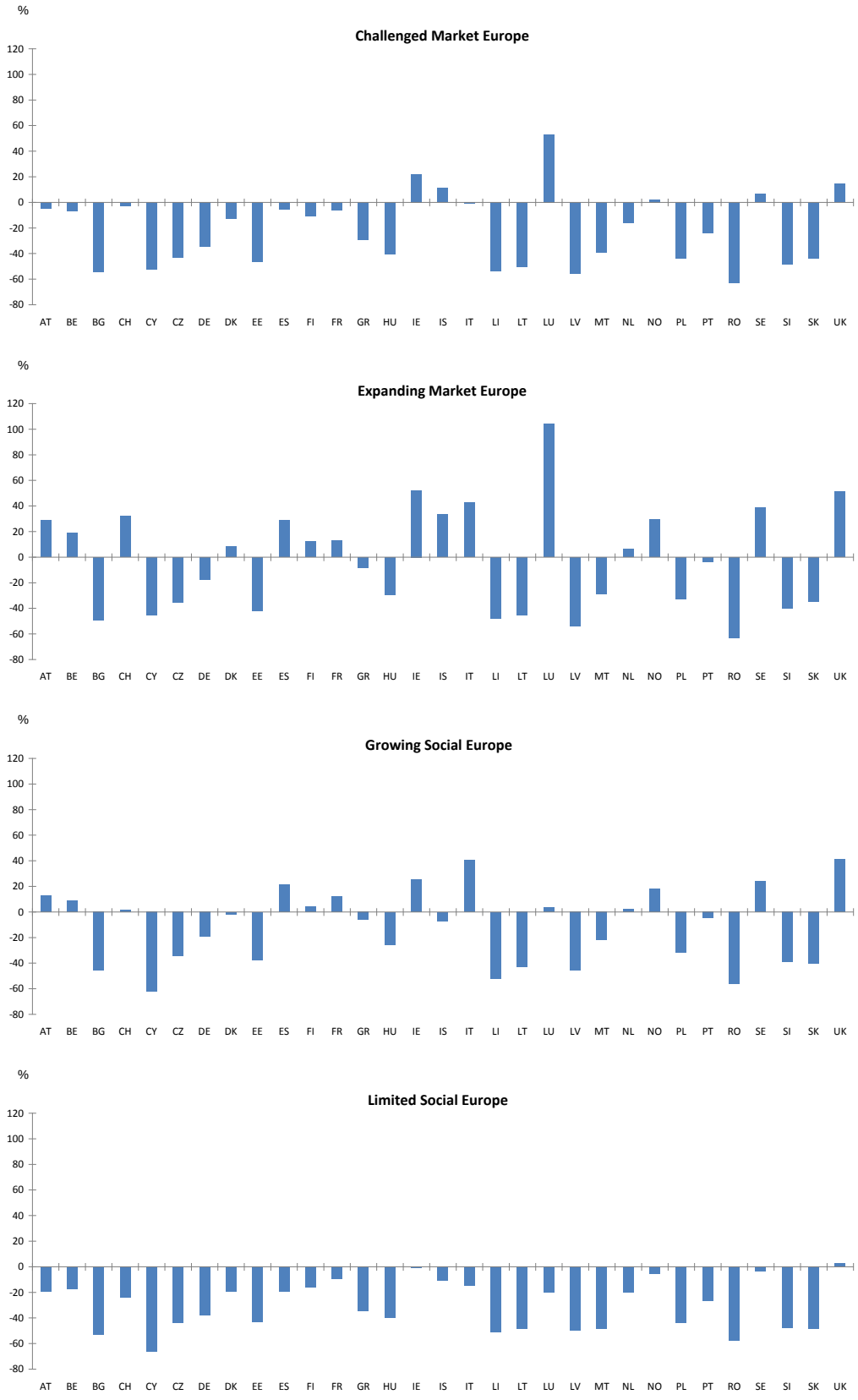


Figure 4-8: Male labour force change 2005-2050, countries

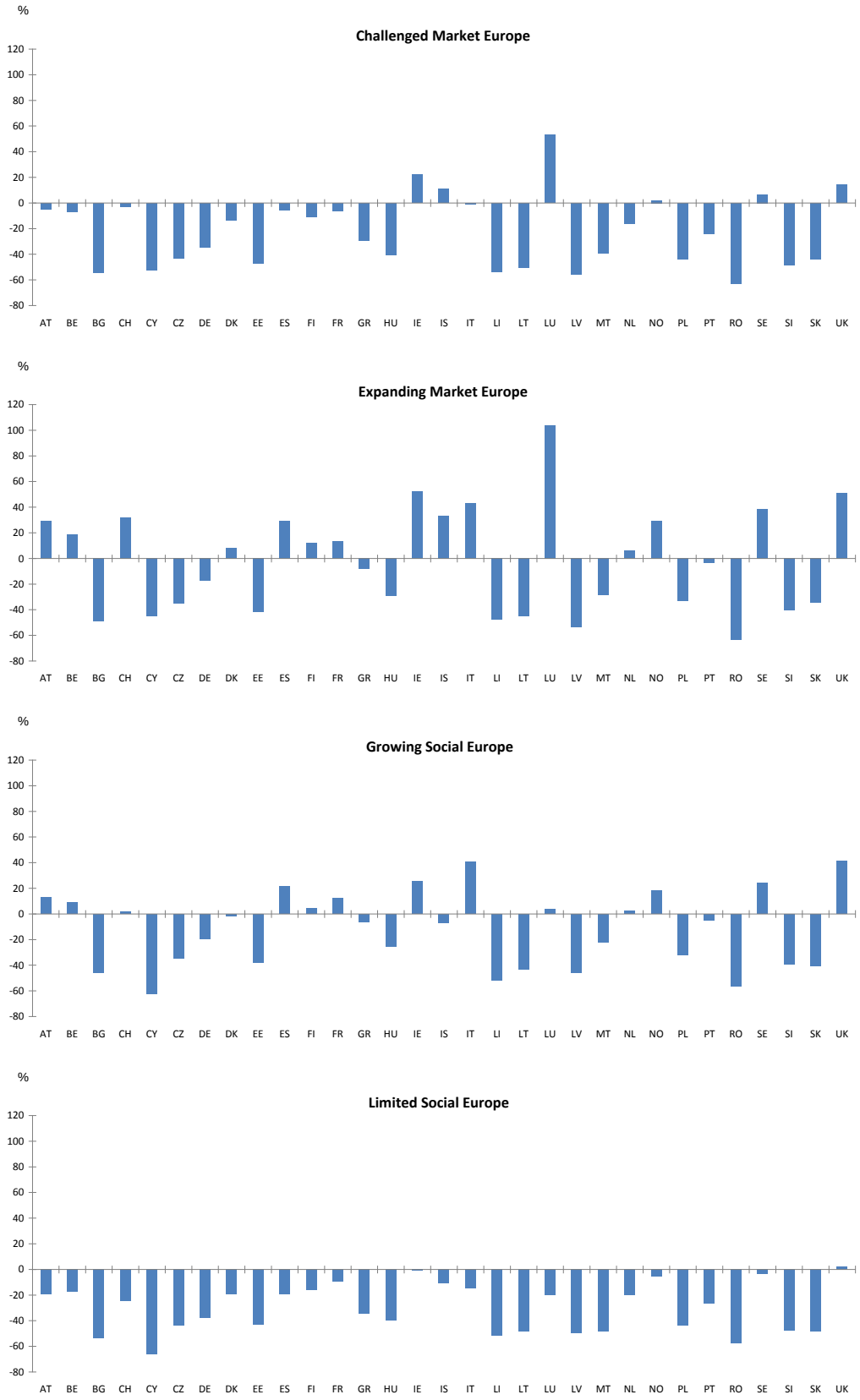


Figure 4-9: Female labour force change 2005-2050, countries

Table 4-6: Labour force (x 1 000)

	2005	2050				2005	2050			
		Challenged Market Europe	Expanding Market Europe	Growing Social Europe	Limited Social Europe		Challenged Market Europe	Expanding Market Europe	Growing Social Europe	Limited Social Europe
	Male					Female				
AT	2180	2142	2747	2394	1874	1803	1714	2327	2034	1458
BE	2563	2628	3260	2908	2378	2007	1865	2379	2182	1658
BG	1774	903	994	1032	948	1547	701	788	835	720
CH	2262	2362	3091	2347	1853	1888	1828	2496	1921	1426
CY	213	154	169	126	125	164	78	90	62	55
CZ	2868	1615	1771	1808	1658	2274	1285	1476	1482	1274
DE	22264	15064	18361	17648	14596	18150	11841	15010	14622	11276
DK	1549	1364	1636	1494	1287	1358	1178	1472	1332	1092
EE	337	196	213	230	216	330	175	192	206	186
ES	12078	11535	15059	13761	10463	8457	7965	10907	10274	6804
FI	1350	1241	1517	1426	1196	1257	1121	1408	1312	1057
FR	14925	15478	18236	17940	15212	13074	12252	14800	14655	11779
GR	2867	2255	2851	2740	2172	1968	1388	1805	1850	1292
HU	2264	1308	1470	1543	1407	1914	1138	1352	1421	1145
IE	1155	1545	1863	1455	1291	839	1025	1277	1053	833
IS	92	108	123	83	82	81	90	107	75	72
IT	14620	14244	19381	18387	13161	9828	9734	14040	13788	8359
LI	11	5	6	5	6	9	4	5	4	4
LT	827	494	562	583	522	794	392	437	450	410
LU	119	188	237	114	99	87	133	177	90	69
LV	589	300	317	378	352	549	243	253	298	276
MT	112	74	85	75	72	49	30	35	38	25
NL	4704	4001	4815	4643	3936	3799	3184	4043	3898	3036
NO	1255	1288	1563	1435	1212	1121	1144	1447	1323	1056
PL	9306	5789	6758	6704	5919	7791	4362	5214	5293	4366
PT	2962	2235	2659	2660	2254	2557	1938	2457	2427	1870
RO	5407	2954	3234	3475	3225	4452	1644	1630	1943	1888
SE	2430	2578	3218	2921	2379	2207	2352	3059	2740	2126
SI	551	387	479	481	381	454	233	271	277	237
SK	1450	1069	1278	1135	973	1199	674	785	711	619
UK	16087	18528	23272	21568	17243	13661	15637	20626	19272	13993

	2005	2050			
		Challenged Market Europe	Expanding Market Europe	Growing Social Europe	Limited Social Europe
	Total				
AT	3983	3856	5074	4428	3331
BE	4569	4493	5639	5090	4036
BG	3321	1604	1782	1867	1668
CH	4149	4191	5587	4268	3280
CY	377	232	258	188	180
CZ	5142	2900	3247	3289	2932
DE	40414	26904	33371	32270	25872
DK	2907	2542	3108	2826	2379
EE	668	372	406	436	403
ES	20535	19499	25966	24035	17268
FI	2607	2362	2925	2738	2253
FR	27999	27730	33036	32595	26991
GR	4835	3644	4656	4591	3464
HU	4177	2447	2822	2965	2552
IE	1994	2571	3140	2508	2124
IS	173	197	231	158	153
IT	24448	23977	33421	32175	21520
LI	20	10	11	10	10
LT	1621	885	999	1033	931
LU	206	321	414	204	168
LV	1138	543	570	676	628
MT	162	104	120	114	97
NL	8502	7185	8858	8541	6972
NO	2376	2432	3011	2759	2268
PL	17097	10151	11972	11997	10285
PT	5519	4173	5116	5087	4125
RO	9859	4598	4864	5418	5113
SE	4637	4930	6276	5661	4505
SI	1006	620	750	758	618
SK	2649	1743	2063	1846	1592
UK	29748	34165	43898	40840	31237

4.2.3 Trends in the labour force: typology of regions

The Challenged Market Europe scenario and the Limited Social Europe scenario are more or less the same with respect the regional patterns of growth of the labour force. The two types Challenge of Labour Force and Challenge of Decline will face a downsizing of 40% of the labour force between 2005 and 2050. In contrast, the Overseas type may expect a growth of 40%. In the Euro Standard type a decline of 10% is foreseen in the Challenged Market scenario against a decline of 15% in the Limited Social Europe scenario. The other types will suffer a decrease up to 10% in both scenarios (with the exception of the Young Potential type with a growth of about 5% in the Challenged Market scenario).

In the other two scenarios, the Expanding Market Europe and the Growing Social Europe scenario, the decline of the labour force in the two type Challenge of Labour Force and Challenge of Decline is considerable lower with about -30%. The type Overseas is expected to have a huge growth of the labour force with 60%. Also the types Young Potentials and Challenge of Ageing are heading for a considerable growing labour force: both with about 40% in the Expanding Market Europe scenario against 30% in the Growing Social Europe scenario. Also for the Family Potential type a growing labour force is envisaged with about 25% in the Expanding Market Europe scenario and 15% in the Growing Social Europe scenario.

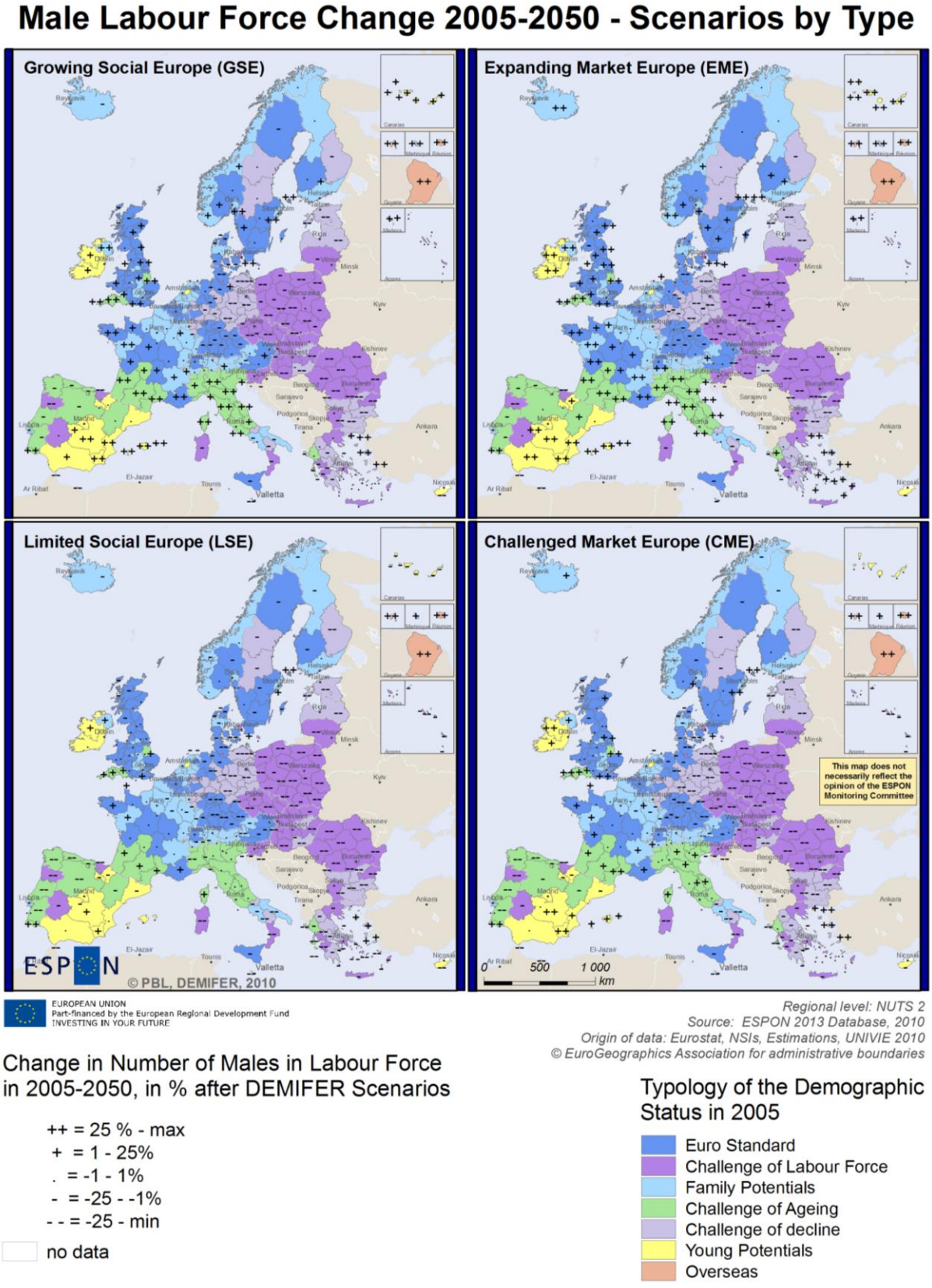


Figure 4-10: Male labour force change 2005-2050, types, GSE, EME, LSE, and CME scenarios

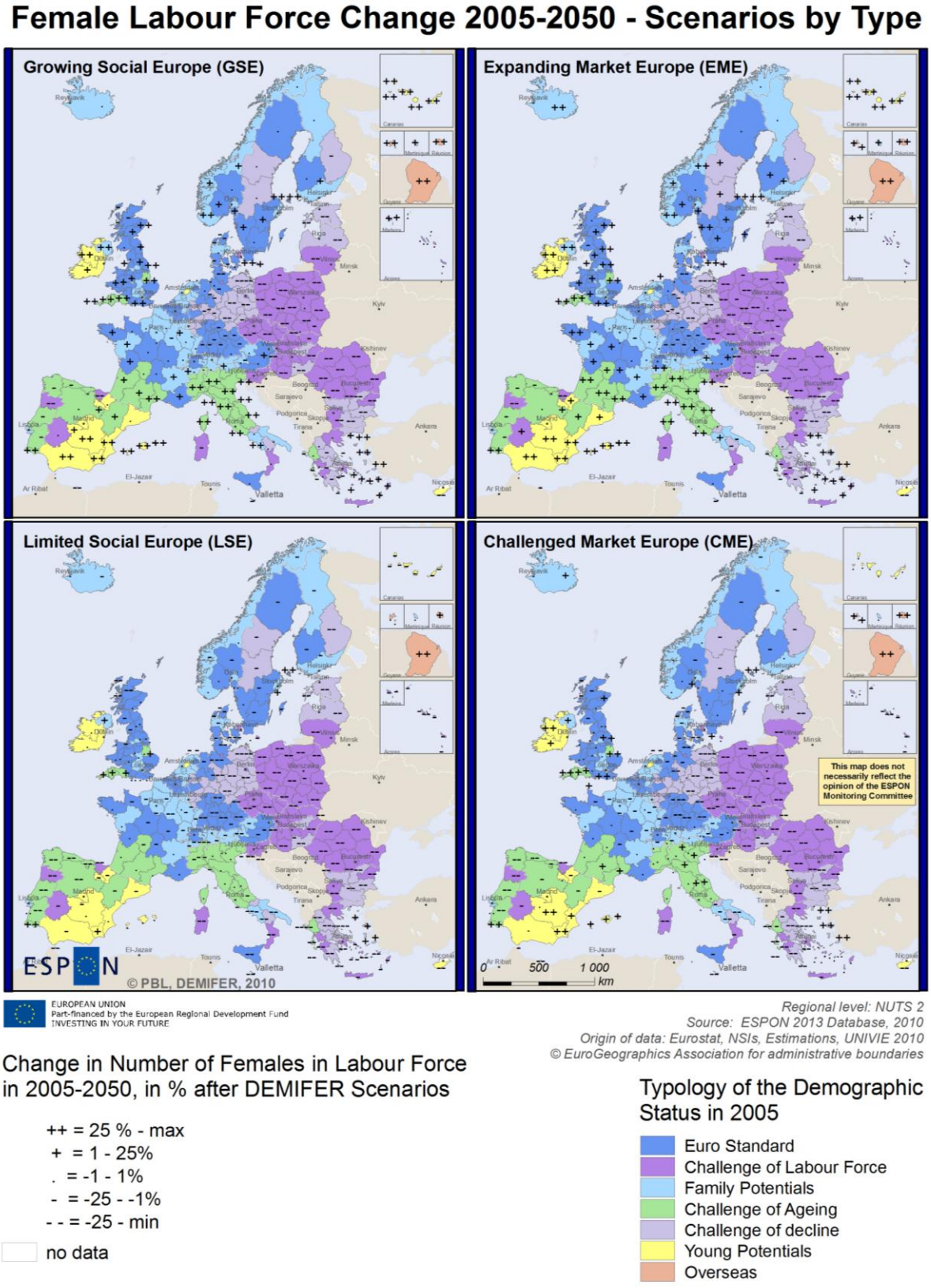


Figure 4-11: Female labour force change 2005-2050, types, GSE, EME, LSE, and CME scenarios

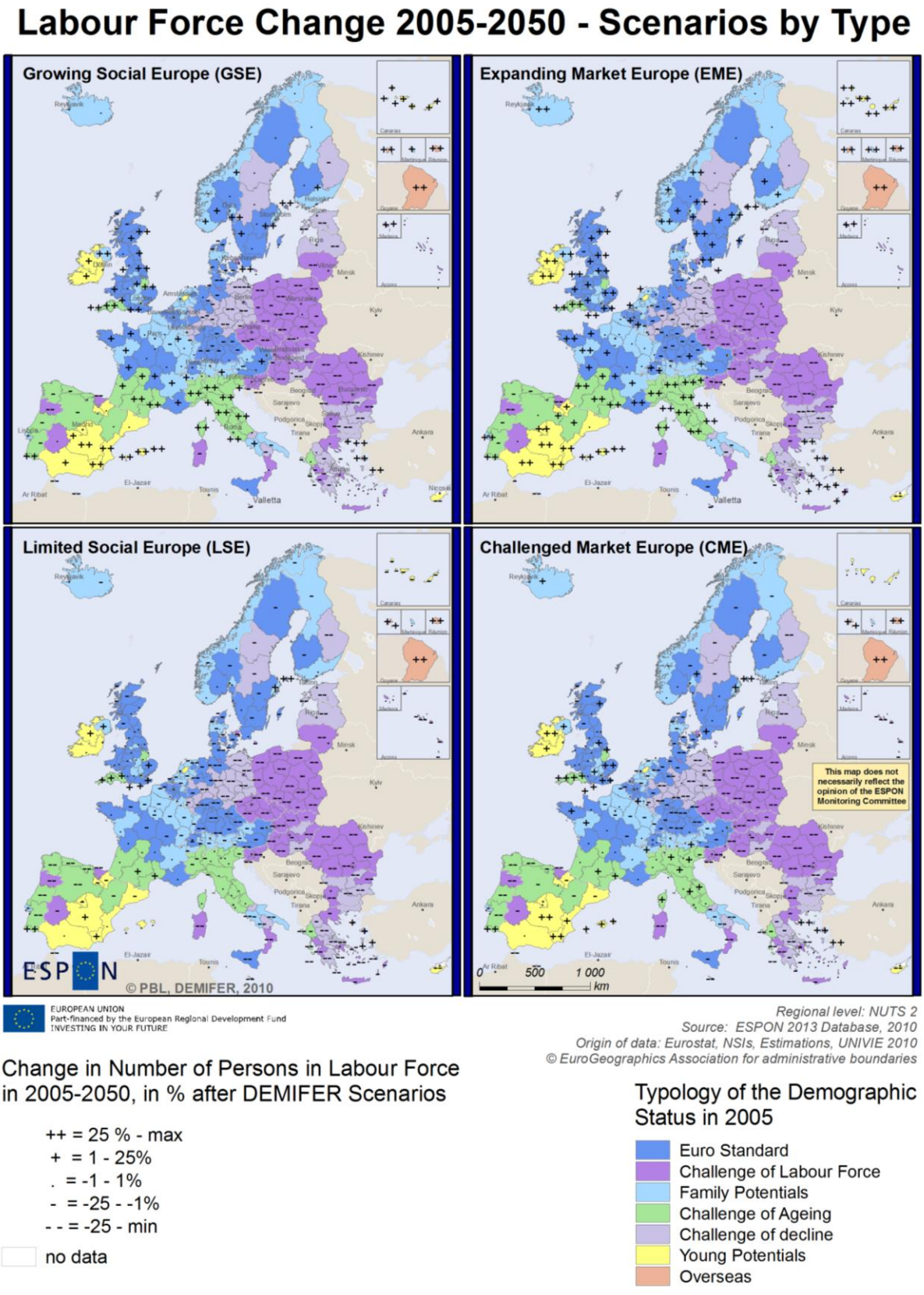


Figure 4-12: Labour force change 2005-2050, types, GSE, EME, LSE, and CME scenarios

4.2.4 Regional trends

In the future a lot of regions will be struck by a shrinking labour force. Dependent on the specific policy scenario the seriousness of the decline of the labour force will be less or more. In the Expanding Market Europe scenario a minority of the regions will be facing a declining labour force: only 35% of the regions of the ESPON space will have a shrinking labour force (of more than 10%) between 2005 and 2050. In the Growing Social Europe scenario this percentage is somewhat higher with 40%. In the Challenged Market Europe scenario the percentage is much higher with 55%, while the Limited Social Europe scenario a large majority of the regions will be the confronted with a setback, namely 70% of the regions see the labour force decline with over 10%. In the last scenario most regions located in the Eastern part of the ESPON space and a lot of regions in the Southern part will suffer a decline of the labour force with more than 30%. Also a lot of regions located in Germany and Austria will suffer a loss of over 30%. In the Expanding Market Europe scenario a lot of regions located in the western and northern part of the ESPON space will have a substantially growing labour force. The contrast with a eastern part is sharp, where a majority of the regions will have to endure a shrinking labour force. Although in the Growing Social Europe scenario the percentage of shrinking regions is almost the same, the percentage of regions with a high labour force growth is significantly higher. This is due to the convergence assumption of this scenario (in contrast to a divergence assumption in the Expanding Market scenario).

The regional pattern of regions with a growing or declining labour force differs considerable between the four policy scenarios. In the Limited Social Europe scenario most regions located in the Eastern part of the ESPON space and a lot of regions in the Southern part will suffer a decline of the labour force with more than 30%. Also a lot of regions located in Germany and Austria will suffer a loss of over 30%. More or less the same pattern is depicted by the Challenged Market Europe scenario, although the number of regions with a severe decline is somewhat lower (and in the wake of it the number of regions in a considerable decline is somewhat higher). According to the Expanding Market Europe scenario the regional pattern of growing and declining labour forces is quite different. A lot of regions located in the northern, western and southern part of the ESPON space will have a substantially growing labour force. However, within countries differentials in growth figures are clearly visible. For example , in the UK, France, Norway, Spain and Sweden the southern part of the country exhibit the highest growth figures, while in Italy this is the case for the northern part. In general, these are regions where large cities are located, attracting labour migrants both from within the country as abroad due to their economic potential. Surprisingly, most regions in - economically booming - Germany will still face a declining labour force. Labour migration is not able to compensate for a lasting negative natural growth (leading to low entrance figures in the labour force). In this scenario a sharp contrast with the eastern part of the ESPON space is visible, where a majority

of the regions will have to endure a shrinking labour force. The regional pattern of regions with a growing or declining labour force in the Growing Social Europe scenario resembles that of the previous scenario, although the number of regions with a high labour force growth (of over 30%) is significantly lower and the number of regions with a considerable growth (of between 10 between 30%) is higher. This is due to the convergence assumption of this scenario: less regions have extreme growth figures.

The regional trends in the male and female labour force resemble each other, although in the Limited Social Europe scenario the percentage of regions with a shrinking female labour force is much higher than the percentage with a shrinking male labour force. In this scenario round 75% of the regions will have a more than 10% shrinking female labour force against 60% of the regions with a more than 10% declining male labour force. In the Growing Social Europe scenario the percentage of regions with a shrinking male labour force is slightly higher (with round 40%) than the percentage of regions with a shrinking female labour force (with about 35%).

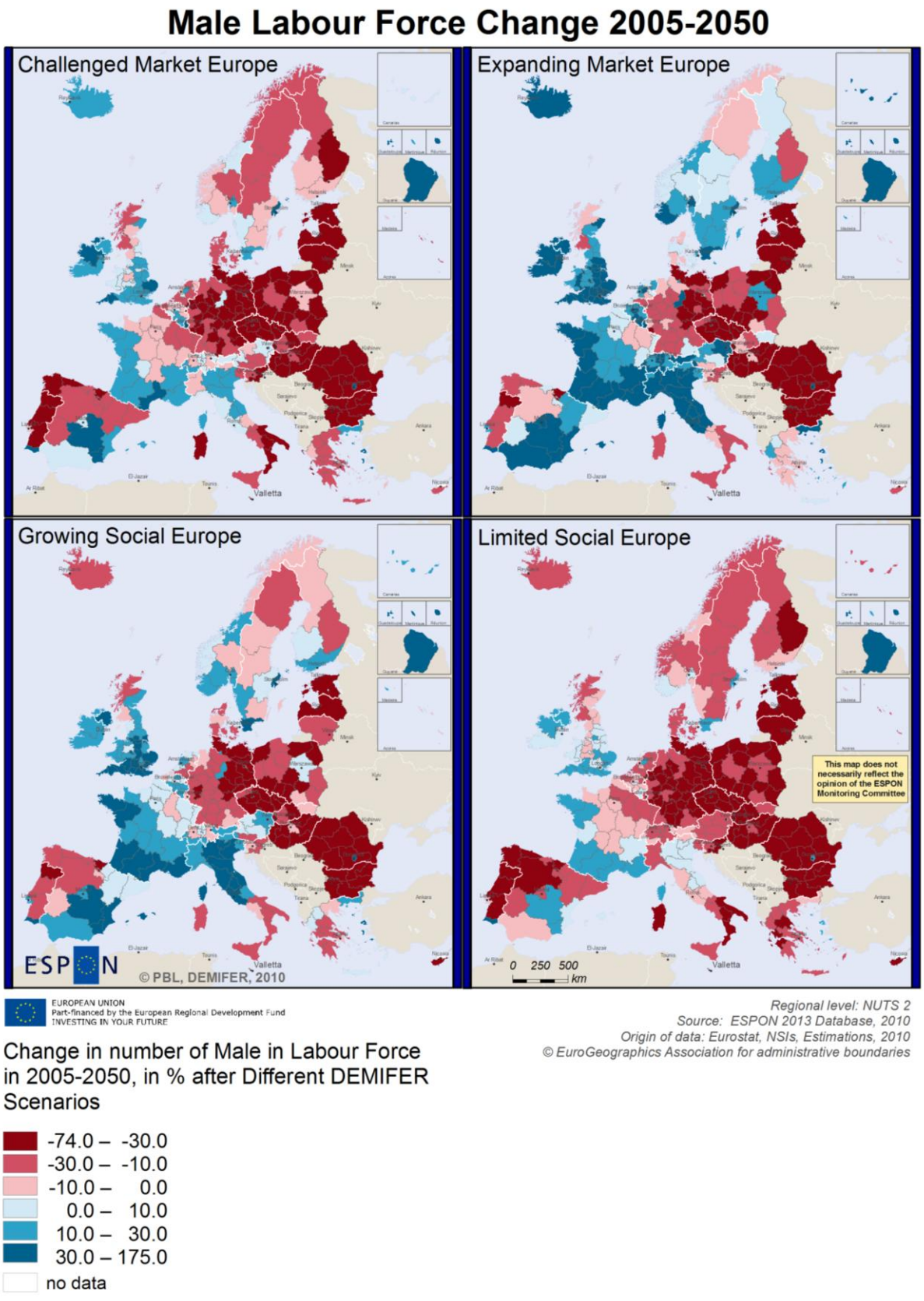


Figure 4-13: Male labour force change 2005-2050, regions, GSE, EME, LSE, and CME scenarios

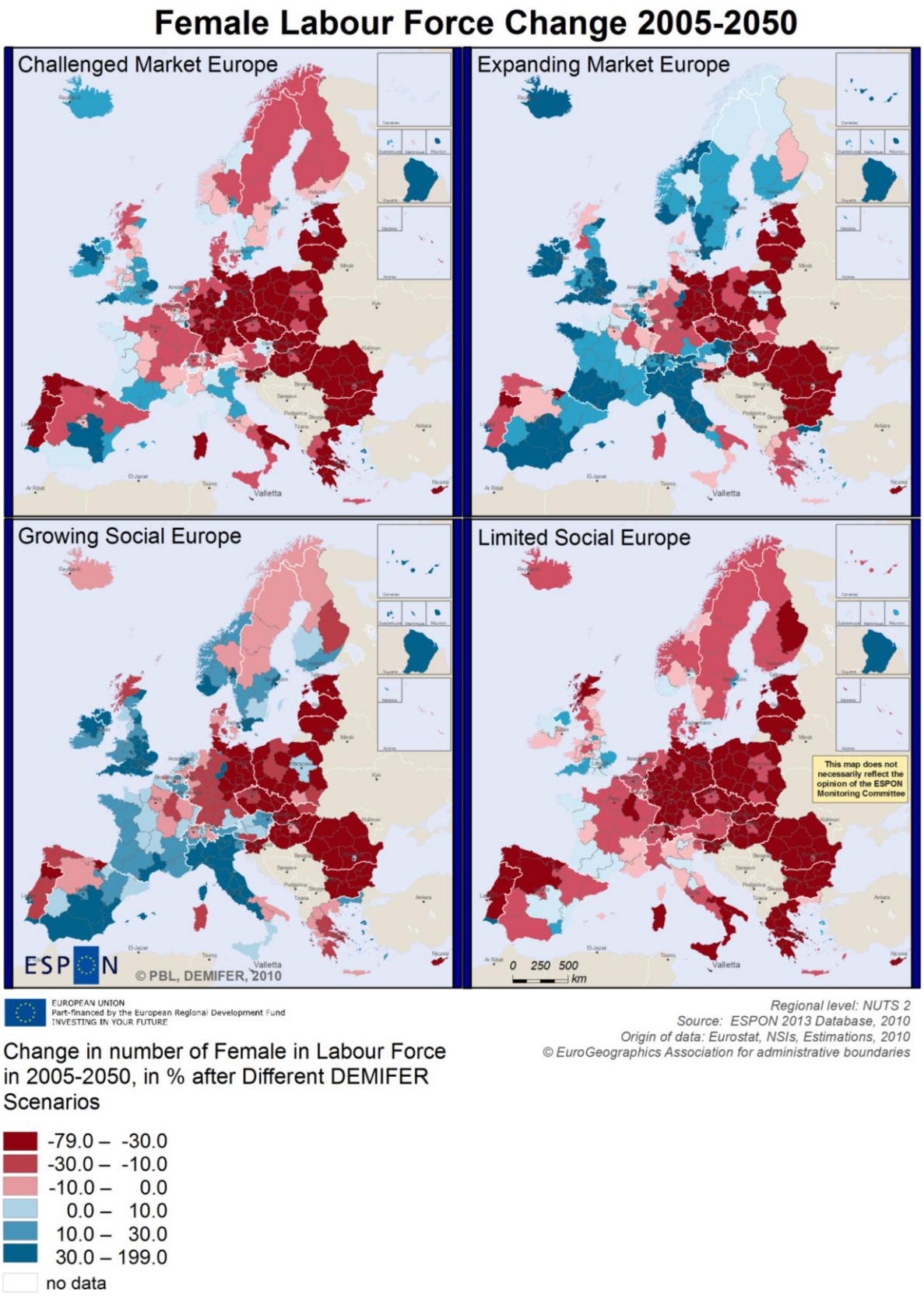


Figure 4-14: Female labour force change 2005-2050, regions, GSE, EME, LSE, and CME scenarios

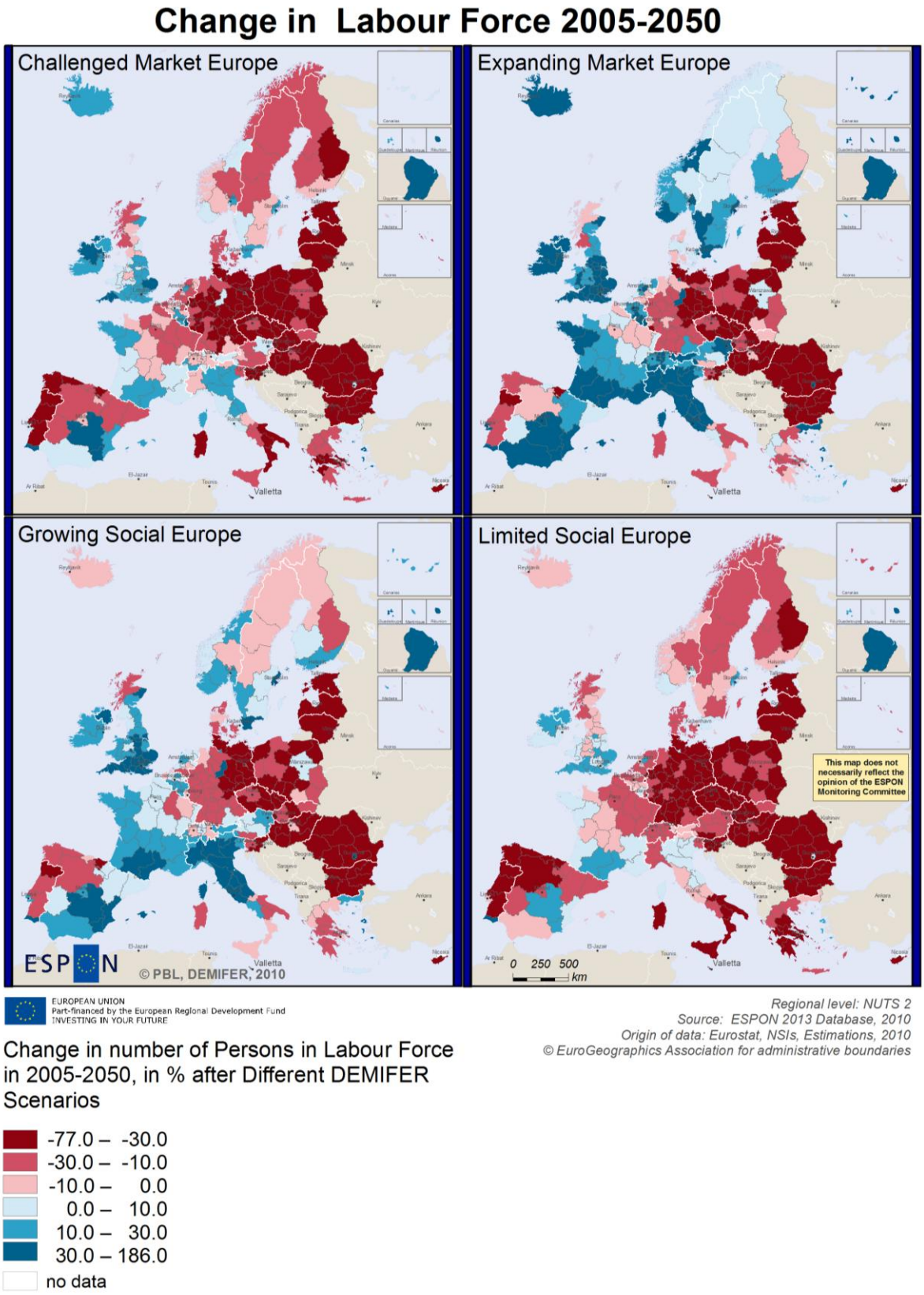


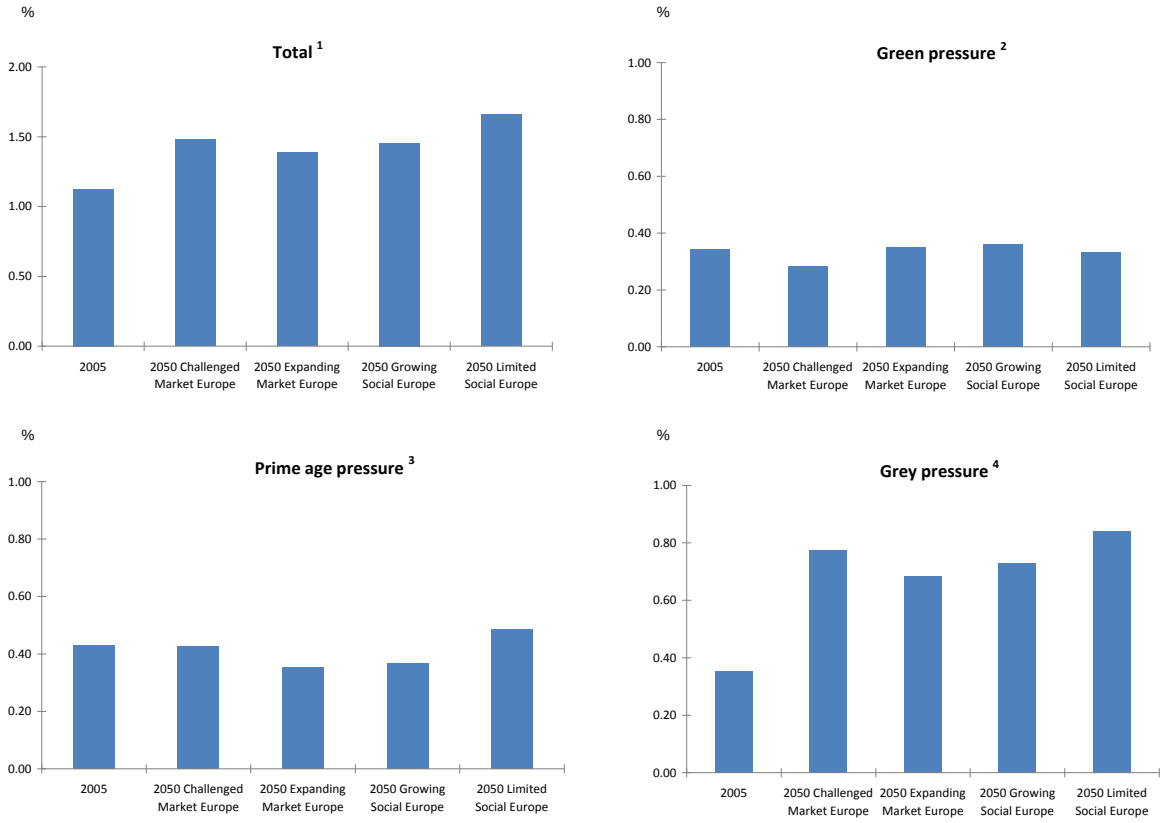
Figure 4-15: Labour force change 2005-2050, regions, GSE, EME, LSE, and CME scenarios

4.3 Dependency ratio

4.3.1 Dependency ratio: ESPON space

The dependency ratio gives an indication of the pressure on the labour force brought to bear by providing for the non-working population. This pressure can be distinguished by the contribution of specified age groups, namely the green pressure (by young people under 20), grey pressure (by people over 65) and the pressure exercised by non-working people at prime working ages.

The dependency ratio of the ESPON space amounts to 1.1 in 2005. The dependency ratios of the three age groups are between 0.3 and 0.4, although the prime age pressure is slightly higher than that of the other two age groups. In all four policy scenarios it is envisaged that the dependency ratio is going to rise substantially in the future. According to the Limited Social Europe scenario the rise is the steepest, with a dependency ratio of 1.7 in 2050. This is no wonder considering the lowest participation rates of this scenario. In the Challenged Market Europe the dependency ratio will be somewhat smaller in 2050 than in the previous scenario. In the other two scenarios stronger economic growth leads to higher participation rates and as a result to lower dependency ratios in 2050; in the Expanding Market Europe scenario a ratio of 1.4 is foreseen. Looking at the contribution of the specified age groups to the dependency ratio, it is clear that the enormous rise of this ratio in all four scenarios is predominantly caused by the huge rise of the grey pressure. In all four scenarios this type of pressure is (more than) doubled. Especially in the Limited Social Europe scenario the grey pressure will gain momentum, with an increase from 0.4 in 2005 to 0.8 in 2050. Also in the Challenged Market Europe scenario the grey pressure will rise fast. With respect to the prime age pressure, these two scenarios foresee almost the same degree of pressure in 2050 as in 2005, while in the other two scenarios a slight fall is expected. Also the green pressure will be more or less stable in the future, although a slight fall is expected in the Challenged Market Europe scenario and the Limited Social Europe scenario.



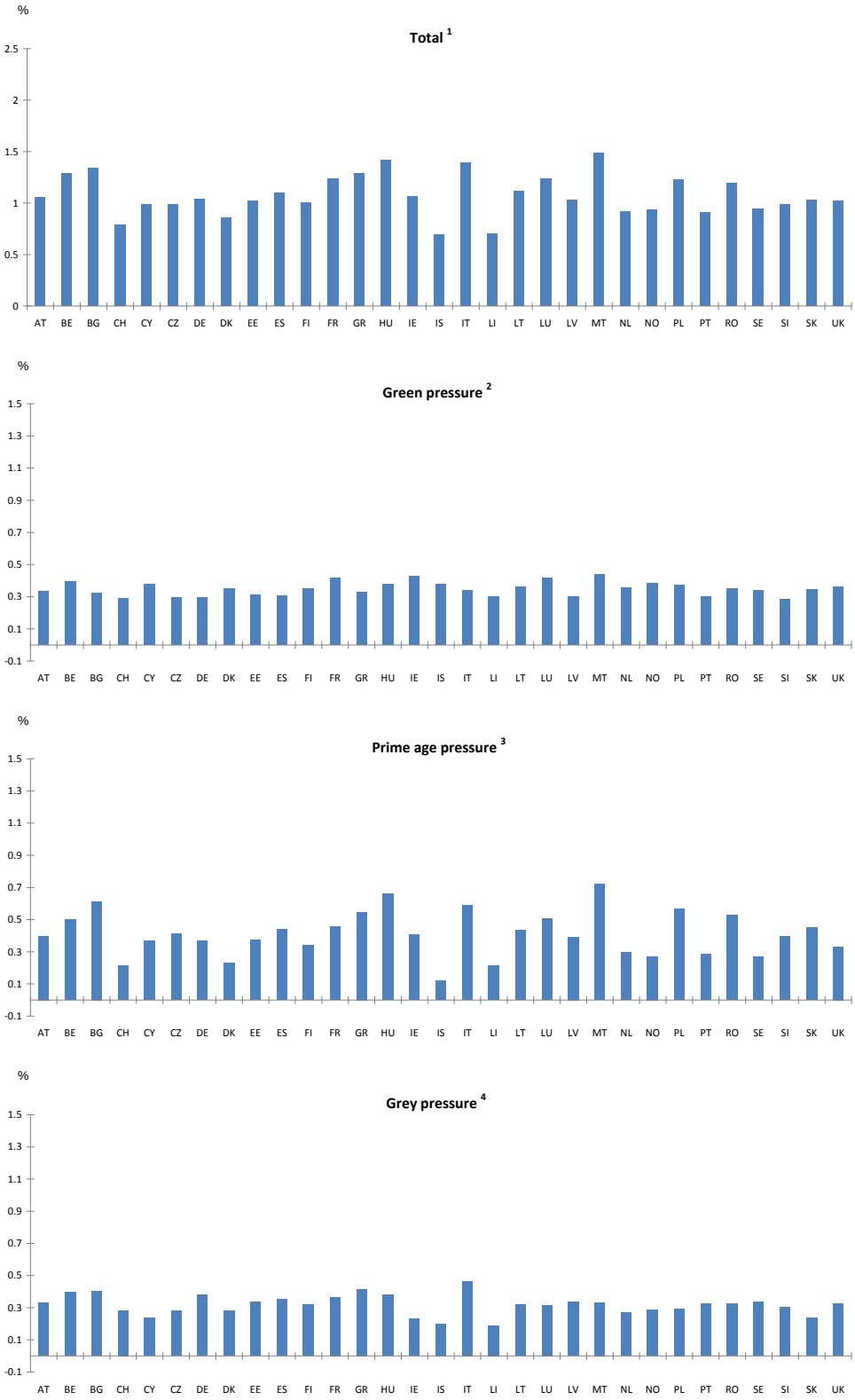
[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

Figure 4-16: Dependency ratio, 2005 and 2050, ESPON space

4.3.2 Dependency ratios: countries

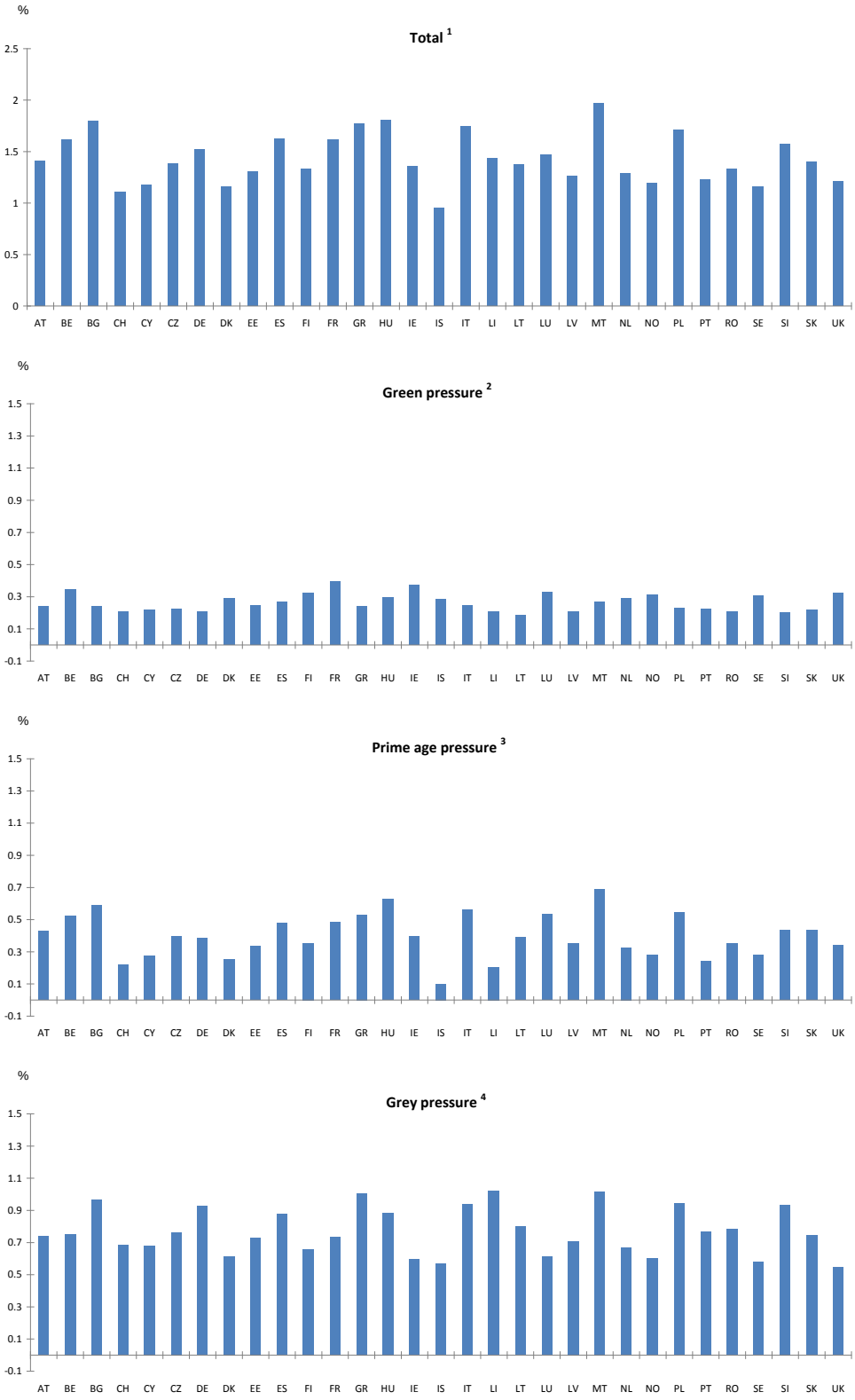
The disparity in the dependency ratios of the countries belonging to the ESPON space is fairly large. In several small countries the ratio is well below 1 while in some other countries it is close to 1.5. Looking at the contribution of the age groups, especially the prime age pressure shows large fluctuations. The green pressure is the least volatile.

According to the Limited Social Europe scenario the disparity is even much greater in 2050: a lot of countries will have a dependency ratio near 2. The green pressure is by then almost the same as in 2005. In contrast, the prime age pressure has increased in most countries. However, the largest contribution to the rising dependency ratio in the future is made by the eldest age group. In all countries the grey pressure will more than double. In the Growing Social Europe scenario the dependency ratio in 2050 is generally lower than that in the Limited Social Europe scenario. Also the differences between the countries are less impressive. In this scenario the prime age pressure is generally lower than in the Limited Social Europe scenario, while the grey pressure and green pressure is more or less the same. The country specific patterns of the dependency ratios are more or less the same in the Challenged Market Europe scenario and the Expanding Market Europe scenario.



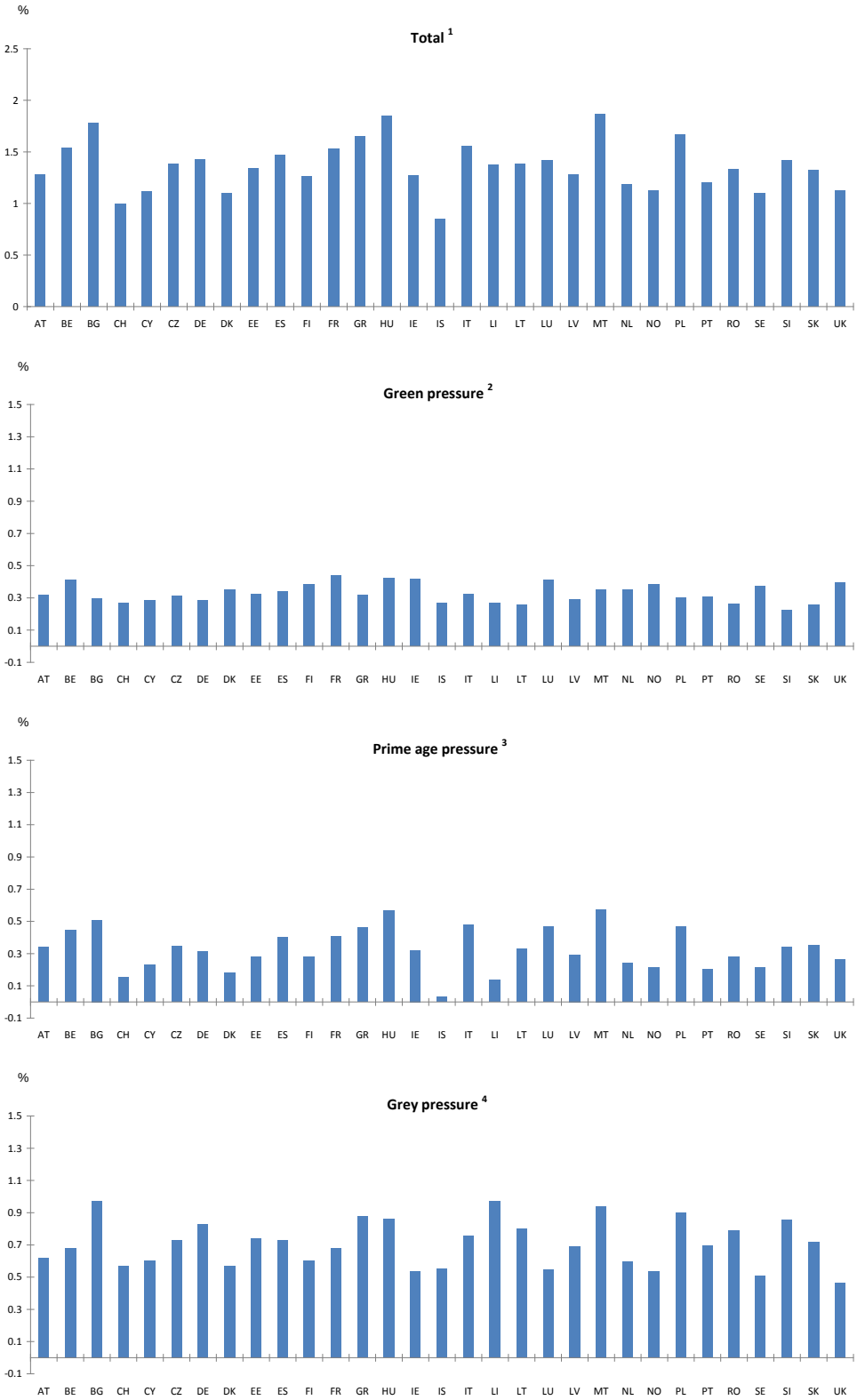
[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

Figure 4-17: Dependency ratio, 2005, countries



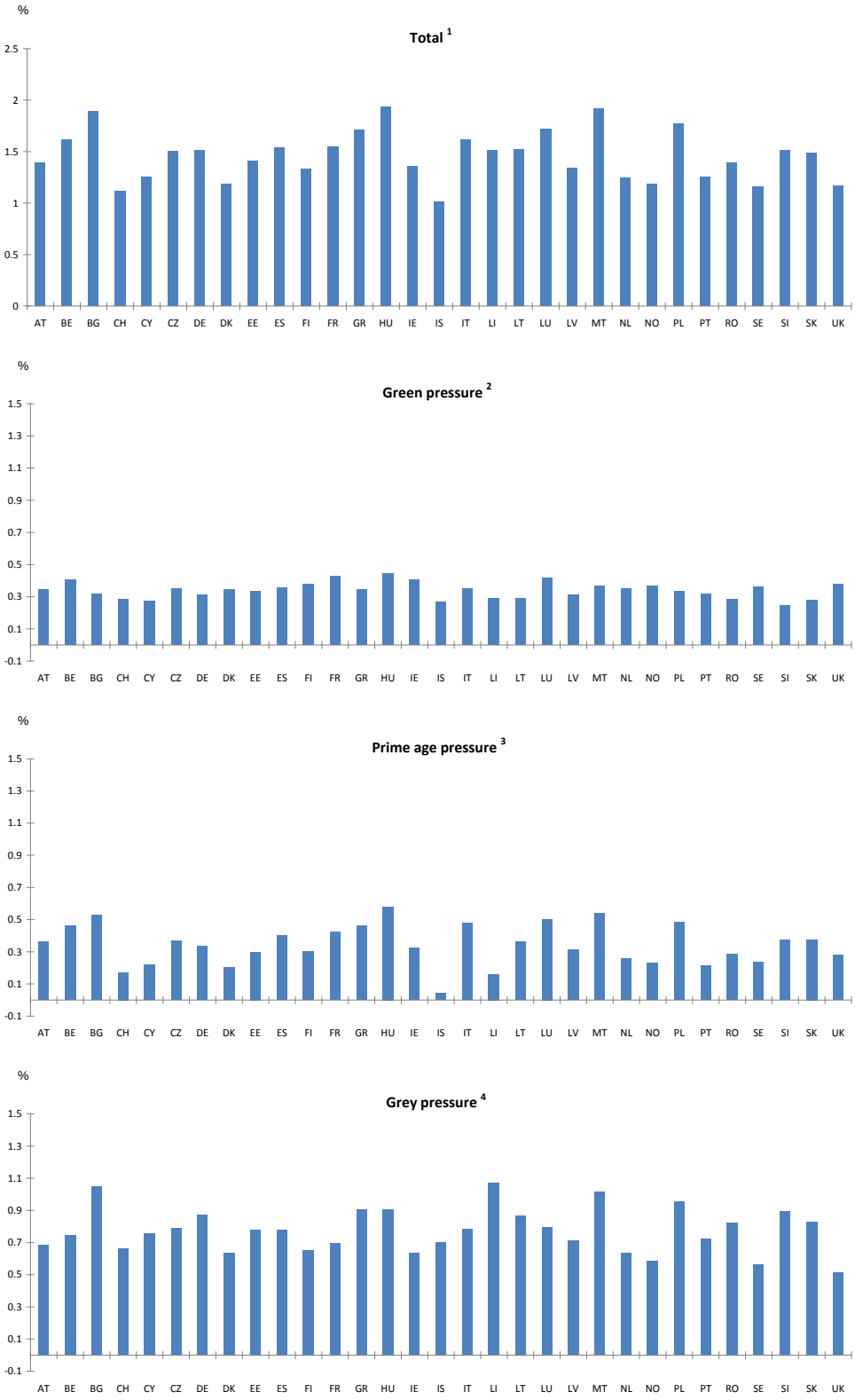
[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

Figure 4-18: Dependency ratio, 2050, Challenged Market Europe scenario, countries



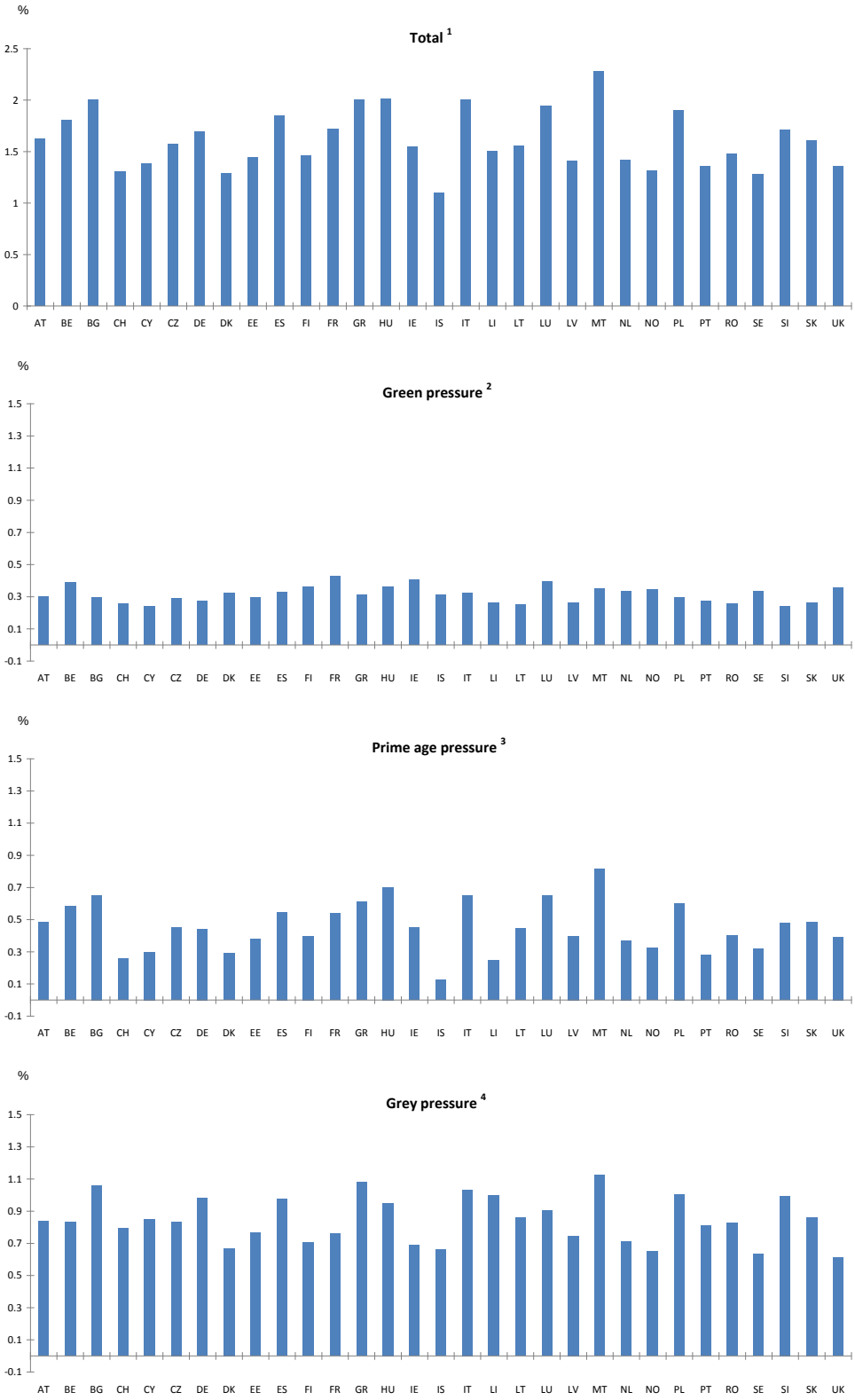
[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

Figure 4-19: Dependency ratio, 2050, Expanding Market Europe scenario, countries



[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

Figure 4-20: Dependency ratio, 2050, Growing Social Europe scenario, countries



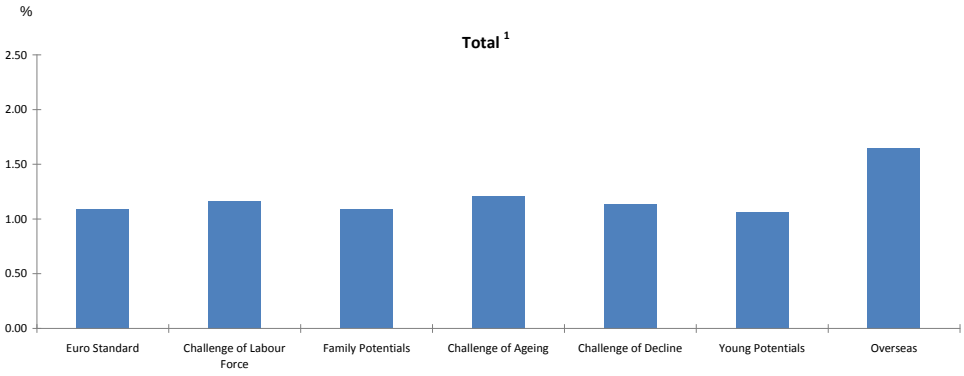
[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

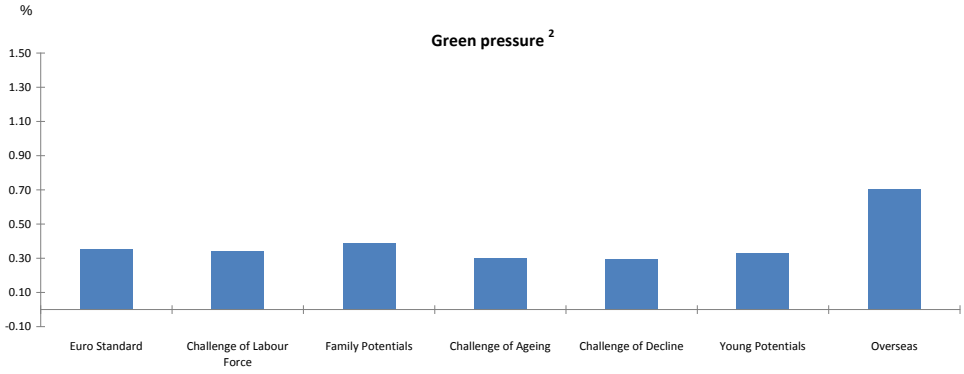
Figure 4-21: Dependency ratio, 2050, Limited Social Europe scenario, countries

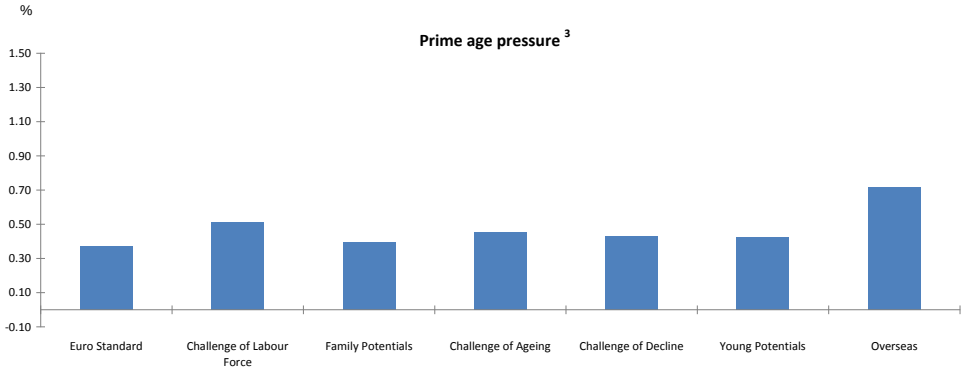
4.3.3 Dependency ratios: typology of regions

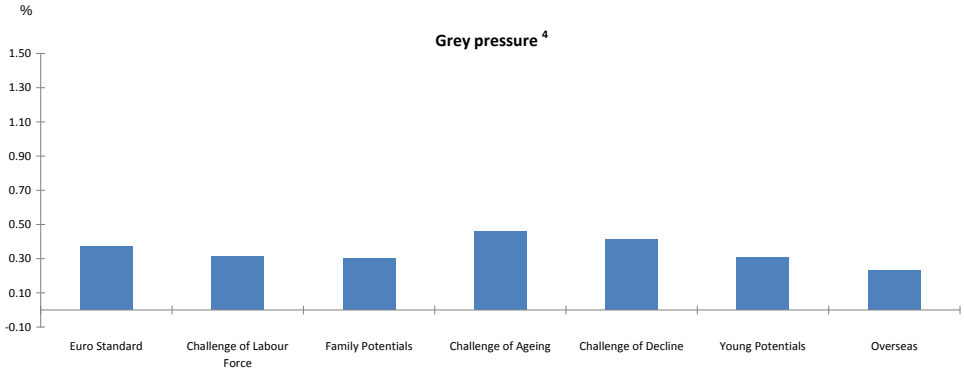
The disparity in the dependency ratios of the 7 types is very small in 2005. The only exception consists of the Overseas type with a much higher dependency ratio, namely 1.7 against round 1.1 for the other 6 types. Both the green pressure and the prime age pressure is considerable higher in the Overseas type, while the grey pressure is in line with that of the other types.

In the future, according to all four scenarios the gap between the dependency ratio of the Overseas type and the other types is going to get much smaller, although its 'leading position' will remain. Notably in the Growing Social Europe scenario the Overseas type has no longer a significantly higher dependency ratio. In this scenario the Challenge of Labour Force type and Challenge of decline type have a dependency ratio that is nearly as high. The Overseas type still has a much higher green pressure and prime age pressure but the grey pressure is much lower than that of most other types.



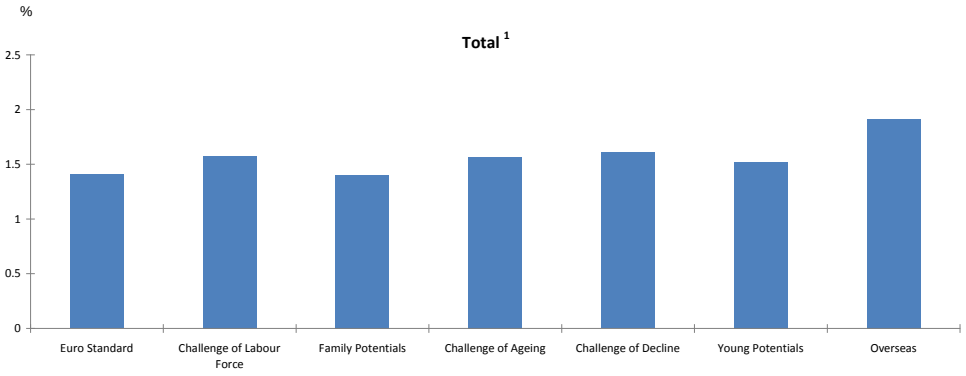


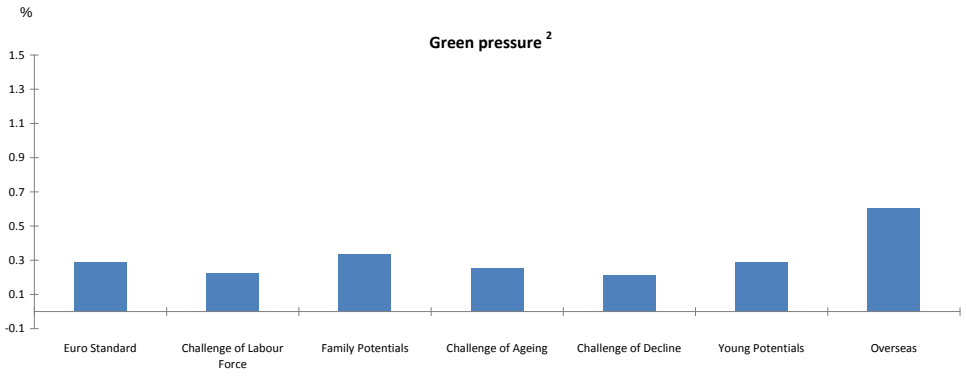


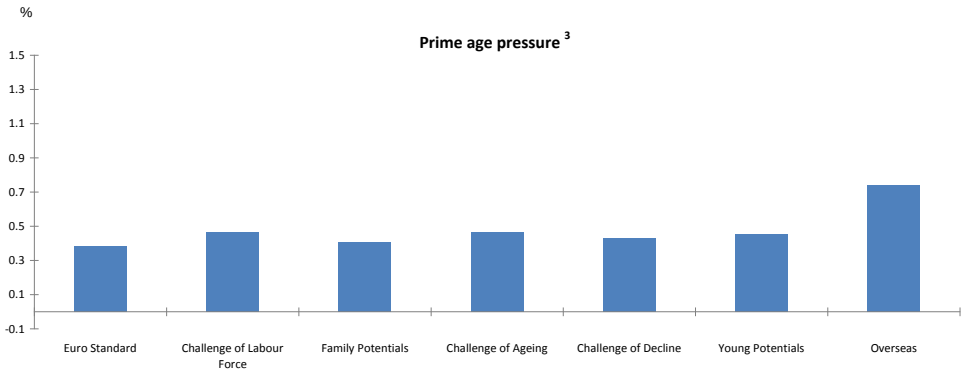


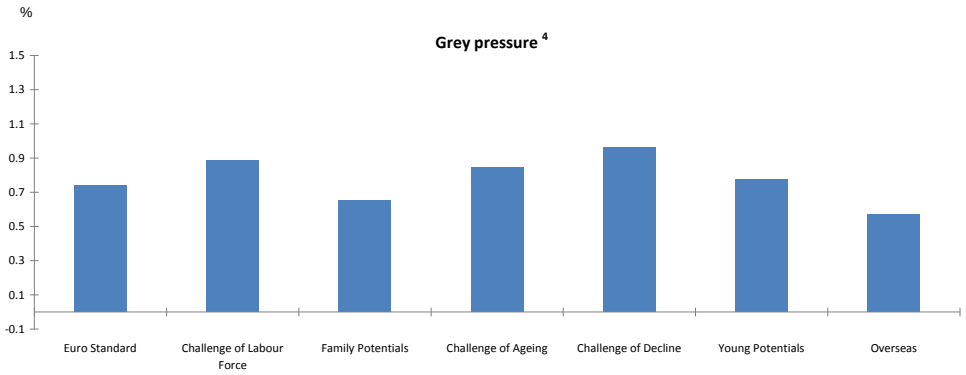
[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

Figure 4-22: Dependency ratio, 2005, types



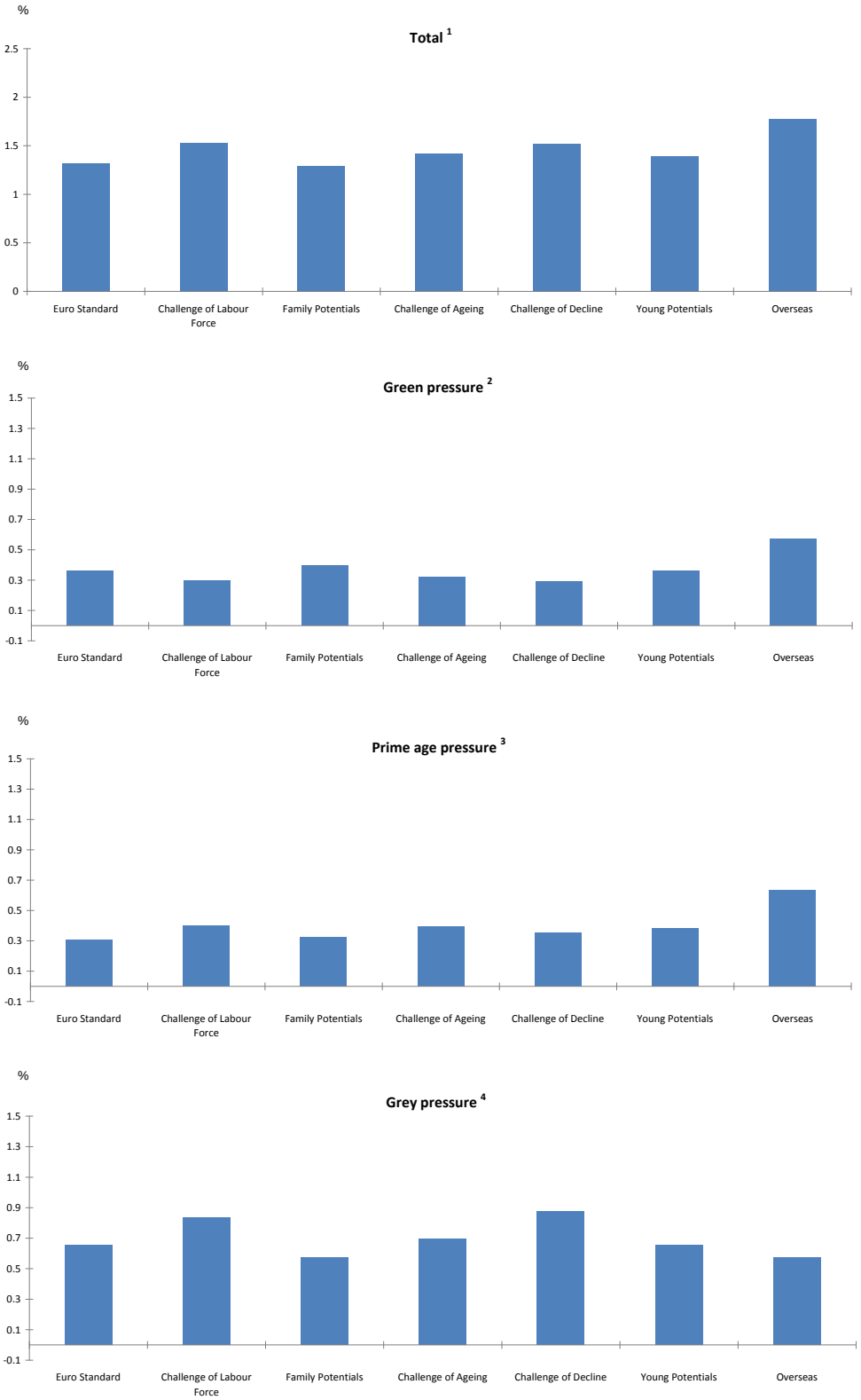






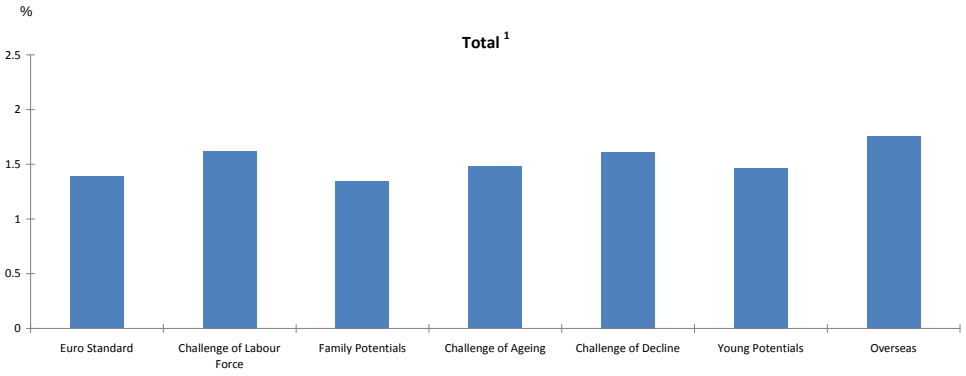
[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

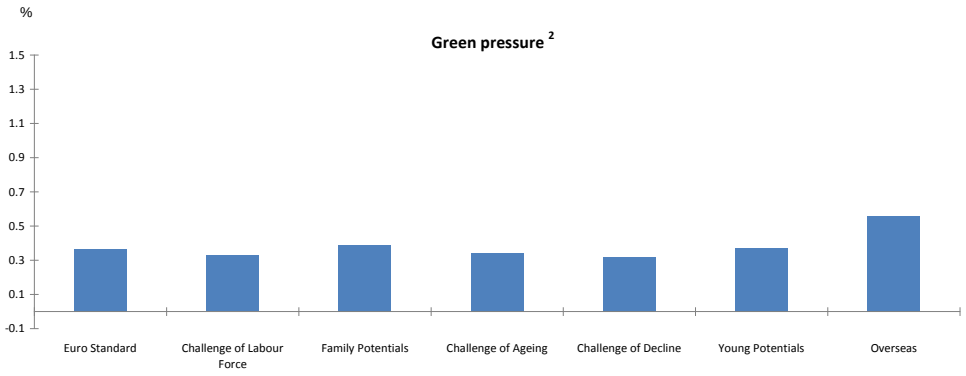
Figure 4-23: Dependency ratio, 2050 Challenged Market Europe, types

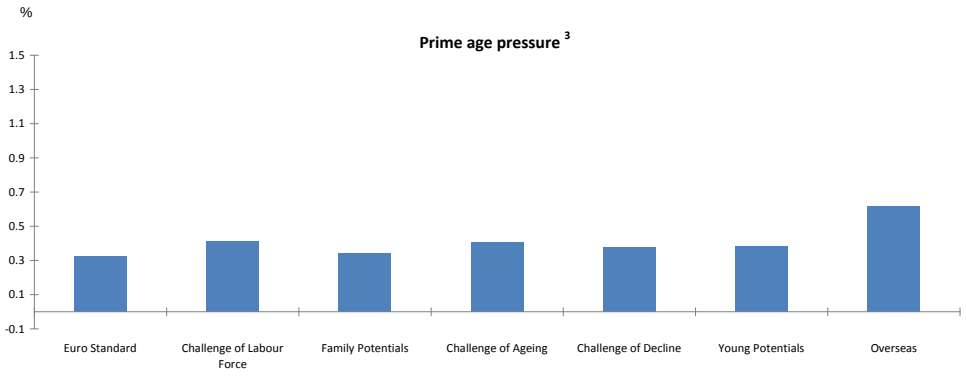


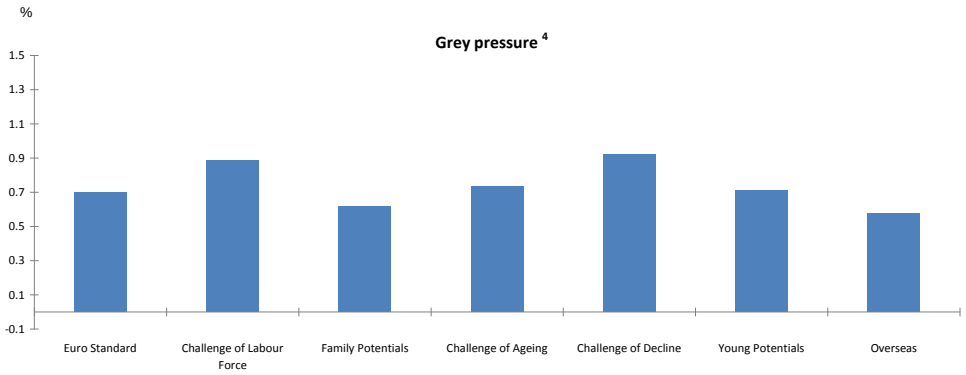
[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

Figure 4-24: Dependency ratio, 2050 Expanding Market Europe, types



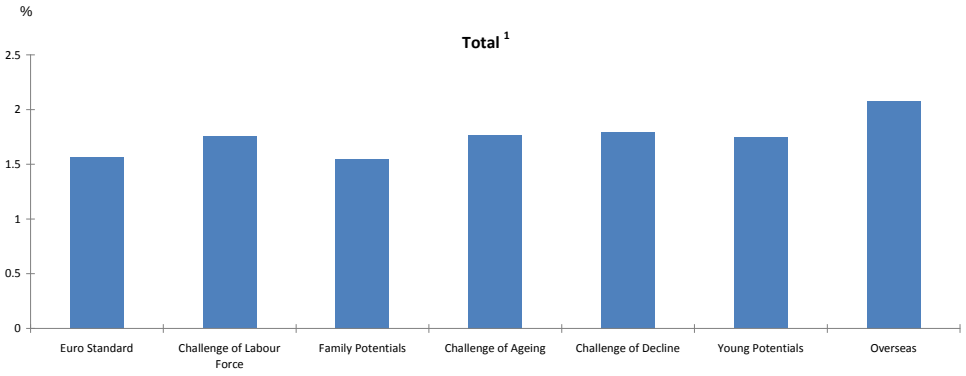


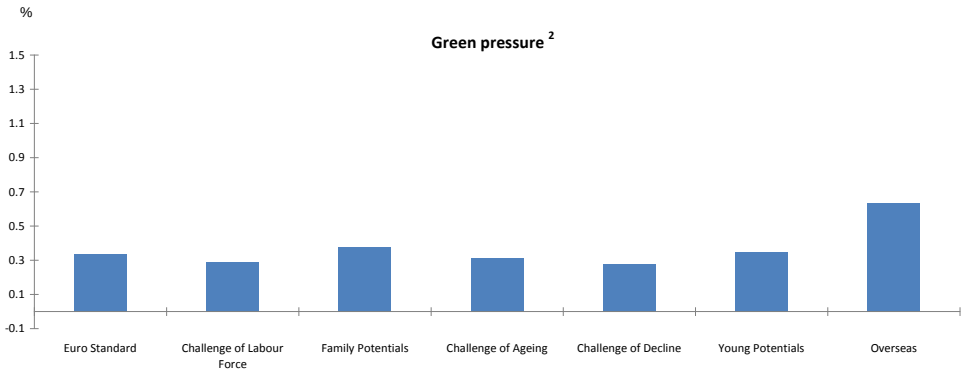


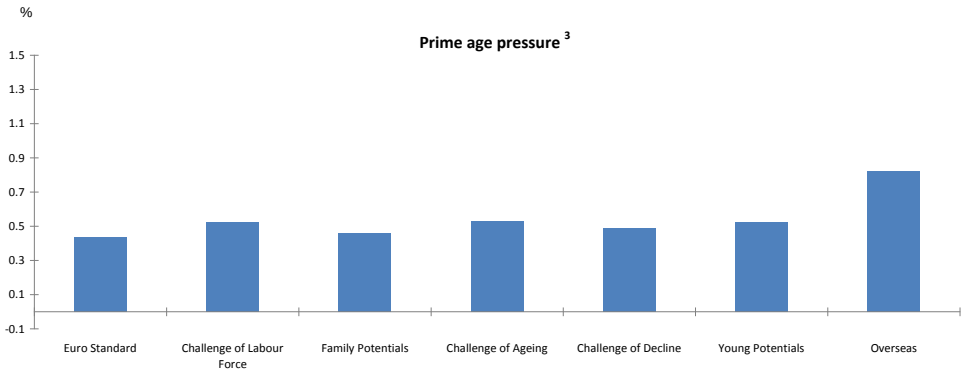


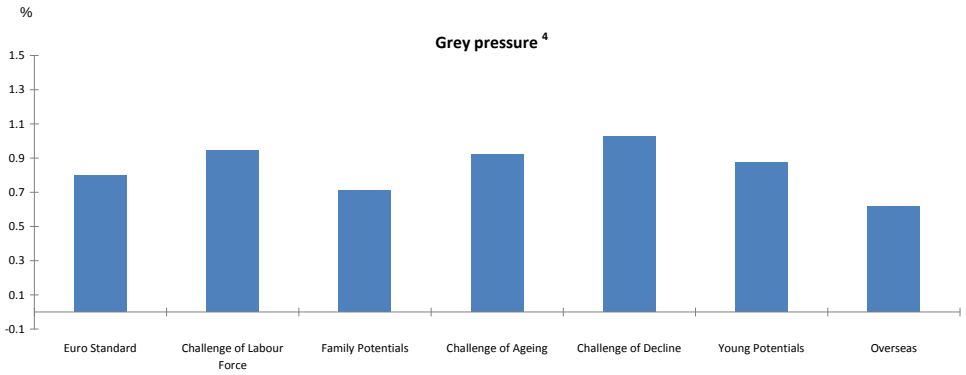
[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

Figure 4-25: Dependency ratio, 2050 Growing Social Europe, types









[1] Non-active population related to active population
[2] Population aged 19 and below related to active population
[3] Population aged 20-59 related to active population
[4] Population aged 60 and over related to active population

Figure 4-26: Dependency ratio, 2050 Limited Social Europe, types

4.4 Labour productivity

4.4.1 Labour productivity: ESPON space

From the analyses presented above, it is clear that according to all four scenarios the dependency ratio is going to grow substantially in the future. This points to an unfavourable development in the balance between the working and the non working part of the population. Especially an intensified financial burden might come along with this development. In terms of prosperity measured by Gross Domestic Product (GDP), this might imply that the GDP per person might go down as a shrinking proportion of the population has to provide for the non working part. However, this unfortunate prospect might be avoided by raising the labour productivity. In order to get an superficial impression of the effects of a rising labour productivity on the prosperity a rather tentative estimate has been made.

The prosperity can be computed by dividing the current GDP of the ESPON space through the population. This leads to a GDP per person of about 23 thousand Euro in 2005. Also at the level of countries the same exercises can be done. Countries that lag behind the ESPON 'average' with respect to the GDP per person are for example Bulgaria, Czech Republic, Latvia, Lithuania and Romania. In contrast, the Scandinavian countries stand out for their much higher welfare. Also at regional level the disparities are quite high, for example in the UK, the GDP per person in Inner London is four times the value of the Highlands and Islands.

Next, an indication of the current labour productivity can be acquired by looking at the GDP per actual worker in the labour force (which can be computed by dividing the GDP of the ESPON space through the size of the labour force). This amounts to about 49 thousand Euro in 2005. In order to get a tentative picture of the effect of a rise in the labour productivity on the prosperity (per person) the following computation can be made. For each of the four scenarios the expected GDP per person in 2050 is computed by multiplying the size of the labour force (according to the four scenarios) by the assumed labour productivity (per labourer) and next dividing this outcome by the size of population (according to the four scenarios) of that year. This computation implies that assumptions must be made on probable rises of the labour productivity. It is well known that the labour productivity differs between the economic sectors. In general the labour productivity is lower for the service sector (in particular the non profit sector , such as the care sector and the government). In contrast, large gains in labour productivity has been made in the past by the ICT sector. So, the sector specific composition of the economy is of importance with respect to attainable rises in the labour productivity. Other factors which play a role in the (future) labour productivity are developments in technology and the use of capital goods (possibly accompanied by substitution of labour by capital). Also the composition of the labour force can be of importance, due to sex-specific and age group specific differences in labour productivity. However, our simple exercise on estimating the effect of rises in the labour productivity

on the prosperity does not take such matters into account. In stead, each scenario uses merely a yearly growth rate of the labour productivity, which is applied on the size of the labour force without making reference to the factors mentioned above. So, it must be stressed that these estimates are rather speculative, although they might give an important indication of probable developments.

In order to arrive at assumptions on the rise of the labour productivity in the future, it is useful to inspect developments in the past on the one hand and to look at assumptions on future growth according to other organisations on the other hand. In the fifties and sixties of the previous century a rather high level of productivity growth was recorded, with figures of around 4% to 5% in Europe and around 3% in the United States of America (B. Smid, 2005, and Groningen Growth and Development Centre and The Conference Board, 2004). In the later decades a steady decrease in the labour productivity was witnessed. For the period 1995 up to 2003 the labour productivity amounted to 1,5 for Europe and 1,9 for the United States. With respect to the future growth of the labour productivity Gordon (2003) assumed a yearly productivity growth in the American market sector between 2,2% and 2,8% for the first decades of this century. Jorgenson et al. (2003) estimated the future growth of the labour productivity for the whole economy in the first decade at 1,8% per year. They also gave a more pessimistic estimate of 1,1 % per year, due to a less important contribution of ICT to the labour productivity. Finally, a more optimistic estimate resulted in a yearly productivity growth of 2,4 %.

The Board of Trustees (2004) also produced an estimate of future labour productivity growth for the American economy in the period up to 2080. In their baseline scenario the yearly growth of labour productivity amounted to 1,6%, while in the low and high scenario the estimates were 1,3% and 1,9% respectively. For Europe the OECD (2001) has published an long term estimate of the labour productivity growth. In the period up to 2020 the growth rates of the individual countries of Europe converge to a level of 1,75% growth per year, while hereafter a constant growth of 1,75% is assumed.

Based on these finding the four policy scenarios are associated with a different yearly growth rate of the labour productivity. In the economic most positive scenario Expanding Market Europe with the most favourable attitude toward market imitative the yearly growth of the labour productivity of 2,0% is assumed, being close to the high estimates for the American whole economy. In the economic least positive Limited Social Europe scenario with the least favourable attitude towards market initiative a yearly growth of the labour productivity of 1,0% is assumed, being close to the lower estimates for the American whole economy. The Challenged Market Europe scenario is also oriented at a strong market sector but operates in an economic less favourable situation; this results in a lower yearly labour productivity growth than in the Expanding Market Europe scenario, namely 1,75%. In the Growing Social Europe scenario the lack of market orientation in policies lead to a relative strong service sector, having a lower labour productivity. For this scenario a yearly growth of the labour productivity

of 1,25% is assumed; being somewhat higher than the yearly growth in the Limited Social Europe scenario.

In Table 4-7 the result of the exercise of the effect of rising labour productivity growth on the GDP per person is shown. Also the effect of a 'status quo' situation is presented, in which the current labour productivity does not change in the future. In all four scenarios a fierce drop of the prosperity is expected in case the labour productivity keeps the same in the future. This is due to the unfavourable change in the balance between the working and non working part of the population. According to the table the Expanding Market Europe scenario is the least dramatic scenario, with an expected negative yearly growth of -0.26 % of the GDP per person. As could be expected, the Limited Social Europe scenario is the most undesirable scenario with a negative yearly growth of -0.49% of the GDP per person per year. The outcomes of the other two scenario are in between those of the previous two scenarios with a negative yearly growth of about 0,3% per year. Next, the table shows the effects of the assumptions on a continued rise of the labour productivity in the future. Now, the picture of the expected GDP per person looks much more desirable. In all four scenarios the negative growth figures of the GDP per person has turned over in positive figures, ranging from 0,5% per year in the Limited Social Europe scenario to 1,75% per year in the Expanding Market Europe scenario.

It is also possible to compute the necessary rise in labour productivity in order to keep the GDP per person at the current level in the future. In that case the necessary rise in the labour productivity is considerable smaller: ranging from 0,26 % in the Expanding Market Europe scenario to 0.5 % in the Limited Social Europe scenario. In the Strong Social Europe and the Challenged Market Europe scenarios the necessary rise in the labour productivity is in between: 0,32 % and 0,35% respectively.

Table 4-7: Estimate of yearly change of GDP per person (%) according to yearly change in labour productivity (%), 2005-2050, ESPON space

Challenged Market Europe		Expanding Market Europe		Growing Social Europe		Limited Social Europe	
Current labour productivity	Yearly growth of labour productivity: 1.25%	Current labour productivity	Yearly growth of labour productivity: 2,0%	Current labour productivity	Yearly growth of labour productivity: 1.75%	Current labour productivity	Yearly growth of labour productivity: 1,0%
%							
-0,33	0,91	-0,26	1,75	-0,31	1,41	-0,49	0,50

4.4.2 Labour productivity: countries

What will be the impact on prosperity of a sustained rise in the labour productivity in the future at the country level. Before answering this question, it is useful to look at the situation in which no improvements in the labour productivity will happen. In that case the prosperity will fall in each country, as shown by the negative yearly growth figures of the GDP per person in Table 4-8. This

applies even to the economic most favourable Expanding Market Europe scenario. This points to the necessity of a rise in the labour productivity in every country, in order to attain a higher prosperity in the future. To what extent are the other three scenarios capable to change the expected fall in prosperity by raising the labour productivity? In the Limited Social Europe scenario with a rather gloomy economic development meagre yearly growth figures of the GDP per person are attained, ranging from 0,1% for Liechtenstein to 0,6% for the United Kingdom. It must be noticed that Liechtenstein, like Switserland, has a very high GDP per person due to the banking sector, which disturbs the computation of the 'real' labour productivity. In the Expanding Europe scenario the yearly growth figures of the GDP per person are much more positive, where all countries have growth rates ranging from 1.5% up to 1.9% (with the exception of Liechtenstein with a growth figures of 1.25%). In the other two scenarios the yearly growth figures of the GDP per person are in between those of the Limited Social Europe and Expanding Market Europe scenario.

To a certain extent a trade off exists between necessary changes in the labour productivity and the necessity of (labour) migrants. This means that the need for replacement migration might be mitigated by raising the level of labour productivity. However, especially in situations of rather low economic growth substituting replacement migration by a higher labour productivity might have negative effects on the prosperity, as it leads to a smaller labour force while the non working part of the population remains the same. In case of the Limited Social Europe scenario, this might turn the rather small positive figures on yearly growth of the GDP per person into negative figures (like the ones belonging to the situation of no growth in the labour productivity in the future). Especially in countries of the Southern part of Europe, having a dominance of labour-intensive activities, it might be difficult to raise the labour productivity as substitution of labour by capital is hardly possible. Plausible figures on the trade off between labour productivity and labour migrants are hard to provide, as this would need insight in the sector composition of the economy in combination with the current labour productivity of migrants (per sector).

Table 4-8: Estimate of yearly change of GDP per person (%) according to yearly change in labour productivity (%), 2005-2050, countries

		Challenged Market Europe		Expanding Market Europe		Growing Social Europe		Limited Social Europe	
		Current labour productivity	labour productivity: 1.25%	Current labour productivity	Yearly growth of labour productivity: 2.0%	Current labour productivity	labour productivity: 1.75%	Current labour productivity	Yearly growth of labour productivity: 1.0%
		%							
AT	Austria	-0,35	0,90	-0,23	1,77	-0,33	1,40	-0,54	0,45
BE	Belgium	-0,30	0,95	-0,23	1,77	-0,30	1,43	-0,46	0,53
BG	Bulgaria	-0,40	0,85	-0,38	1,61	-0,48	1,25	-0,56	0,43
CH	Switzerland	-0,37	0,88	-0,24	1,75	-0,38	1,35	-0,56	0,42
CY	Cyprus	-0,20	1,05	-0,14	1,86	-0,28	1,45	-0,41	0,58
CZ	Czech_Republic	-0,40	0,84	-0,41	1,59	-0,52	1,21	-0,57	0,41
DE	Germany	-0,47	0,78	-0,38	1,61	-0,46	1,26	-0,62	0,37
DK	Denmark	-0,33	0,92	-0,27	1,73	-0,36	1,38	-0,45	0,53
EE	Estonia	-0,30	0,95	-0,33	1,67	-0,39	1,34	-0,42	0,57
ES	Spain	-0,50	0,75	-0,37	1,63	-0,42	1,31	-0,68	0,31
FI	Finland	-0,34	0,91	-0,27	1,73	-0,33	1,40	-0,45	0,54
FR	France	-0,34	0,91	-0,27	1,73	-0,28	1,45	-0,43	0,56
GR	Greece	-0,42	0,82	-0,32	1,67	-0,37	1,36	-0,60	0,39
HU	Hungary	-0,33	0,92	-0,36	1,63	-0,43	1,30	-0,49	0,50
IE	Ireland	-0,30	0,95	-0,22	1,78	-0,30	1,43	-0,47	0,52
IS	Iceland	-0,31	0,94	-0,19	1,81	-0,38	1,35	-0,47	0,52
IT	Italy	-0,31	0,94	-0,15	1,85	-0,20	1,54	-0,51	0,48
LI	Liechtenstein	-0,79	0,45	-0,73	1,25	-0,86	0,86	-0,85	0,13
LT	Lithuania	-0,26	0,99	-0,27	1,73	-0,39	1,34	-0,42	0,57
LU	Luxembourg	-0,22	1,02	-0,17	1,82	-0,43	1,30	-0,61	0,38
LV	Latvia	-0,25	1,00	-0,26	1,74	-0,32	1,42	-0,38	0,61
MT	Malta	-0,39	0,85	-0,31	1,68	-0,36	1,38	-0,61	0,37
NL	Netherlands	-0,39	0,86	-0,29	1,71	-0,35	1,38	-0,51	0,48
NO	Norway	-0,27	0,97	-0,21	1,79	-0,26	1,47	-0,39	0,60
PL	Poland	-0,43	0,81	-0,39	1,60	-0,48	1,25	-0,58	0,41
PT	Portugal	-0,35	0,90	-0,32	1,68	-0,37	1,36	-0,47	0,52
RO	Romania	-0,14	1,11	-0,14	1,86	-0,19	1,54	-0,27	0,72
SE	Sweden	-0,23	1,01	-0,17	1,83	-0,23	1,50	-0,36	0,63
SI	Slovenia	-0,57	0,68	-0,44	1,56	-0,52	1,21	-0,69	0,29
SK	Slovakia	-0,36	0,88	-0,30	1,70	-0,44	1,28	-0,55	0,44
UK	United_Kingdom	-0,20	1,05	-0,11	1,89	-0,16	1,57	-0,35	0,64

4.4.3 Labour productivity: typology of regions

At the level of types of regions more or less a divide is visible with respect to the effects of a sustained labour or raised productivity on the prosperity of regions. The overseas type is more or less an outlier as the negative impact is less severe in case of a sustained labour productivity and much more positive in case of a raised labour productivity.

The impact of a rising labour productivity on the GDP per person is quite similar in the types Euro Standard, Family Potentials and Challenge of Ageing. In all those types the yearly growth figures of the GDP per person are around 1,8 % in the Expanding Market Europe scenario and 0.5% in the Limited Social Europe scenario. In other three types, namely Challenge of Labour Force, Challenge of Decline and Young Potentials, the impacts of a continued rise in the labour productivity are considerable smaller, namely around 1,6% in the Expanding Market Europe scenario and around 0,4% in the Limited Social Europe scenario.

Table 4-9: Estimate of yearly change of GDP per person (%) according to yearly change in labour productivity (%), 2005-2050, typology of regions

	Challenged Market Europe		Expanding Market Europe		Growing Social Europe		Limited Social Europe	
	Current labour productivity	Yearly growth of labour productivity: 1.25%	Current labour productivity	Yearly growth of labour productivity: 2.0%	Current labour productivity	Yearly growth of labour productivity: 1.75%	Current labour productivity	Yearly growth of labour productivity: 1.0%
	%							
1 Euro Standard	-0,31	0,94	-0,23	1,77	-0,30	1,44	-0,46	0,53
2 Challenge of Labour Force	-0,38	0,86	-0,35	1,65	-0,42	1,30	-0,53	0,46
3 Family Potentials	-0,31	0,94	-0,21	1,79	-0,26	1,47	-0,44	0,54
4 Challenge of Ageing	-0,33	0,92	-0,19	1,80	-0,25	1,48	-0,50	0,49
5 Challenge of Decline	-0,45	0,80	-0,37	1,62	-0,45	1,28	-0,60	0,39
6 Young Potentials	-0,44	0,80	-0,33	1,66	-0,40	1,33	-0,64	0,35
7 Overseas	-0,21	1,04	-0,10	1,90	-0,09	1,65	-0,33	0,66

4.5 Dynamics of the age structure of the labour force

4.5.1 Dynamics of the age structure of the labour force: ESPON space

Besides developments in the size of the labour force also changes in the age structure of the labour force are important. Partly the age composition gives clues about dynamics in the labour market in terms of inflow and outflow. Figure 4-27 shows that the shape of the age pattern of the labour force in 2050 differs a great deal according the four policy scenarios. In the Expanding Market Europe scenario the age structure in 2050 is much alike that of 2005 up to the age group 40-44 years. However, in the higher age groups the number of labourers are much larger, due to policies and market forces promoting to stay economically active at higher ages. The age structure of the labour force according to the Growing Social Europe scenario is more or less the same as that of the Expanding Market Europe scenario, however with the important difference that the number of persons in the labour market are somewhat lower in all age groups. The two other scenarios stand out for both much lower figures in all age groups and a different shape of the age pattern. In younger age groups the number of persons in the labour force are a great deal lower than in the previous two scenarios, while in the higher age groups only a small gap applies. In the Limited Social Europe scenario the numbers are in nearly each age group a bit lower than in the Challenged Market Europe scenario. Compared with 2005, the labour force in the age groups 60-64 years and higher are somewhat higher in these two scenarios.

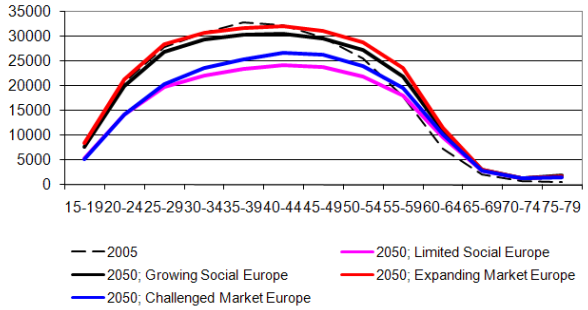


Figure 4-27: Labour force by 5 year age groups, ESPON space

From the figure it can be concluded that the labour force is going to be ageing to a considerable extent in the future, just as the population does. In general, it can be assumed that the younger part of the labour force is more productive and innovative than the older part. Whether this is true is still an ongoing discussion. According to the four policy scenarios the ageing will be more severe in the Challenged Market Europe scenario and the Limited Social Europe scenario. This can be illustrated by figures on the balance between the younger part (up to 39 years) and older part (40 years and higher) of the labour force. This balance is just above 1 for the ESPON space in 2005. However, in the two scenarios with the highest degree of ageing it will be around 80% in 2050 and in the other two scenarios around 90%.

This balance might also give a impression of dynamics in the labour force. It might provide a tentative indication of the relationship between inflow into and the outflow from the labour force (in a specific calendar year). In case this balance is higher than one, the younger part is larger than the older part and it could be expected that in that calendar year the inflow (of young labourers) is higher than the outflow (of older labourers). In case the index is smaller than one the reverse situation might apply: the outflow (of older labourers) is higher than the inflow (than younger labourers). As the index is below 1 in 2050 according to all four scenarios, the risks of an outflow being larger than the inflow is pretty high. In case of flourishing economic prospects, as depicted by the Expanding Market Europe and the Growing Social Europe scenario, this might imply that the opportunities for youngsters to get a job in the future will be favourable. In case of gloomy economic prospects this implies that a lot of youngsters are not capable of acquiring a job, so the labour force is going to age more rapidly as the outflow of older labourers is not compensated enough by the inflow of youngsters.

Table 4-10: Balance between younger and older part of the labour force [1], ESPON space

2005	1,03
Challenged Market Europe 2050	0,79
Expanding Market Europe 2050	0,90
Growing Social Europe 2050	0,90
Limited Social Europe 2050	0,82

[1] Computed by dividing the size of the labour force younger than 39 years through the size of labour force aged 40 years and higher.

4.5.2 Dynamics of the age structure of the labour force: countries

Nowadays, in about two third of the countries belonging to the ESPON space the younger part (up to 39 years) is somewhat larger than the older part (40 years and older). In the other countries the younger part is 0 to 15% smaller. Especially in Finland, Germany and Sweden the balance is in favour of the older part. By 2050 an impressive ageing of the labour force will have occurred in nearly all countries, according to all four scenarios. Only in the Expanding Market Europe scenario a minority (of 4 countries) still has a younger part surpassing the older part. In the other countries the index is between about 0.7 up to 1. In the Challenged Market Europe scenario the value of the index runs from about 0.6 to about 0.95. Especially a lot of former communist countries are forerunners in ageing, for example Romania, Lithuania, Estonia and Bulgaria. After the fall of the communist regimes around 1990 those countries exhibited a tremendous drop in fertility, leading to setbacks in the inflow in the labour force some decades later. So, in a lot of countries two factors might be leading to a high level of ageing: firstly an age effect (meaning that younger cohorts are much smaller than older cohorts due to a fall in fertility in the past) and secondly an age participation effect: due to an economic downfall entrance in the labour market is relatively low. It might be assumed that in the Expanding Market Europe scenario the ageing is largely due to the age effect as age participation rates (amongst youngsters) are quite high in times of vigorous economic growth.

Table 4-11: Balance between younger and older part of the labour force[1], countries

		2005	Challenged Market Europe 205(	Expanding Market Europe 205	Growing Social Europe 2050	Limited Social Europe 2050
AT	Austria	1,16	0,85	1,00	1,03	0,91
BE	Belgium	1,04	0,89	0,98	0,96	0,93
BG	Bulgaria	0,96	0,65	0,73	0,75	0,69
CH	Switzerland	0,93	0,68	0,78	0,80	0,72
CY	Cyprus	1,09	0,68	0,80	0,75	0,64
CZ	Czech_Republic	0,95	0,72	0,85	0,87	0,74
DE	Germany	0,88	0,66	0,78	0,81	0,72
DK	Denmark	0,94	0,82	0,93	0,90	0,84
EE	Estonia	0,86	0,64	0,73	0,74	0,67
ES	Spain	1,31	0,82	0,95	0,94	0,87
FI	Finland	0,85	0,86	0,97	0,95	0,88
FR	France	1,00	0,91	0,98	0,96	0,93
GR	Greece	1,14	0,69	0,80	0,81	0,75
HU	Hungary	1,05	0,76	0,93	0,94	0,80
IE	Ireland	1,34	0,90	0,99	0,96	0,93
IS	Iceland	1,05	0,71	0,72	0,68	0,72
IT	Italy	1,06	0,71	0,81	0,83	0,77
LI	Liechtenstein	0,94	0,63	0,73	0,74	0,69
LT	Lithuania	0,91	0,59	0,67	0,68	0,63
LU	Luxembourg	1,09	0,92	1,04	1,00	0,94
LV	Latvia	0,91	0,63	0,75	0,76	0,67
MT	Malta	1,33	0,92	1,09	1,08	1,00
NL	Netherlands	1,10	0,94	1,10	1,07	0,98
NO	Norway	0,98	0,80	0,92	0,88	0,82
PL	Poland	1,14	0,72	0,83	0,86	0,79
PT	Portugal	0,98	0,60	0,70	0,70	0,63
RO	Romania	1,10	0,58	0,69	0,68	0,59
SE	Sweden	0,85	0,79	0,91	0,87	0,79
SI	Slovenia	1,00	0,69	0,74	0,76	0,72
SK	Slovakia	1,21	0,76	0,85	0,85	0,78
UK	United_Kingdom	1,03	0,92	1,07	1,03	0,92

[1] Computed by dividing the size of the labour force younger than 39 years through the size of labour force aged 40 years and higher.

4.5.3 Dynamics of the age structure of the labour force: typology of regions

The balance between the younger part (up to 39 years) and the older part (40 years and older) of the labour force shows clear disparities between the seven types. The Young potentials type has by far the youngest labour force, with an index of 1.35 in 2005. Also the Overseas type reaches a high value, while also in the types Challenge of Labour Force and Family Potentials the balance is in favour of the younger part. In the types Euro Standard and Challenge of Decline the ageing of the labour force has caused an index with values below 1, while in the Challenge of Ageing type the younger and older part of the labour force have almost the same size.

By 2050 the Overseas type is the only type where according to all four scenarios the younger part of the labour force will exceed the older part. In the type Family Potentials these two parts are 'in balance' in the economically favourable Expanding Market Europe and Growing Social Europe scenarios, while in the two other, economically less appealing, scenarios the older part is slightly larger than the younger part. In the Challenge of Decline type the ageing of the labour force will be the most intense: in the Challenged Market Europe and Limited Social Europe scenarios the younger part is almost one third smaller than the older part. In the other types the ageing of the labour force will be less dramatic. This means that in the future in a majority of the regions of the ESPON space a considerable ageing of the labour force will happen, especially in the two economically less favourable scenarios.

Table 4-12: Balance between younger and older part of the labour force[1], typology of regions

	2005	Challenged Market Europe 205(	Expanding Market Europe 205	Growing Social Europe 2050	Limited Social Europe 2050
1 Euro Standard	0,93	0,79	0,91	0,91	0,82
2 Challenge of Labour Force	1,09	0,69	0,80	0,82	0,73
3 Family Potentials	1,09	0,90	1,02	1,00	0,92
4 Challenge of Ageing	1,01	0,74	0,84	0,85	0,79
5 Challenge of Decline	0,86	0,65	0,75	0,78	0,70
6 Young Potentials	1,35	0,85	0,98	0,97	0,89
7 Overseas	1,21	1,06	1,05	1,05	1,06

[1] Computed by dividing the size of the labour force younger than 39 years through the size of labour force aged 40 years and higher.

5. PROJECTION DATABASE

The projection database consists of a set of Scenario Summary spreadsheets containing the main results from the Scenario projections. The following scenarios are included: Status Quo (for comparison), Growing Social Europe, Expanding Market Europe, Limited Social Europe and Challenged Market Europe. The files containing the components of change are listed in Table 5-1. The files containing population change by 5 year age groups are listed in Table 5-2.

Table 5-1: Scenario output files for total populations and components of change

Workbook file	Contents
Components of change	
Components – Europe – Final v1 – April 2010.xls	Header: Graphical demographic profile including for each scenario – Population change, natural increase and net migration, and components of natural increase and net migration over projection period. Datasheet: summary of components of change for each scenario Raw data: 7 sheets of multipoles components of change output for GSE, LSE, EME, CME, STQ, NMI and NEM scenarios
Components – National – Final v1 – April 2010.xls	Header: Selection facility allowing choice of country. Graphical demographic profile including for each scenario – Population change, natural increase and net migration, and components of natural increase and net migration over projection period. DataSheet: summary of components of change for each scenario. Total, Male and Female data Raw data: 7 sheets of multipoles components of change output for GSE, LSE, EME, CME, STQ, NMI and NEM scenarios
Components – Regional – Final v1 – April 2010.xls	Header: Selection facility allowing choice of region. Graphical demographic profile including for each scenario – Population change, natural increase and net migration, and components of natural increase and net migration over projection period. Datasheet: summary of components of change for each scenario ChangeByRegion: Change in Births, Deaths, inter-Europe net and extra-Europe net migration by scenario Raw data: 7 sheets of multipoles components of change output for GSE, LSE, EME, CME, STQ, NMI and NEM scenarios

Notes: The database work books are in zip archives (.zip) containing the information in MS Excel 2003 (.xls) format: Components Final v1.zip.

Table 5-2: Scenario output files for populations by 5 year age groups

Workbook file	Contents
Change by 5 year age group *Age Profle – National - Final v1.xls*	Header: Selection facility allowing for choice of country Population: Tabulated data for each scenario. 5 year age groups all years 2005-2050 based on header selection PopPyramids: Tabular and graphical representation of male/female population counts and proportions for each scenario, 2005 base. Selection facility allowing comparison of 2005 with any projection year. PopChange: Total Population 2005 and 2050, increase/decrease between these periods, rank increase/decrease for each country, by scenario PopChange0-14: Total Population 2005 and 2050, increase/decrease between these periods, rank increase/decrease for each country, by scenario PopChange15-64: Total Population 2005 and 2050, increase/decrease between these periods, rank increase/decrease for each country, by scenario PopChange65+: Total Population 2005 and 2050, increase/decrease between these periods, rank increase/decrease for each country, by scenario PopChangeEUSummary: Summary of previous three sheets for Europe RankPopChange: Tabular summary of ranked total population change 2005-2050 Labour_force_dependency: Tabular and graphical summary of old age dependency ratio (ODR), economic old age dependency ratio (EODR), labour market dependency ratio (LMDR) and very old age dependency ratio (VODR) for each scenario, 2005-2050 RawData: 30 sheets of multipoles output
Age Profle – Regional - Final v1.xls	Header: Selection facility allowing for choice of region Population: Tabulated data for each scenario. 5 year age groups all years 2005-2050 based on header selection PopPyramids: Tabular and graphical representation of male/female population counts and proportions for each scenario, 2005 base. Selection facility allowing comparison of 2005 with any projection year. PopChange: Total Population 2005 and 2050, increase/decrease between these periods, rank increase/decrease for each country, by scenario PopChange0-14: Total Population 2005 and 2050, increase/decrease between these periods, rank increase/decrease for each region, by scenario PopChange15-64: Total Population 2005 and 2050, increase/decrease between these periods, rank increase/decrease for each region, by scenario PopChange65+: Total Population 2005 and 2050, increase/decrease between these periods, rank increase/decrease for each region, by scenario RankPopChange: Tabular summary of ranked total population change 2005-2050 Labour_force_dependency: Tabular and graphical summary of old age dependency ratio (ODR), economic old age dependency ratio (EODR), labour market dependency ratio (LMDR) and very old age dependency ratio (VODR) for each scenario, 2005-2050 RawData: 30 sheets of multipoles output

Notes: The database work books are in zip archives (.zip) containing the information in MS Excel 2003 (.xls) format: Age Profile – Files – Finalv1.zip.

6. WHAT THE RESULTS SAY ABOUT ALTERNATIVE FUTURES FOR COHESION AND COMPETITIVENESS

This report has presented a large amount of evidence about the demographic future of Europe, its countries and its regions. In this final section we offer some thoughts about the implications of our projections for two policy concerns of European regional development policy: cohesion and competitiveness.

By *cohesion* we understand two related ideas. The first is that levels of living and welfare should be fairly distributed across groups in the population defined by their spatial location. The second is that cohesion is achieved in societies when all groups differing in terms of national origin or ethnic identity have equal chances to succeed. Now demographic attributes do not speak directly to these issues but they do have implications for them.

The first observation is that Europe is still incredibly divided in its demographic regimes and potentials by an invisible "iron curtain". Time and time again the distinctiveness of regions in the central and eastern countries which were part of the Soviet empire was apparent. These regions face population decline and far more ageing than those in western, northern and southern Europe. Our successful policy scenarios seemed to contribute a little to narrowing the gaps but not much. There are some reasons for optimism. The experience of southern European states in the EU has been of some convergence, though the current recession may set that back. The investment by the German state in its eastern Länder has meant their demographic position is less extreme than that of countries such as Romania and Bulgaria. So the European Union has to address the issue of how much it is prepared to invest in its new members and how fast, in the face of a decade of reduced fiscal means.

Another observation can be made about this issue. The regional maps themselves may be deceptive if we ignore the size of the populations who live in those regions. In 2050 a poor declining region may face a difficult future of shrinking markets and high dependency ratios. However, compared with the 2005 situation fewer people are living there. They have shifted both through internal, inter-country and differential extra-Europe migration to wealthier regions. The family living in a depressed and redundant coalfield region may have moved to a metropolis offering better opportunities at least for their offspring, who may in turn have migrated to a more dynamic city to a long and successful career. None of these dynamics will be apparent on the static or dynamic maps.

Cohesion will also be an issue for the demographically favoured regions. Their future population growth and slower ageing will be a function of immigration from other regions, countries and continents. The integration of these newcomers into the fabric of society through programmes of language and skills training will be vital.

What do our results say about competitiveness? Those countries, types and regions which are growing could be viewed as favoured (expanding markets, increasing labour supply), while those countries, types and regions which are declining could be viewed as disadvantaged. There are counter-arguments put forward by the Greens that downsizing will reduce pressure on resources and the environment. However, regions with declining populations are not attractive to economic enterprises that create jobs though they may attract retired migrants. The countries, regions, region types which will be most competitive will be those with the largest concentration of their populations in the working ages. The countries, regions, region types which will be least competitive will be those with the smallest concentration of their populations in the working ages.

The most important message to policy makers and politicians is about population ageing. They have been told by demographers about the future challenges. Our policy scenarios show that population ageing in Europe could be greater than hitherto appreciated. Policies that shift pension/social security ages rapidly upwards are needed; policies which make easy to work beyond age 65 are needed; policies which remove the privileges of insiders with good pensions taken at early ages paid for by the rest of society are no longer viable. David Willets, the UK Member of Parliament, has argued convincingly that social policy has been dominated over the past decades by the interests of the baby boomers (Willetts, 2010). They are now beginning to retire and demand their social transfers and protections which are unsustainable. However, these remarks stray somewhat from the demographic analysis we have focussed on.

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APPENDIX

Scenario profile **: Austria**

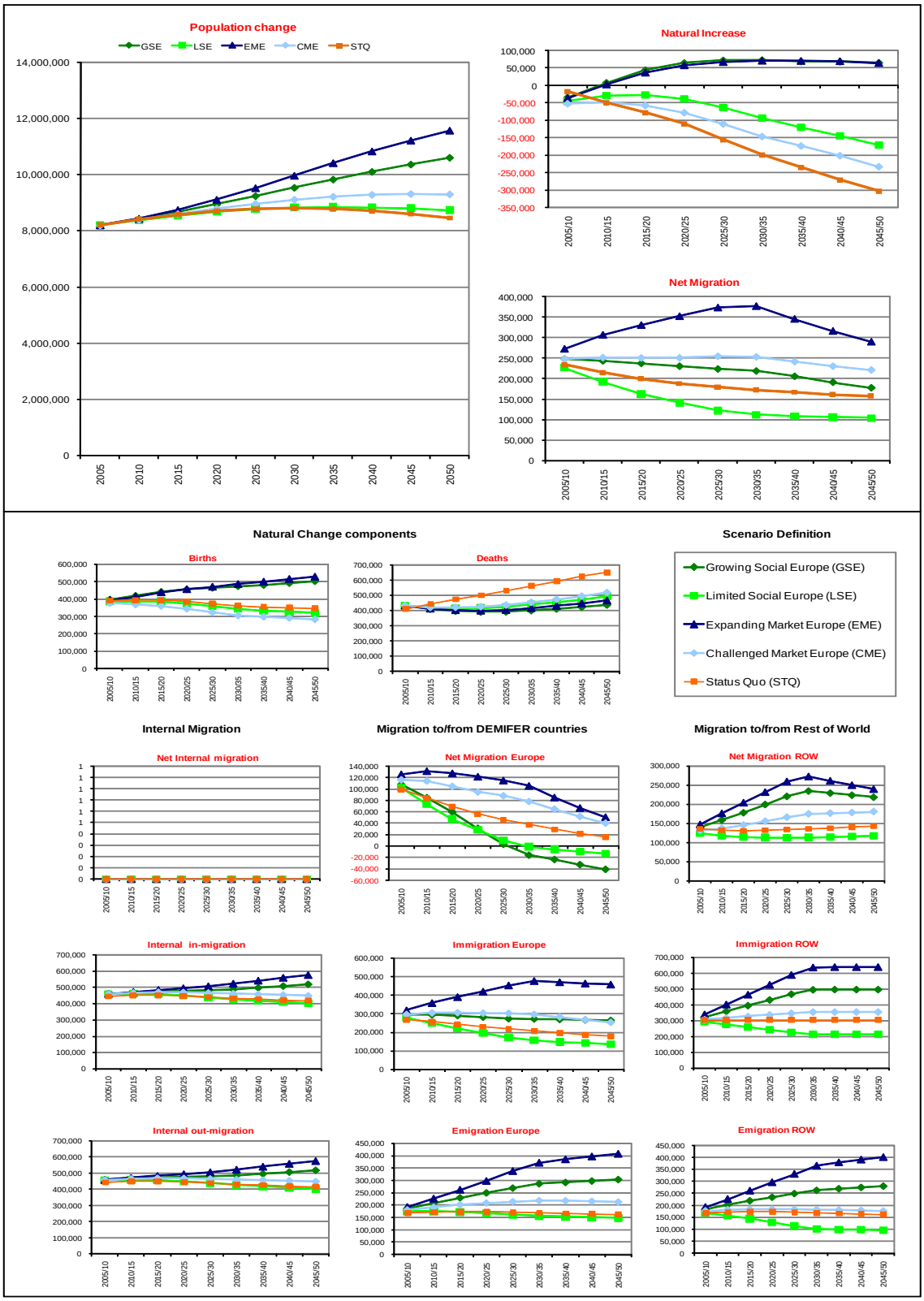

Figure A.1: Scenario profile for population stocks and components of change, 2005-50: Austria

Scenario profile **:** **Belgium**

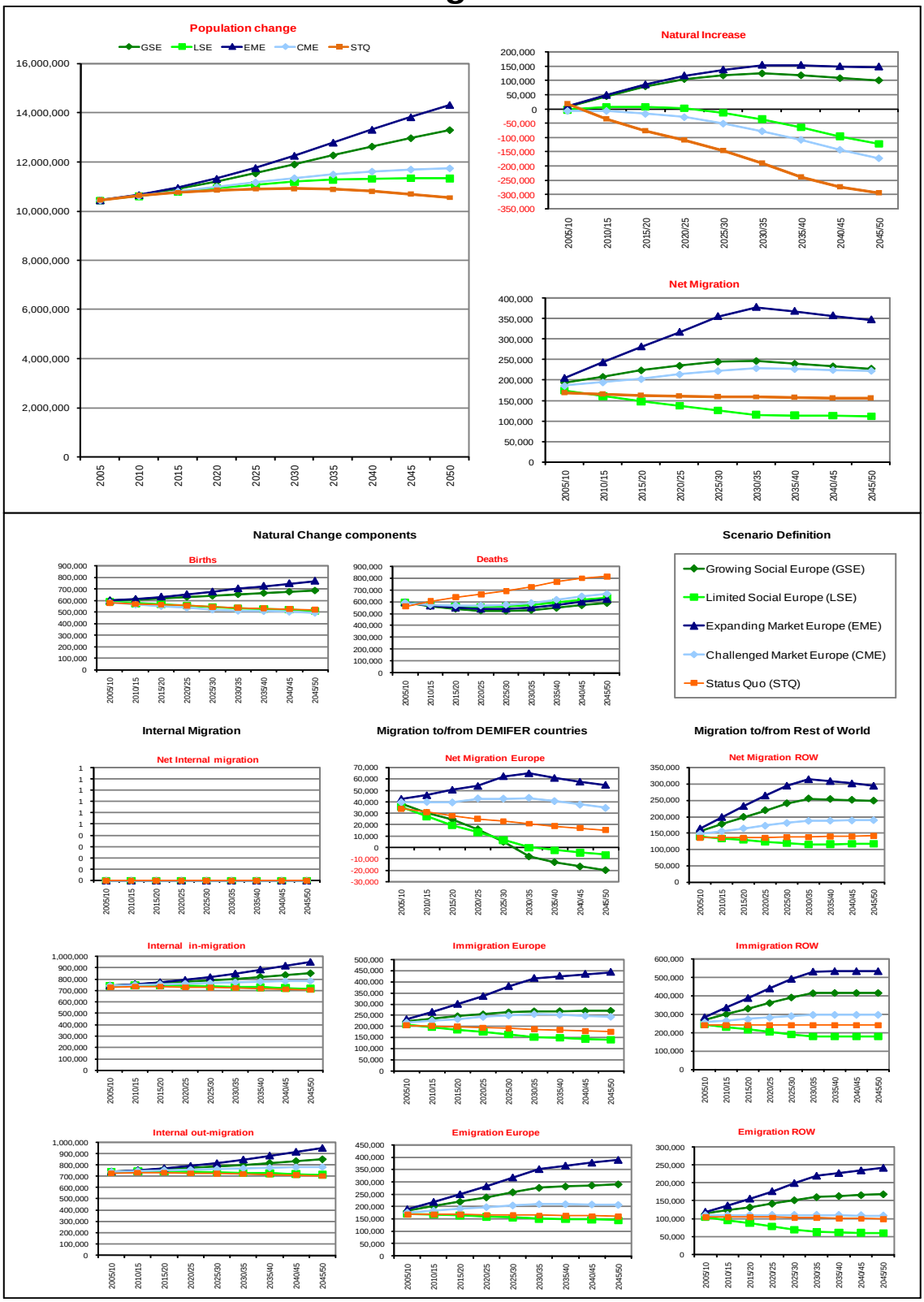

Figure A.2: Scenario profile for population stocks and components of change, 2005-50: Belgium

Scenario profile **:** **Bulgaria**

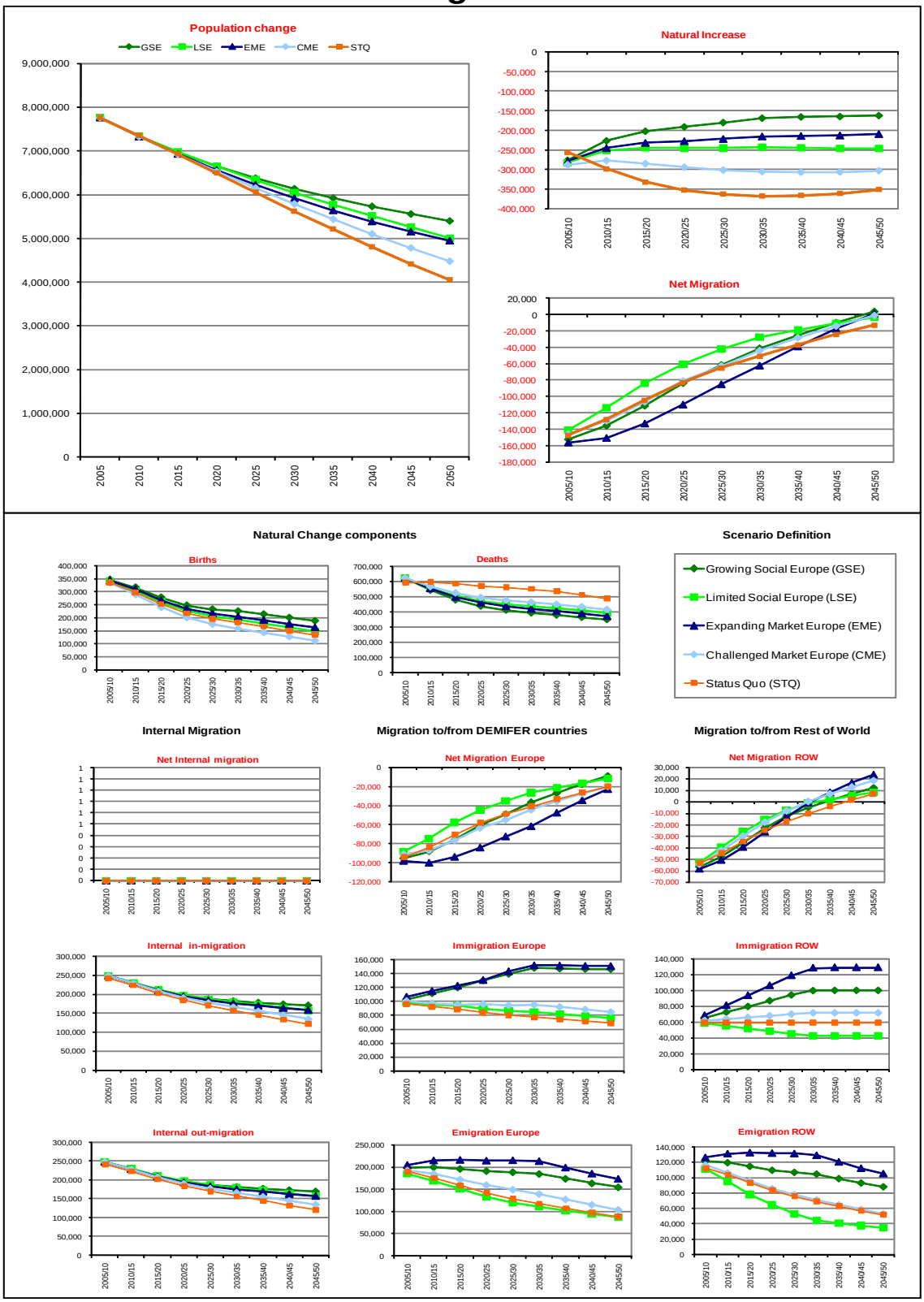

Figure A.3: Scenario profile for population stocks and components of change, 2005-50: Bulgaria

Scenario profile **:** **Cyprus**

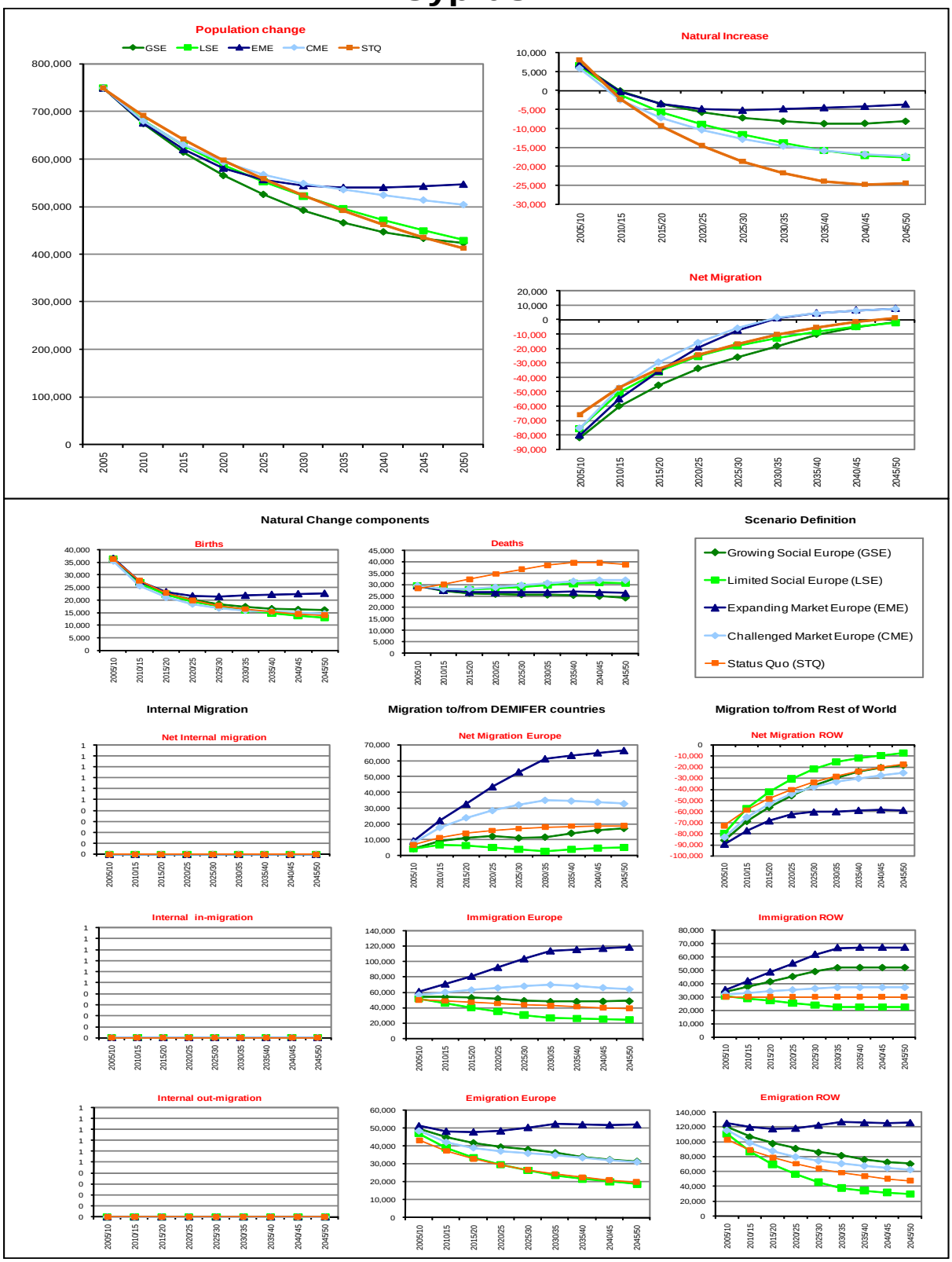

Figure A.4: Scenario profile for population stocks and components of change, 2005-50: Cyprus

Scenario profile **:** **Czech Republic**

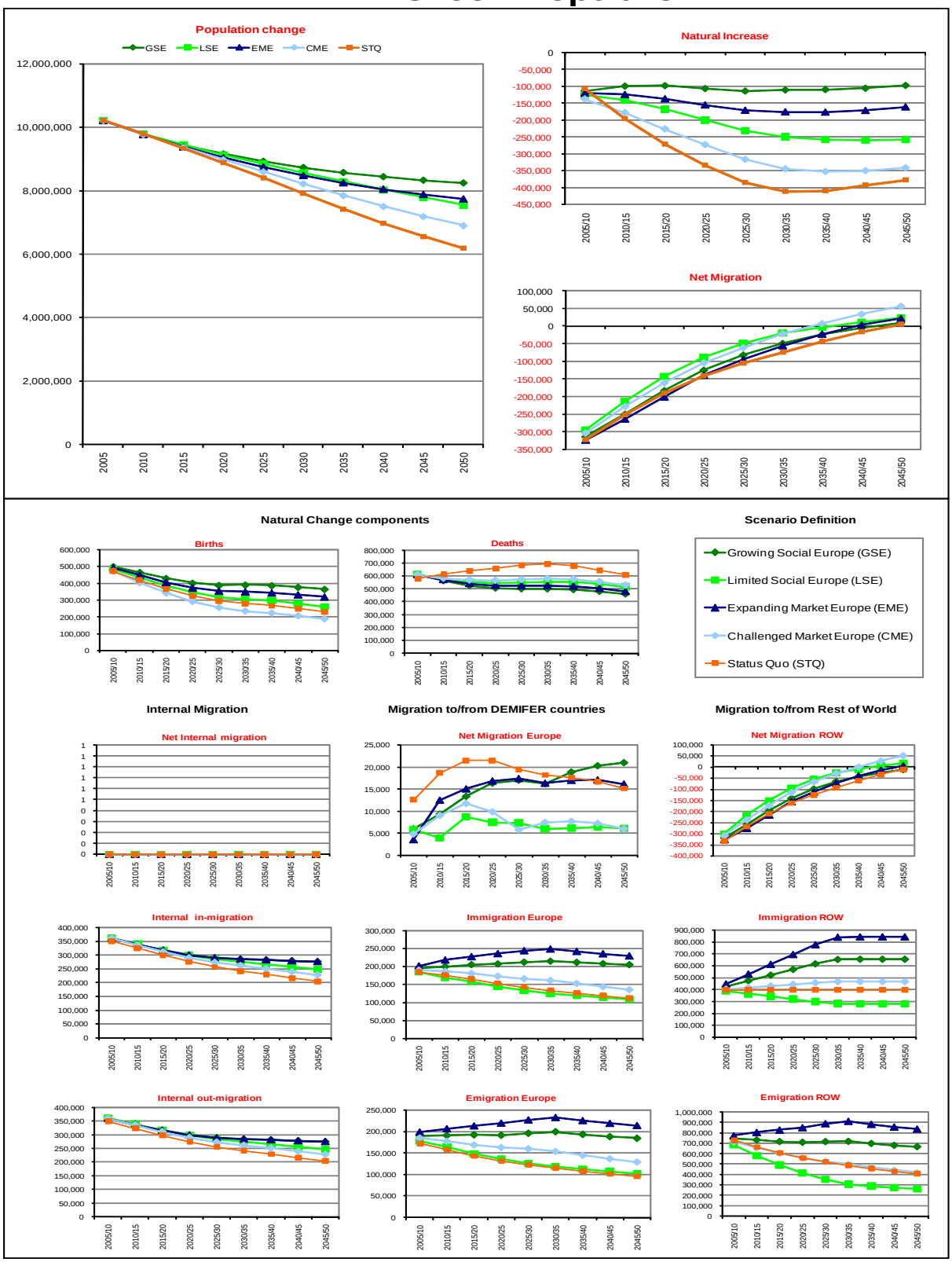

Figure A.5: Scenario profile for population stocks and components of change, 2005-50: Czech Republic

Scenario profile **:** **Denmark**

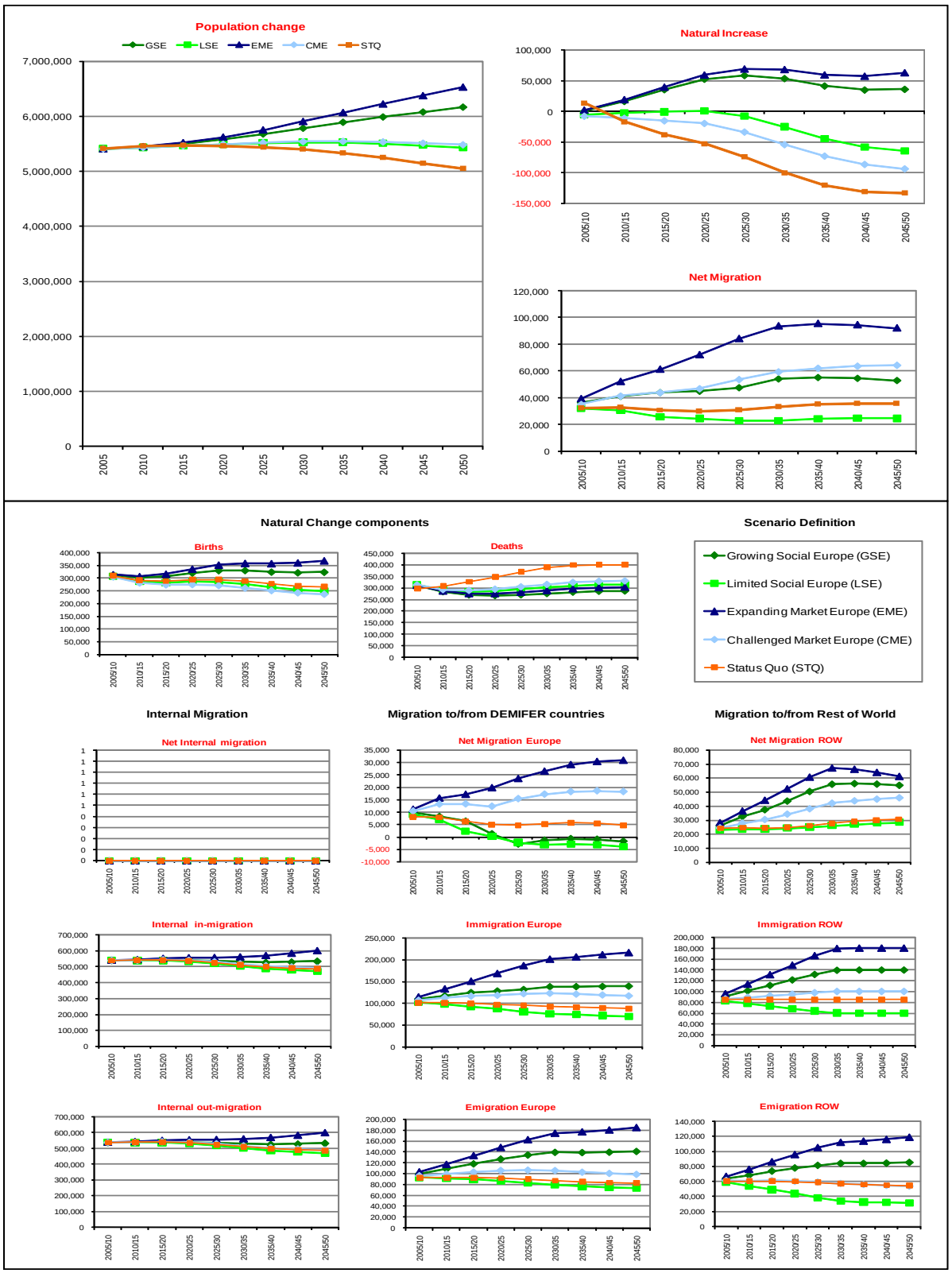

Figure A.6: Scenario profile for population stocks and components of change, 2005-50: Denmark

Scenario profile **:** **Estonia**

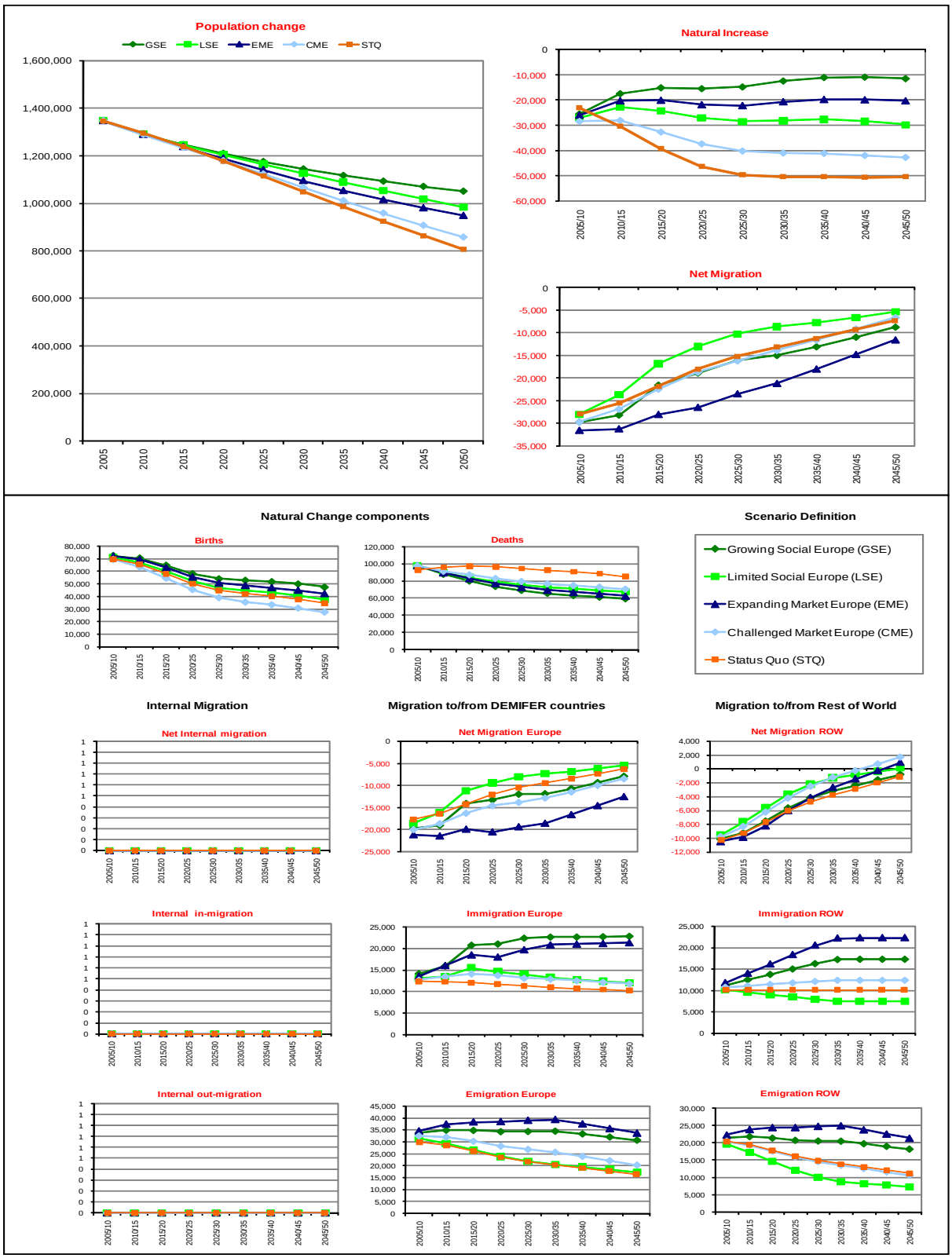

Figure A.7: Scenario profile for population stocks and components of change, 2005-50: Estonia

Scenario profile **:** **Finland**

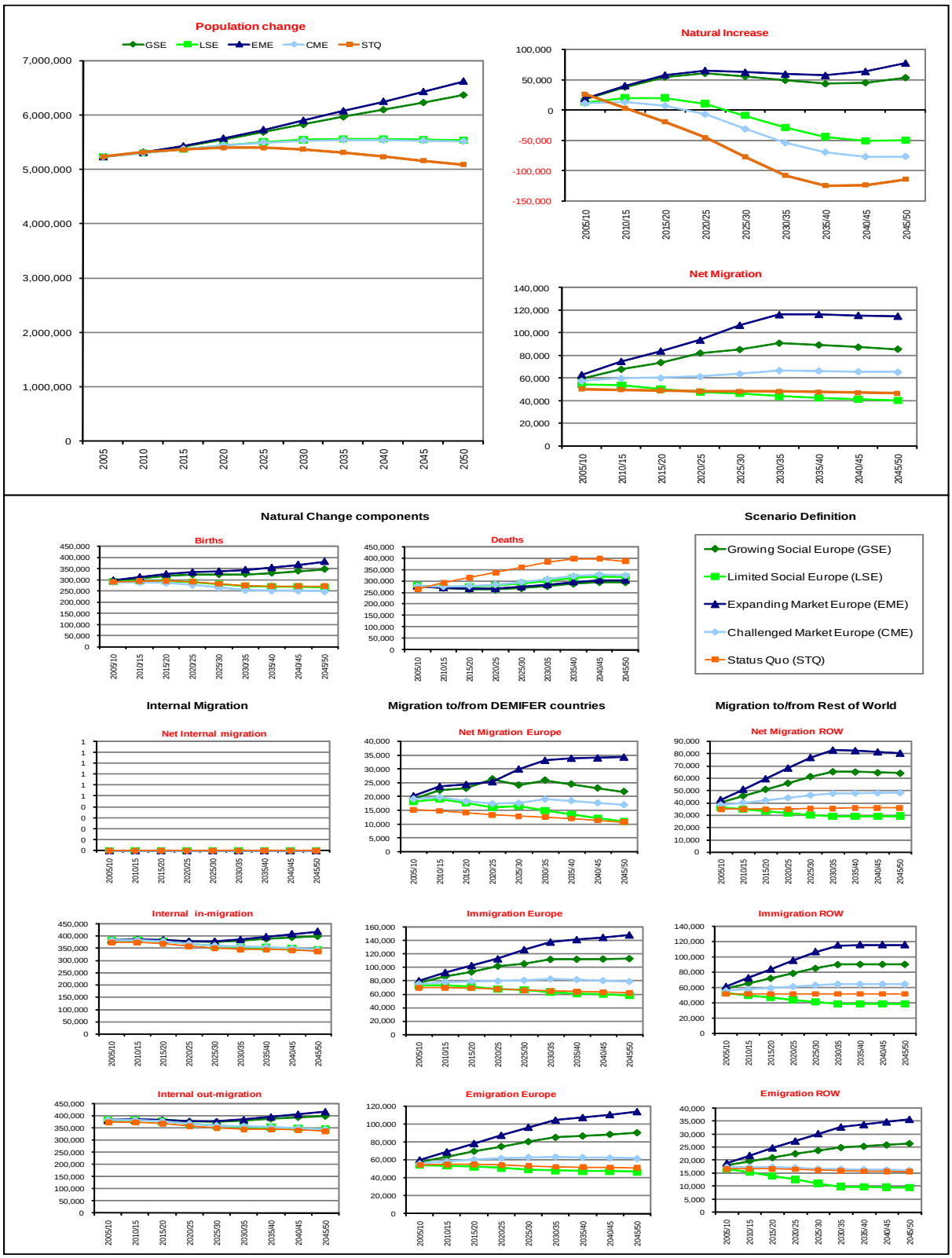

Figure A.8: Scenario profile for population stocks and components of change, 2005-50: Finland

Scenario profile **:** **France**

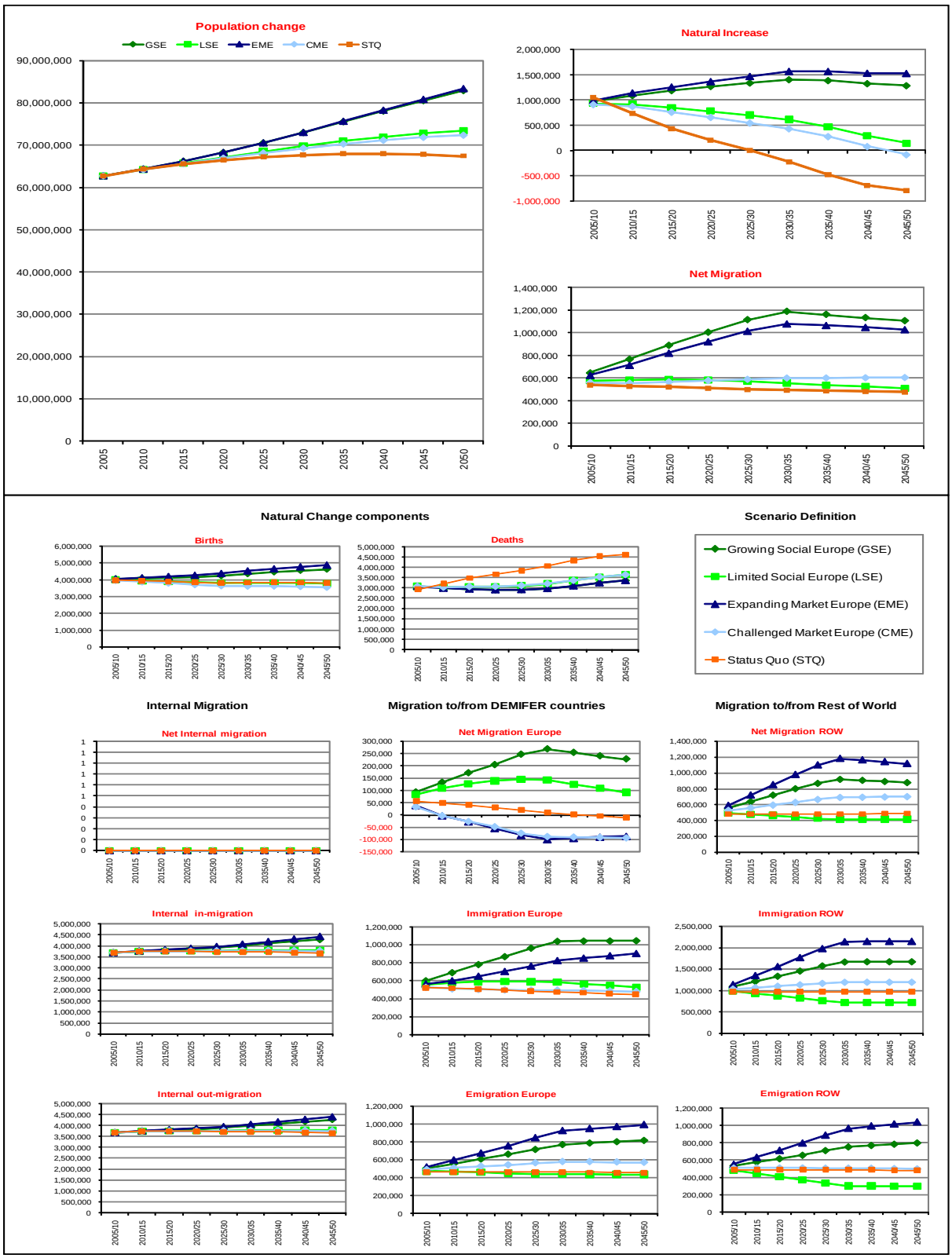

Figure A.9: Scenario profile for population stocks and components of change, 2005-50: France

Scenario profile **:** **Germany**

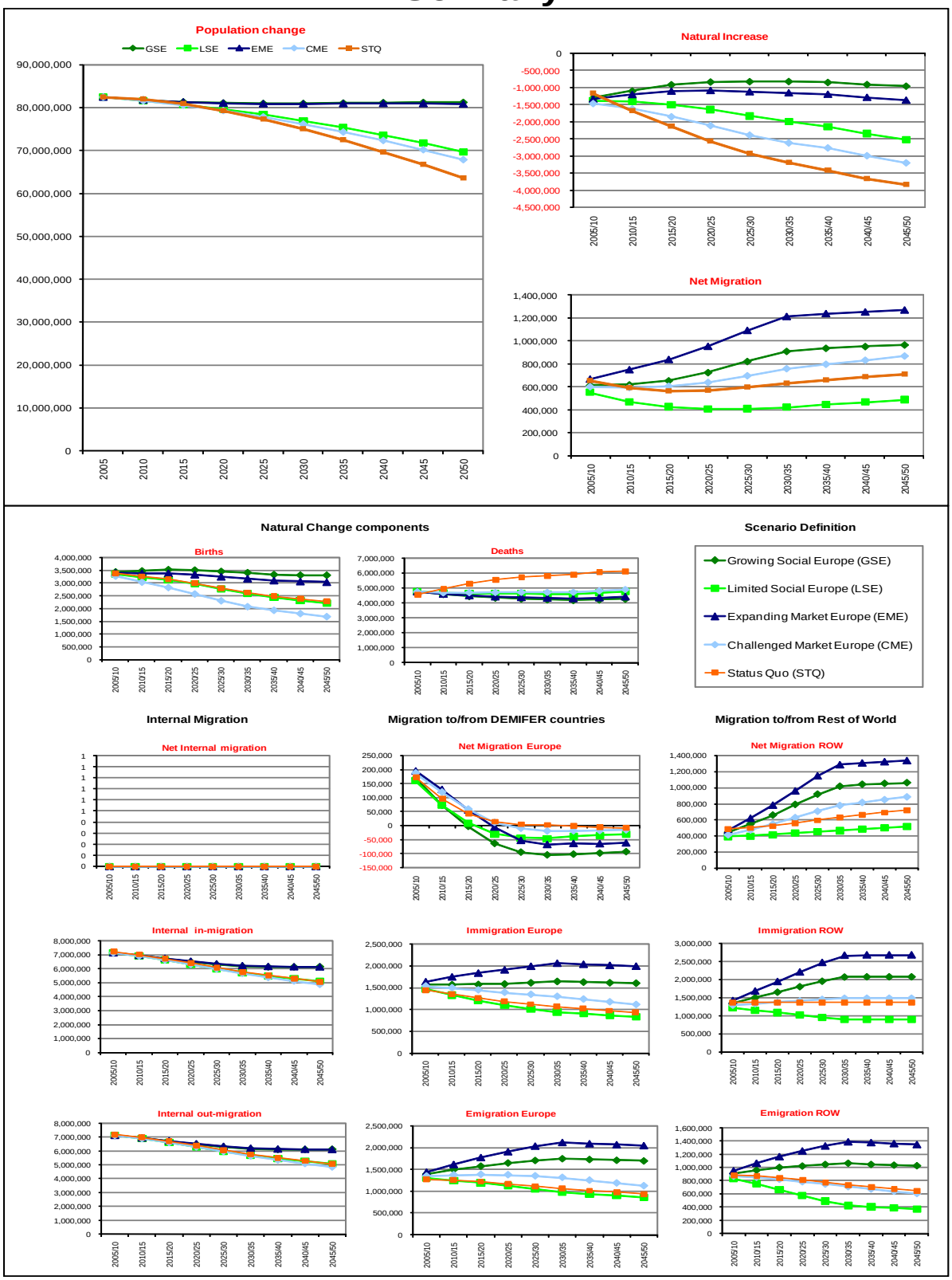

Figure A.10: Scenario profile for population stocks and components of change, 2005-50: Germany

Scenario profile **:** **Greece**

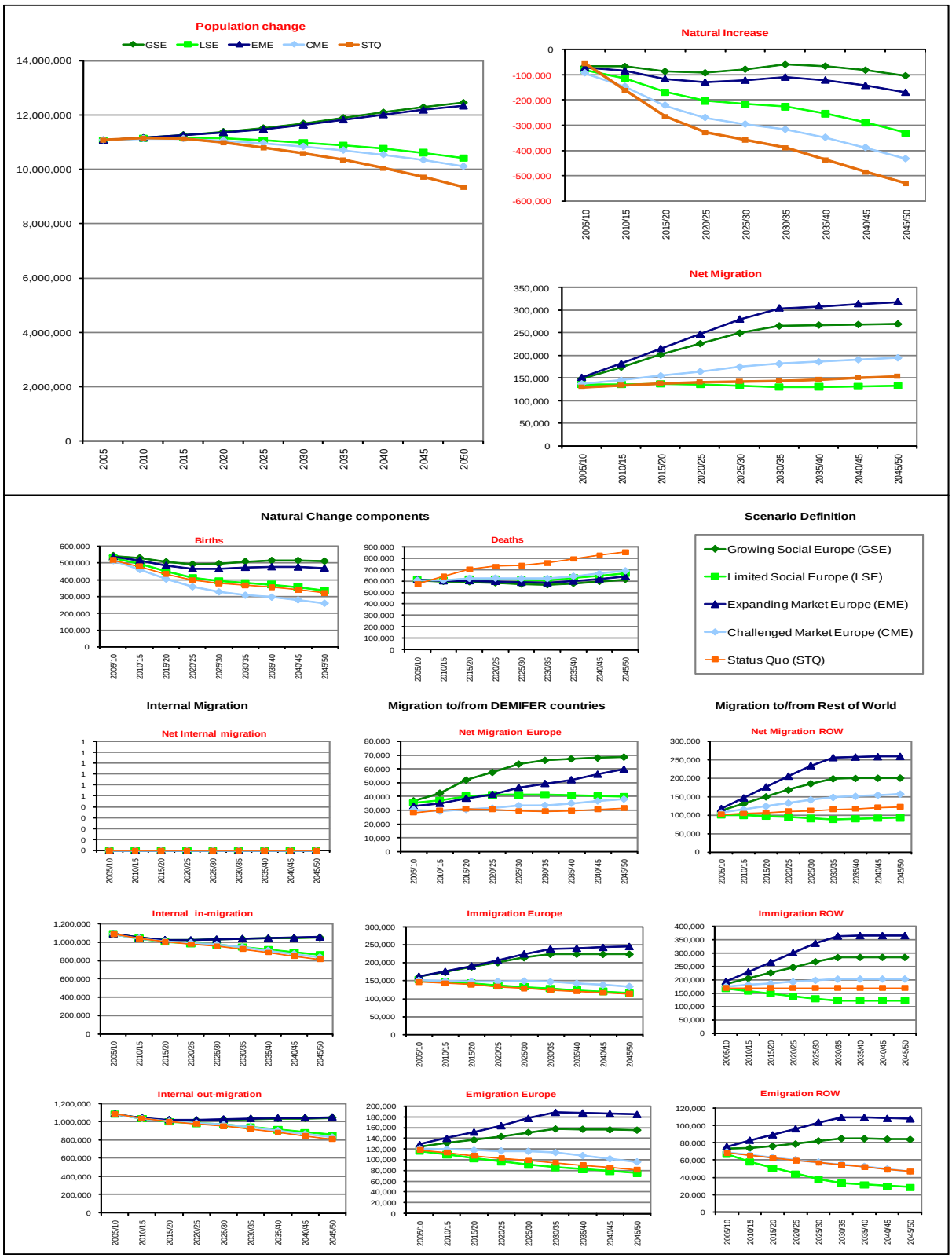

Figure A.11: Scenario profile for population stocks and components of change, 2005-50: Greece

Scenario profile **:** **Hungary**

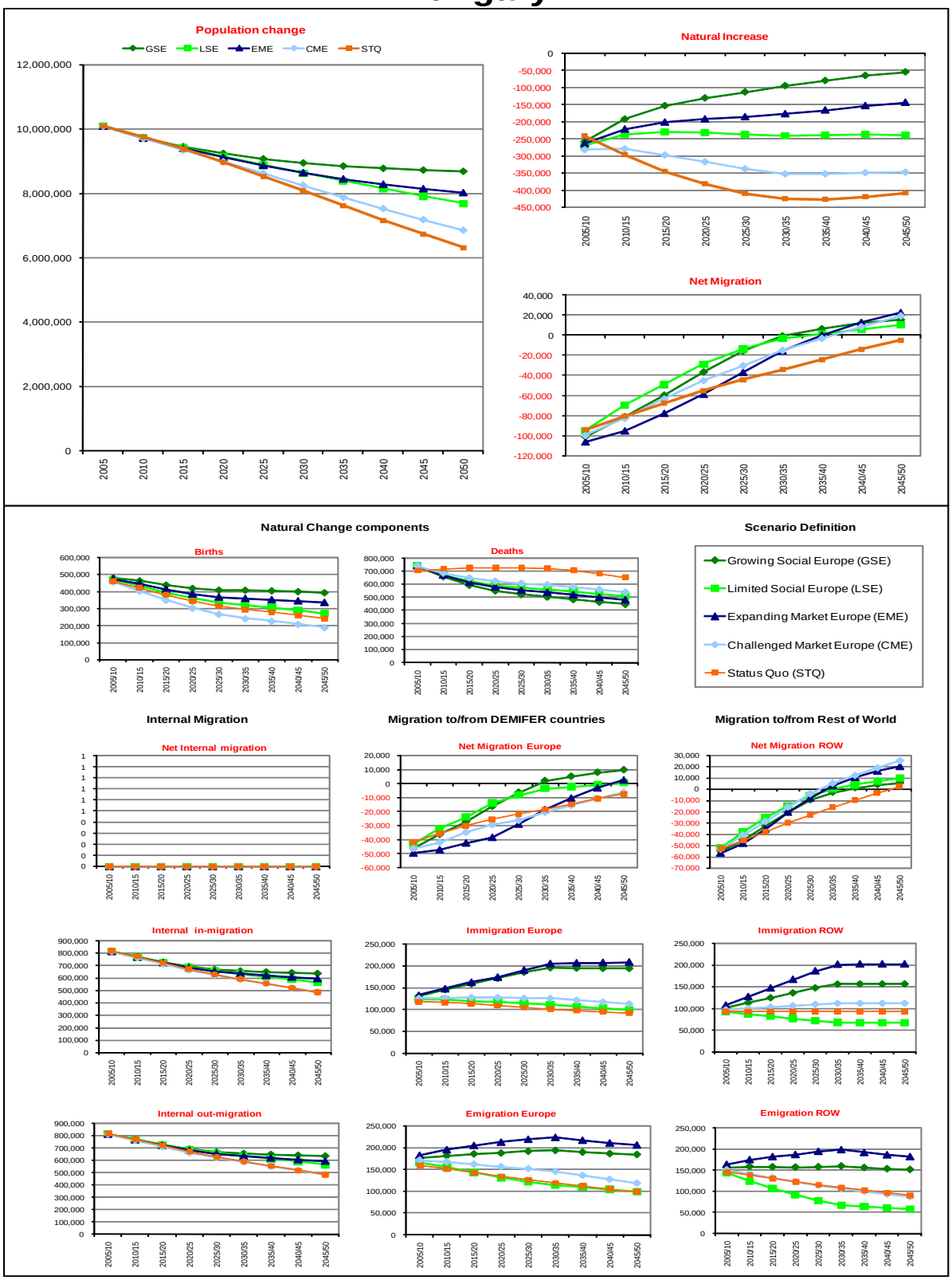

Figure A.12: Scenario profile for population stocks and components of change, 2005-50: Hungary

Scenario profile **:** **Iceland**

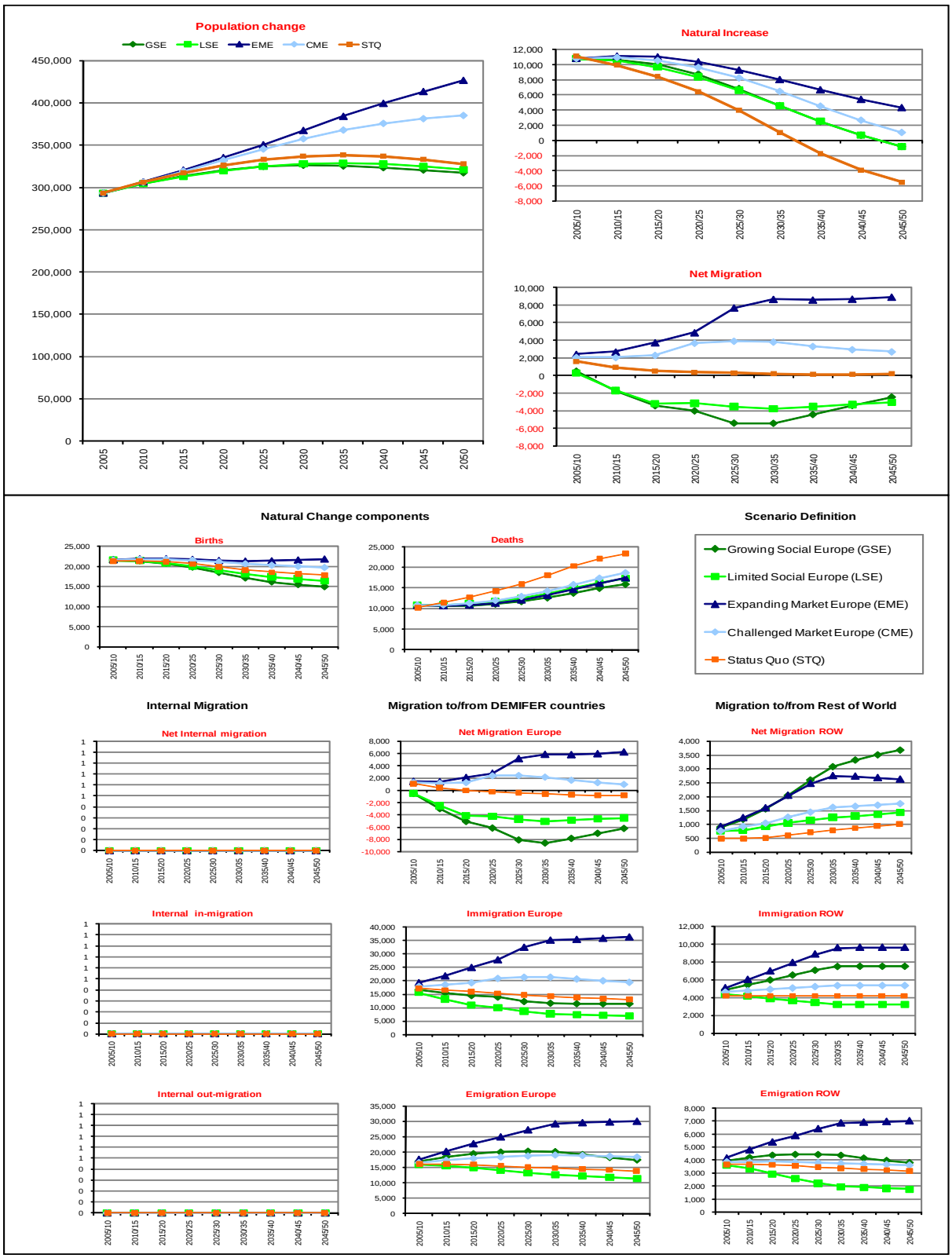

Figure A.13: Scenario profile for population stocks and components of change, 2005-50: Iceland

Scenario profile **:** **Ireland**

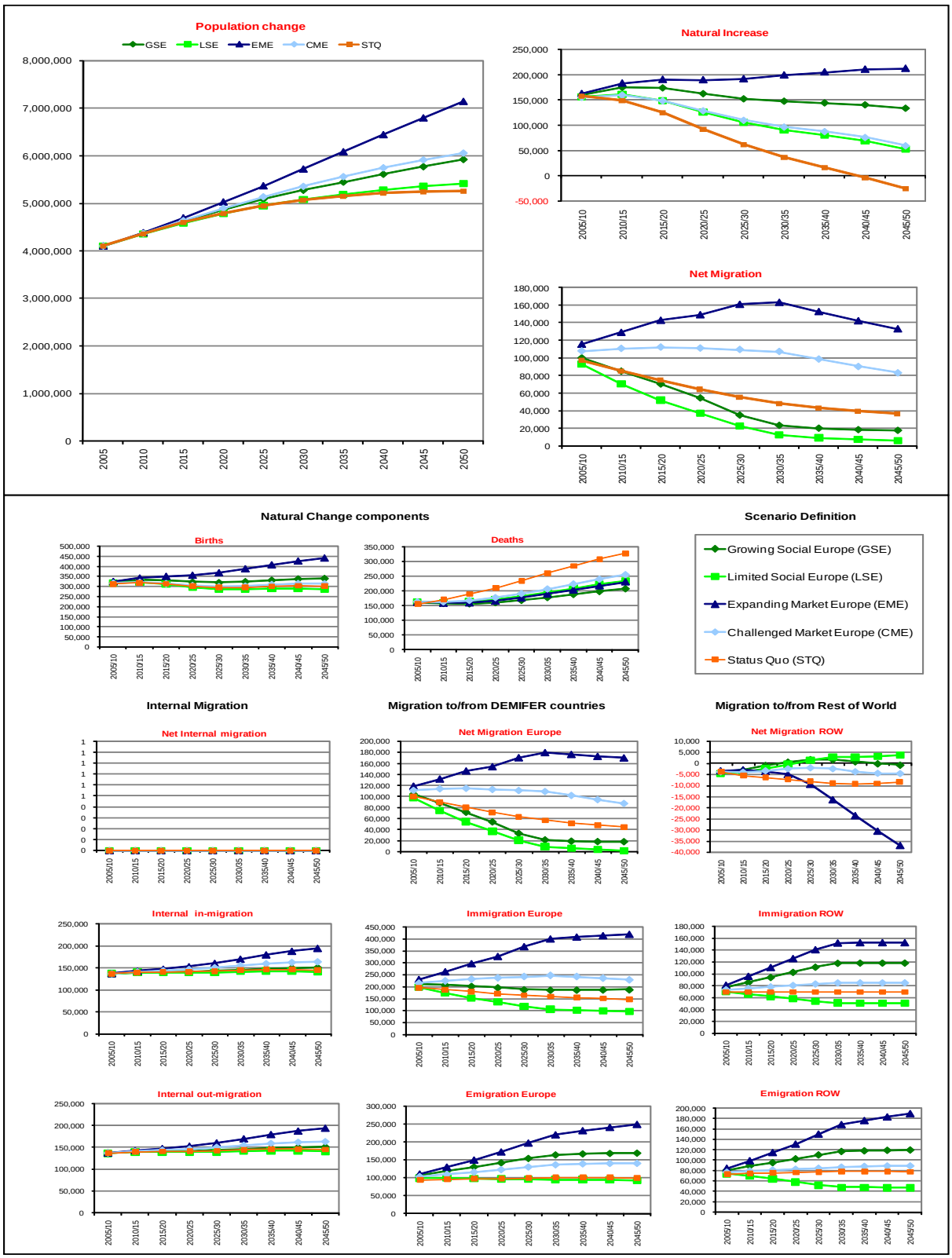

Figure A.14: Scenario profile for population stocks and components of change, 2005-50: Ireland

Scenario profile **:** **Italy**

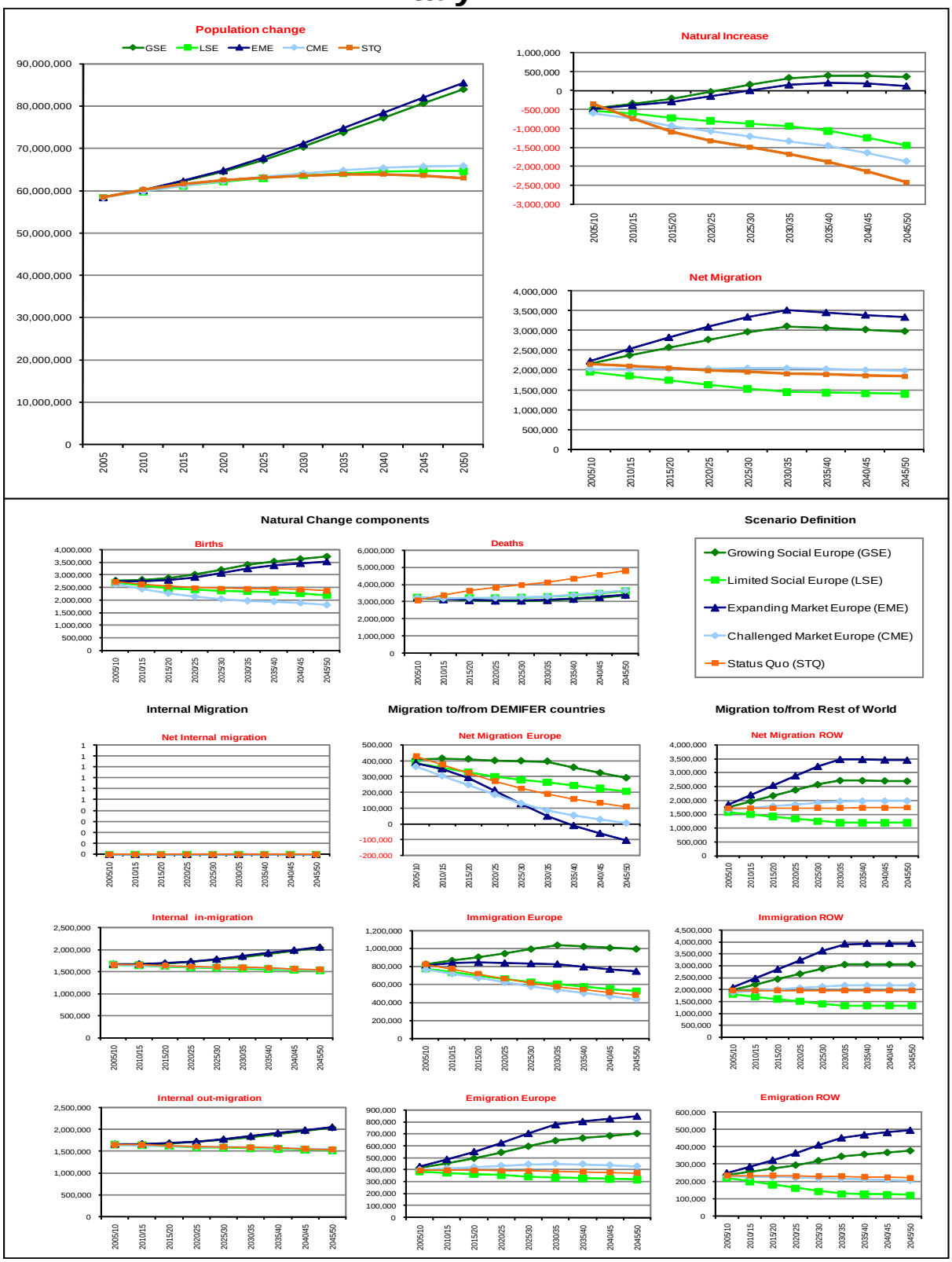

Figure A.15: Scenario profile for population stocks and components of change, 2005-50: Italy

Scenario profile **:** **Latvia**

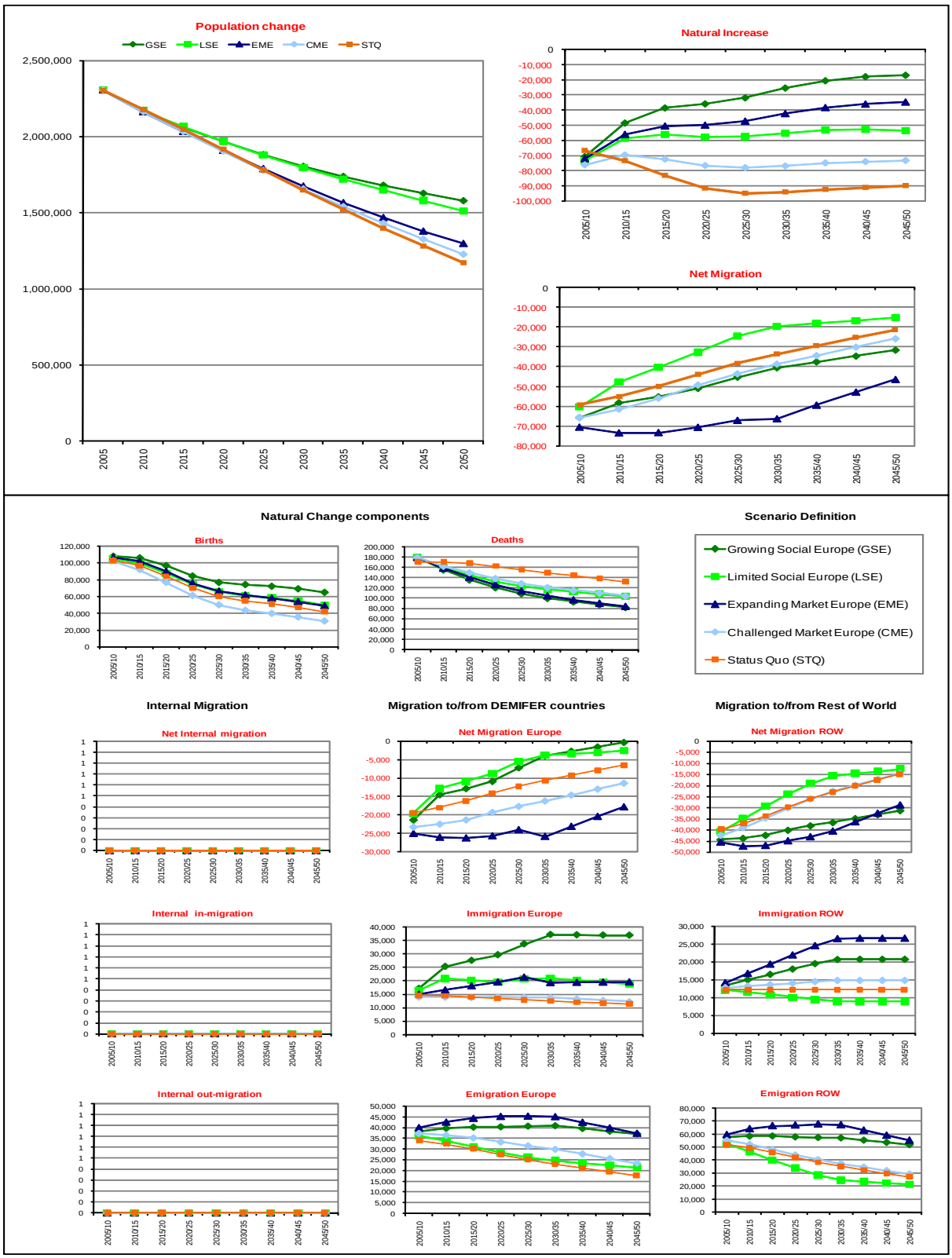

Figure A.16: Scenario profile for population stocks and components of change, 2005-50: Latvia

Scenario profile **:** **Liechtenstein**

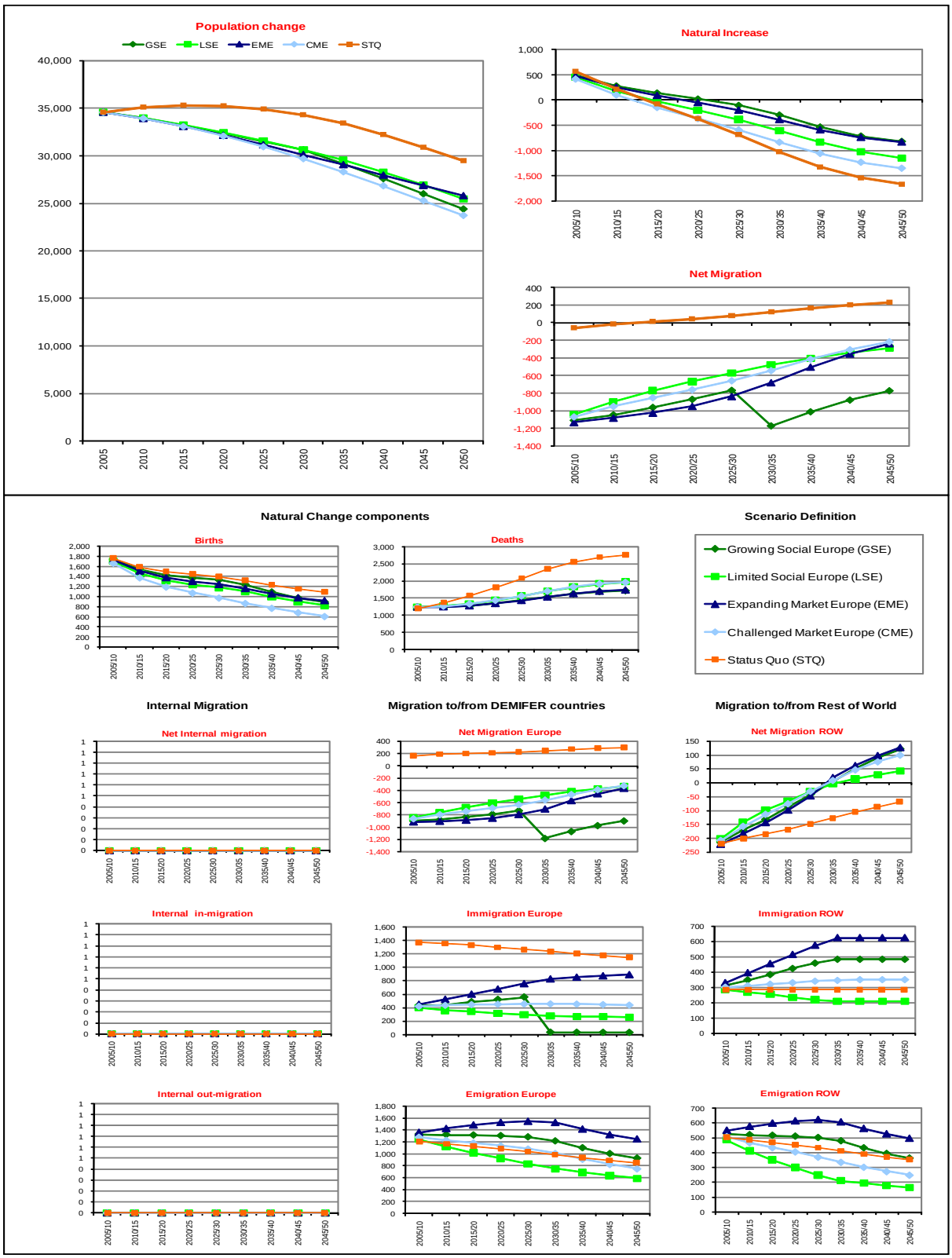

Figure A.17: Scenario profile for population stocks and components of change, 2005-50: Liechtenstein

Scenario profile **:** **Lithuania**

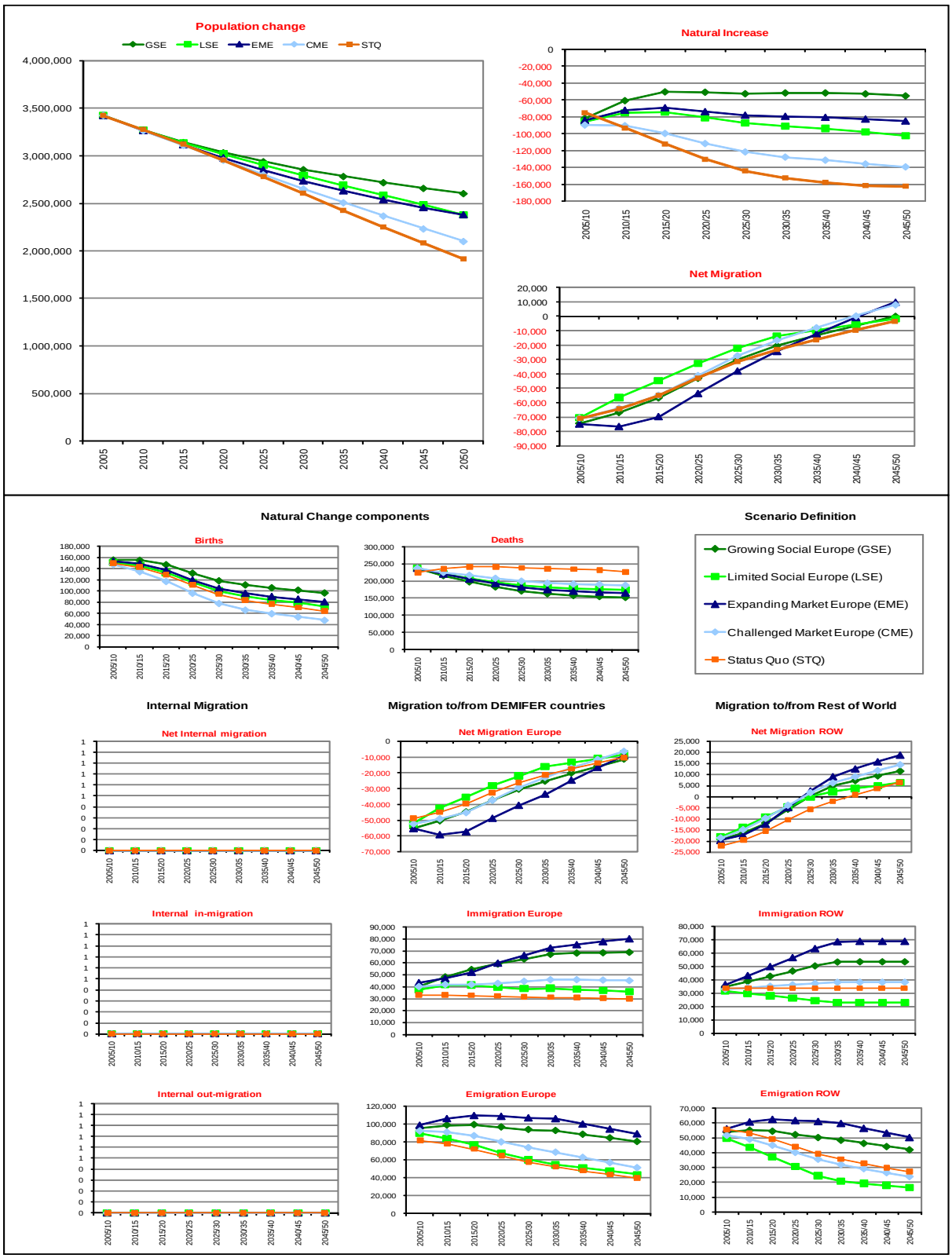

Figure A.18: Scenario profile for population stocks and components of change, 2005-50: Lithuania

Scenario profile **:** **Luxembourg**

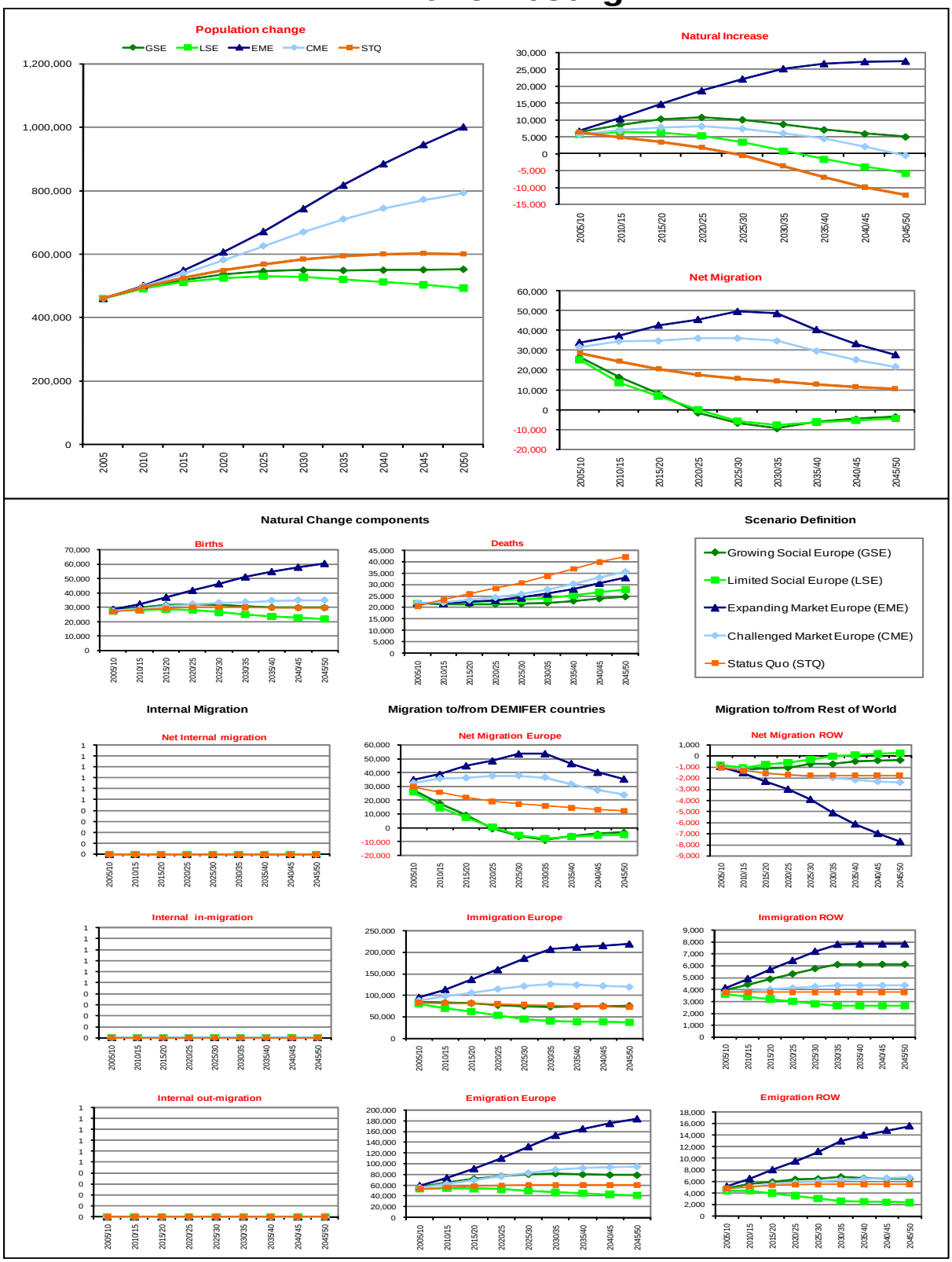

Figure A.19: Scenario profile for population stocks and components of change, 2005-50: Luxembourg

Scenario profile **:** **Malta**

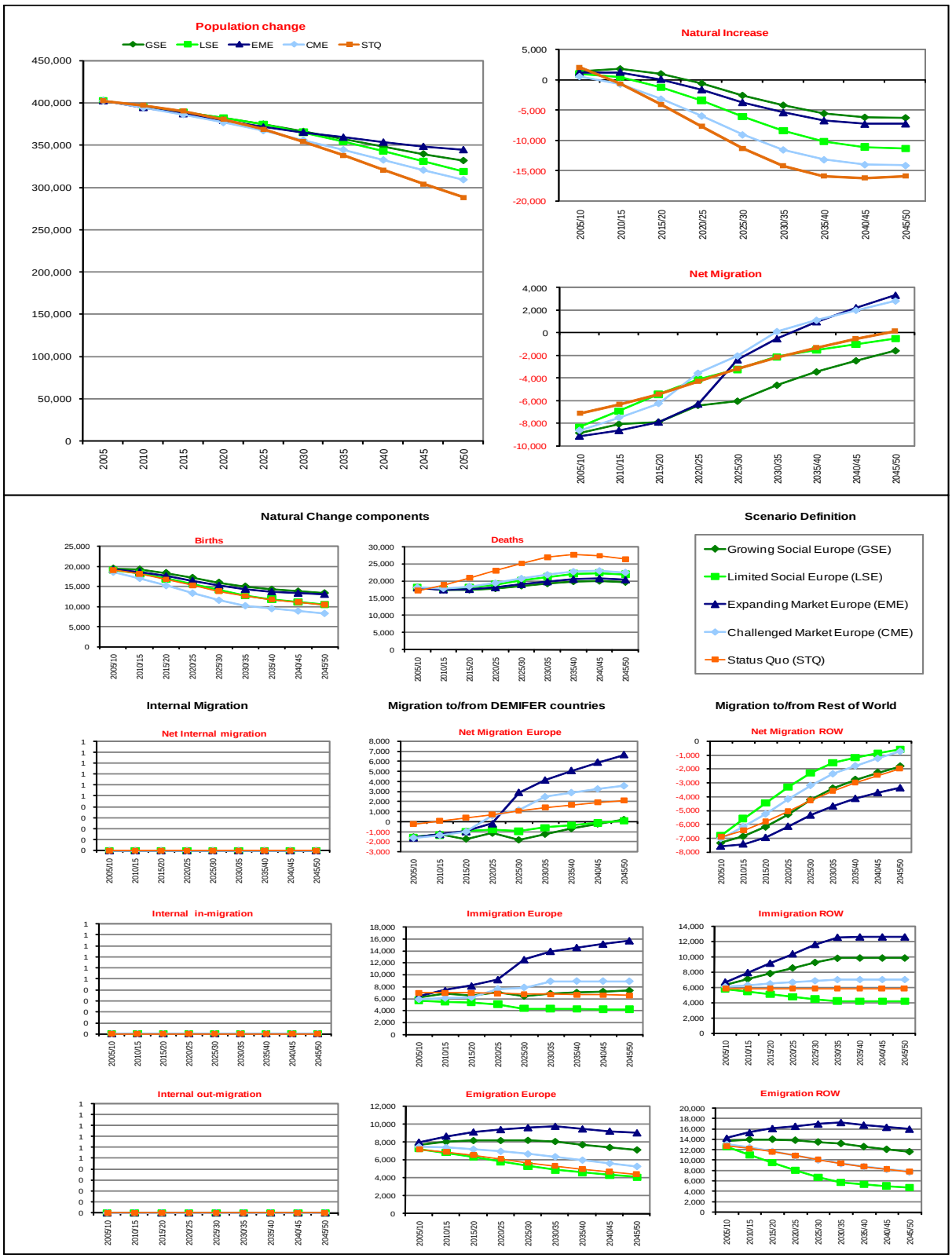

Figure A.20: Scenario profile for population stocks and components of change, 2005-50: Malta

Scenario profile **:** **Netherlands**

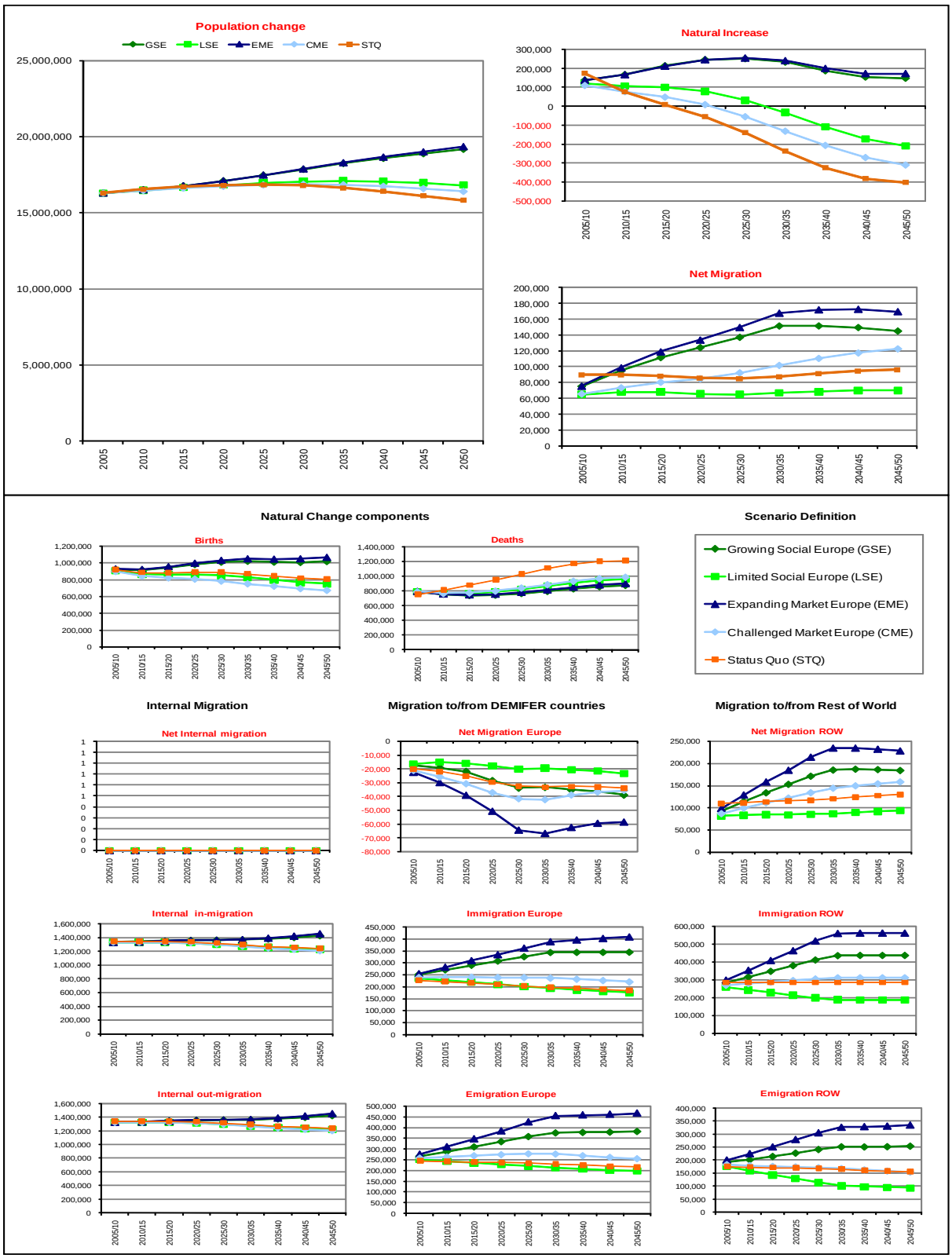

Figure A.21: Scenario profile for population stocks and components of change, 2005-50: Netherlands

Scenario profile **:** **Norway**

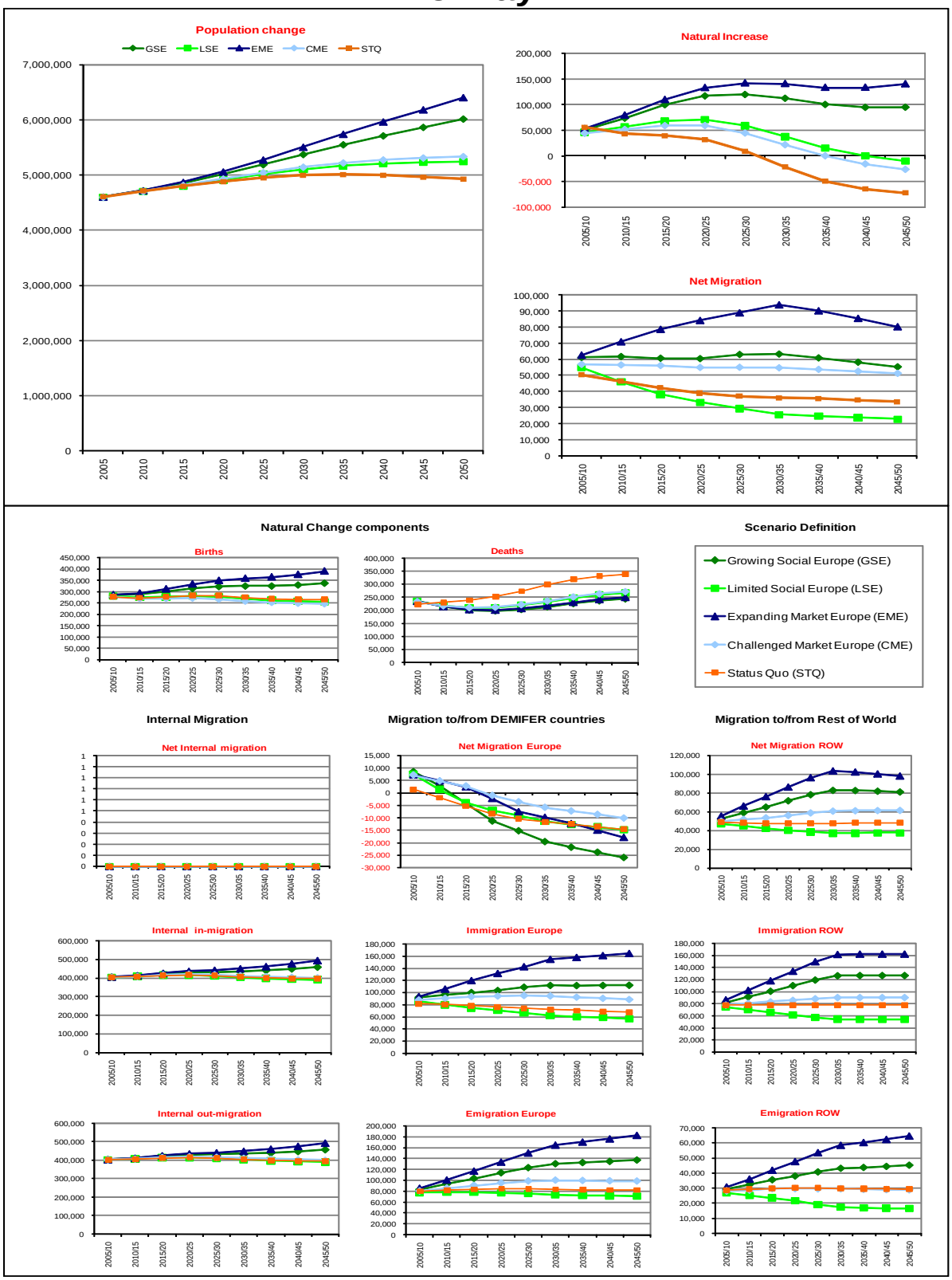

Figure A.22: Scenario profile for population stocks and components of change, 2005-50: Norway

Scenario profile **:** **Poland**

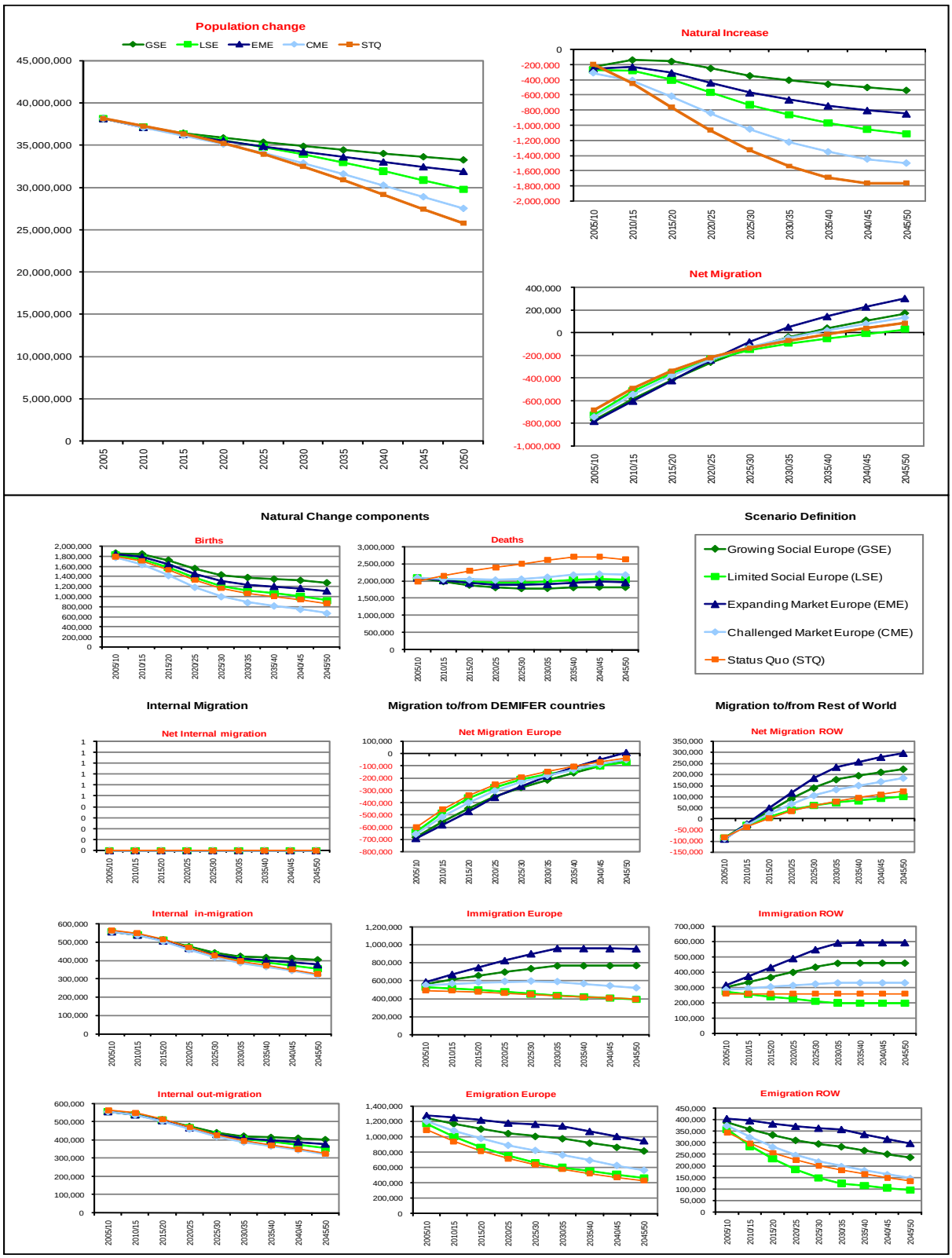

Figure A.23: Scenario profile for population stocks and components of change, 2005-50: Poland

Scenario profile **:** **Portugal**

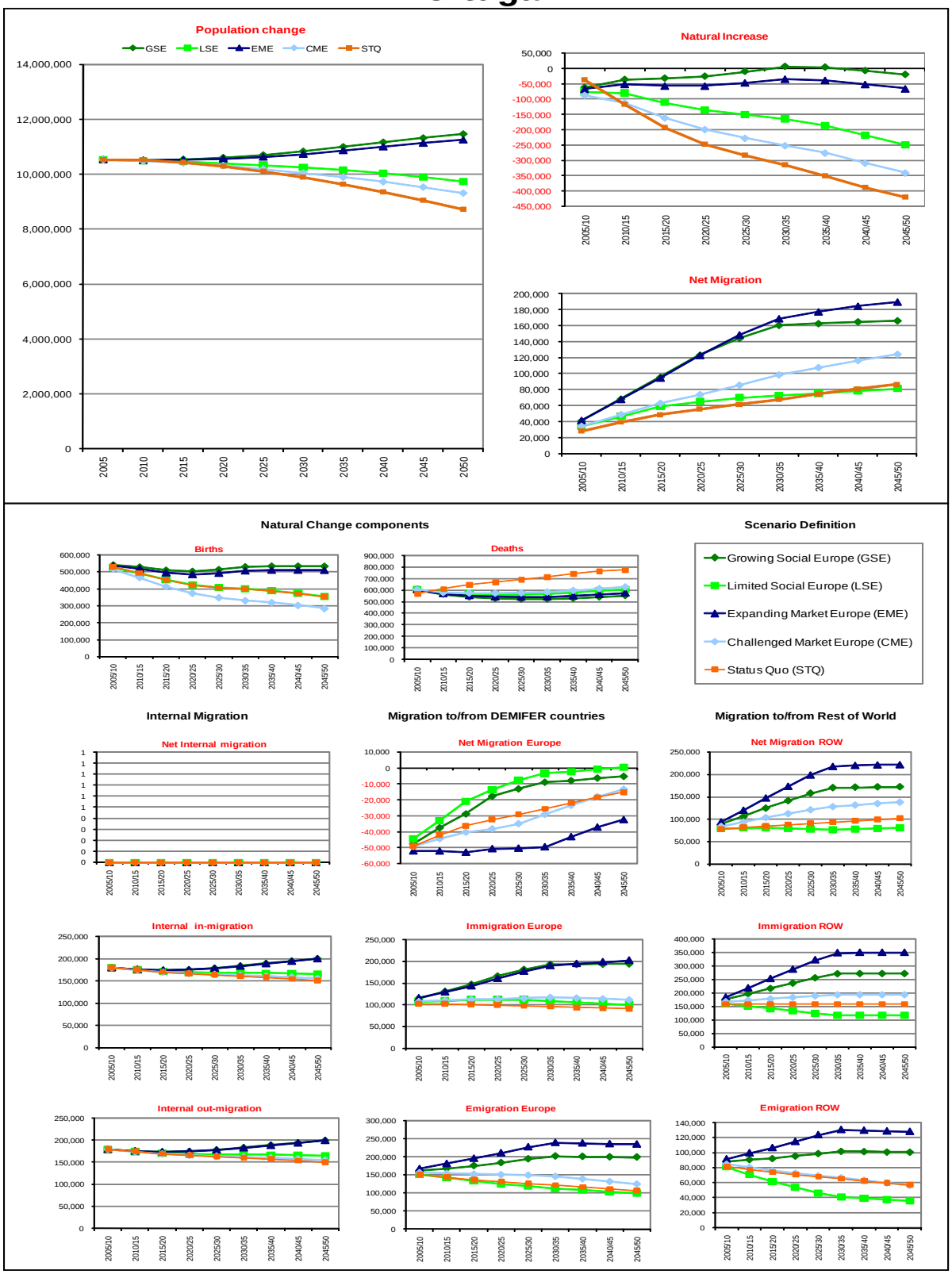

Figure A.24: Scenario profile for population stocks and components of change, 2005-50: Portugal

Scenario profile **:** **Slovakia**

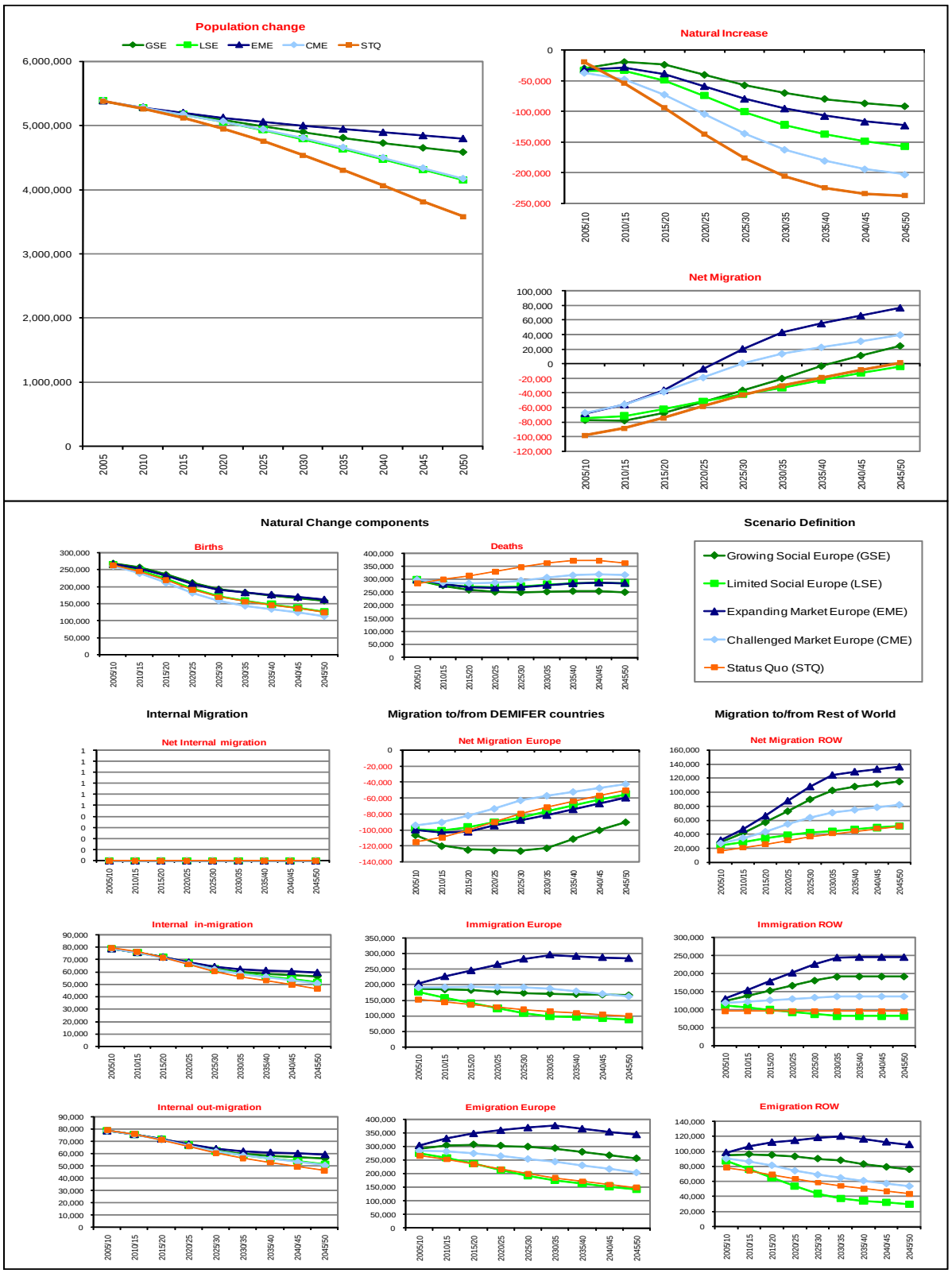

Figure A.25: Scenario profile for population stocks and components of change, 2005-50: Slovakia

Scenario profile **:** **Slovenia**

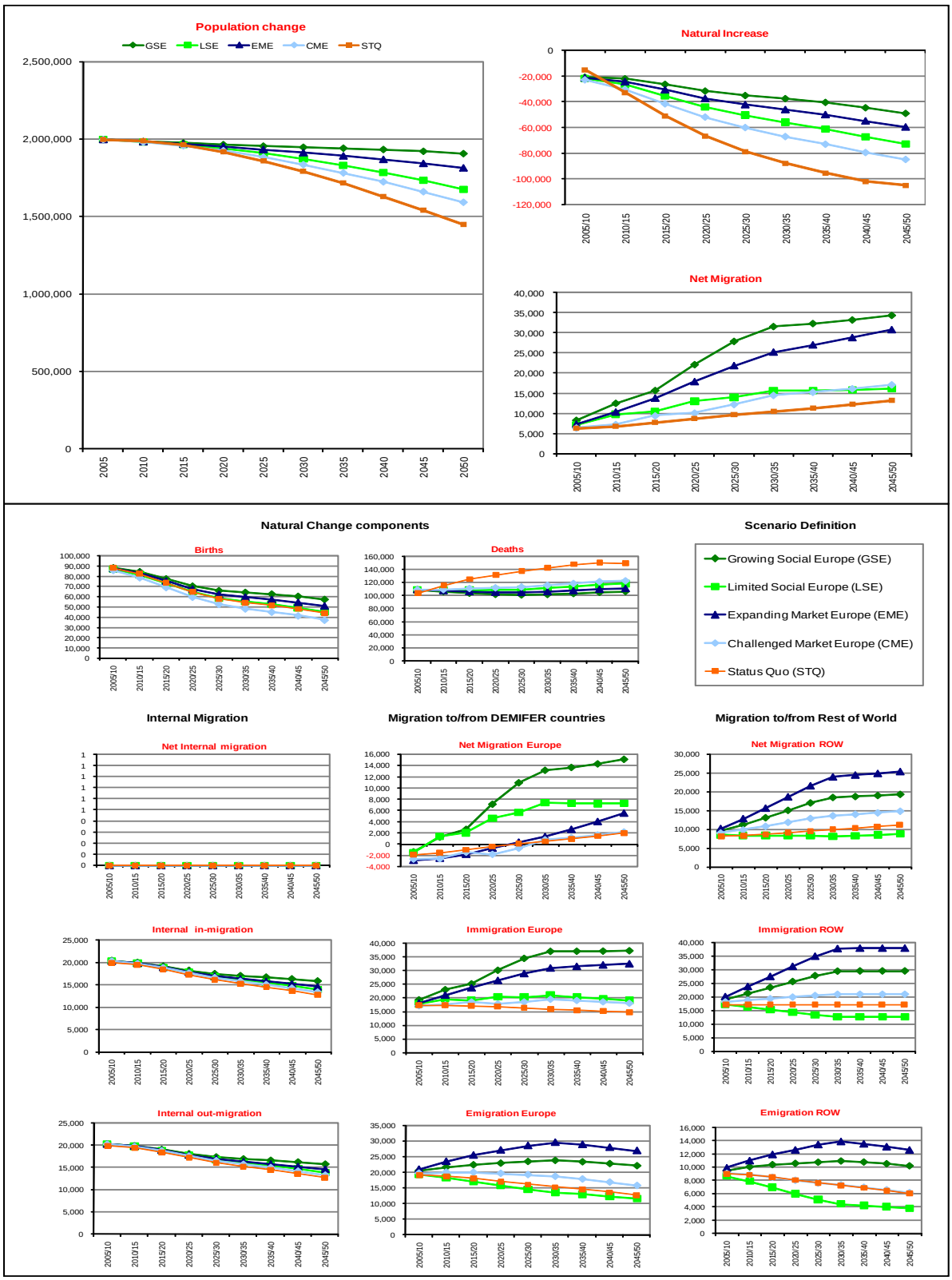

Figure A.26: Scenario profile for population stocks and components of change, 2005-50: Slovenia

Scenario profile **:** **Spain**

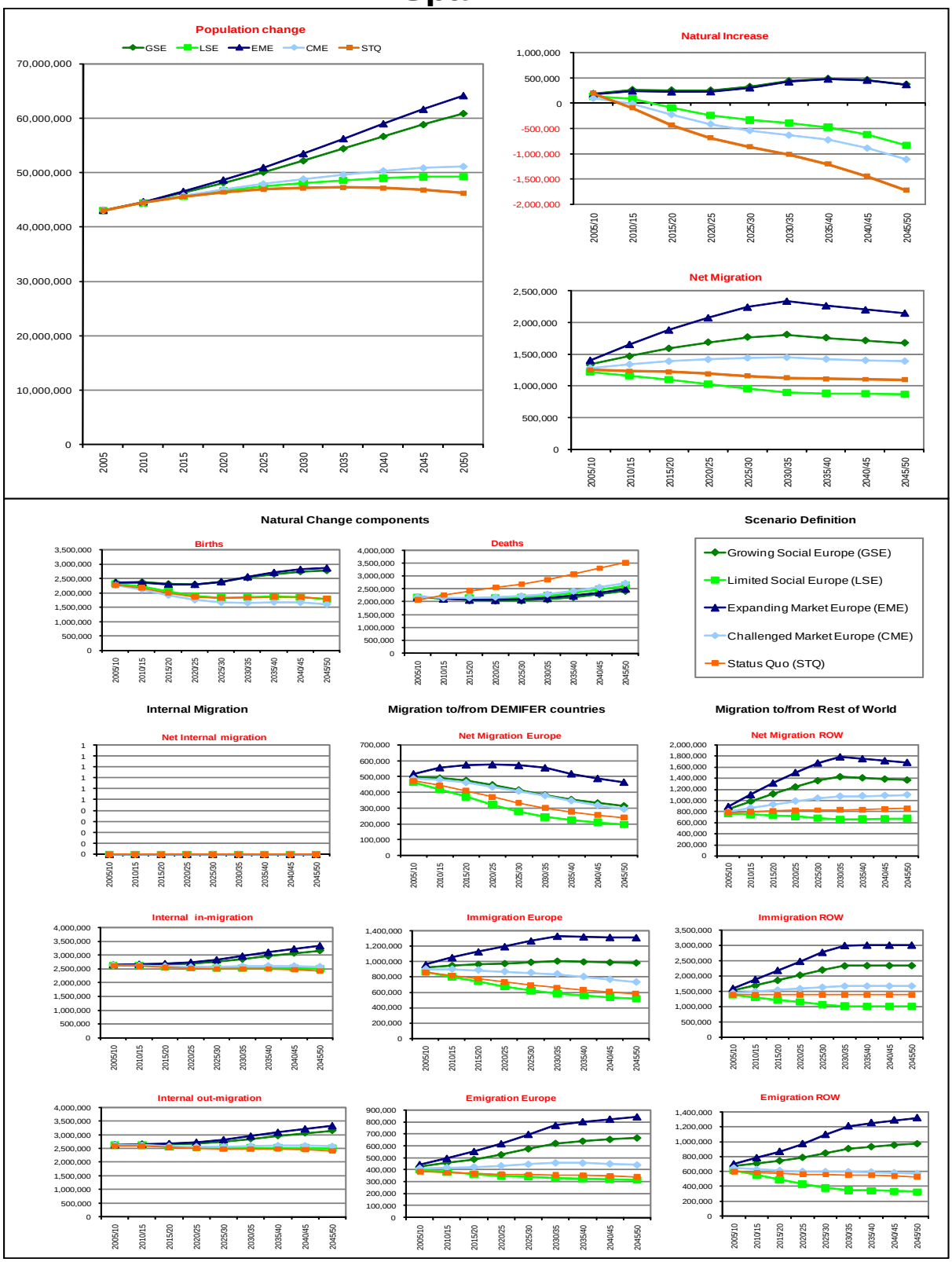

Figure A.27: Scenario profile for population stocks and components of change, 2005-50: Spain

Scenario profile **:** **Sweden**

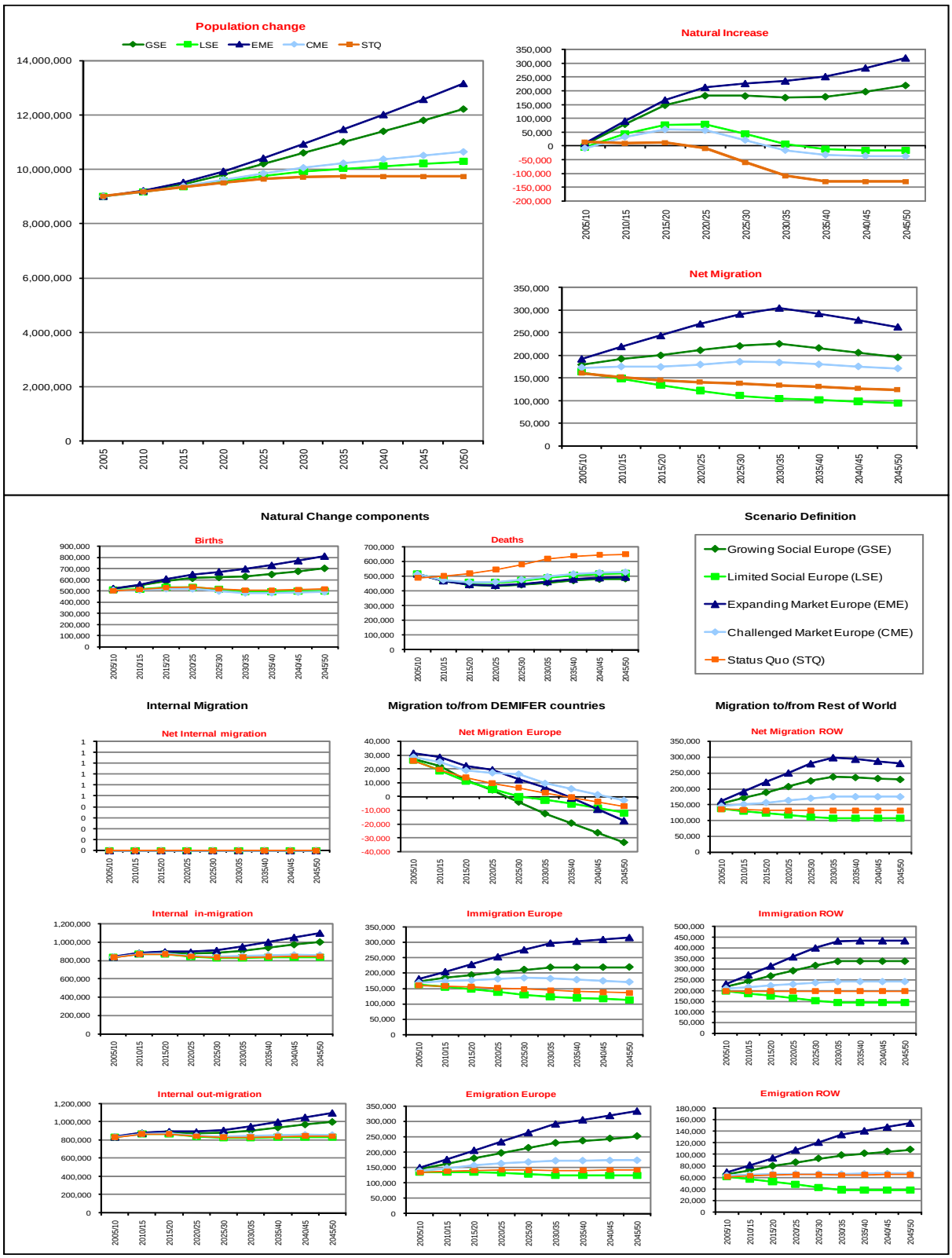

Figure A.28: Scenario profile for population stocks and components of change, 2005-50: Sweden

Scenario profile **:** **Switzerland**

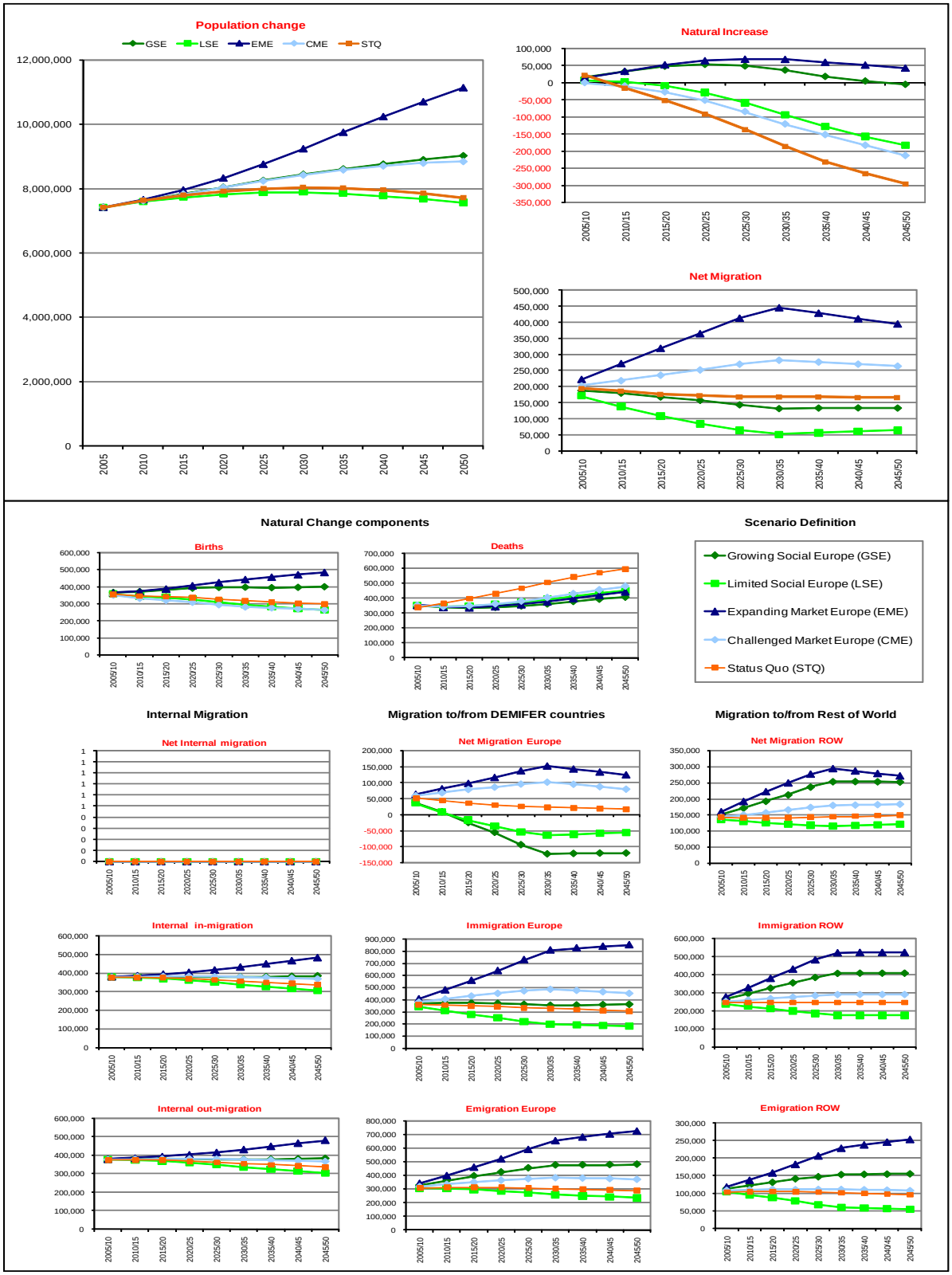

Figure A.29: Scenario profile for population stocks and components of change, 2005-50: Switzerland

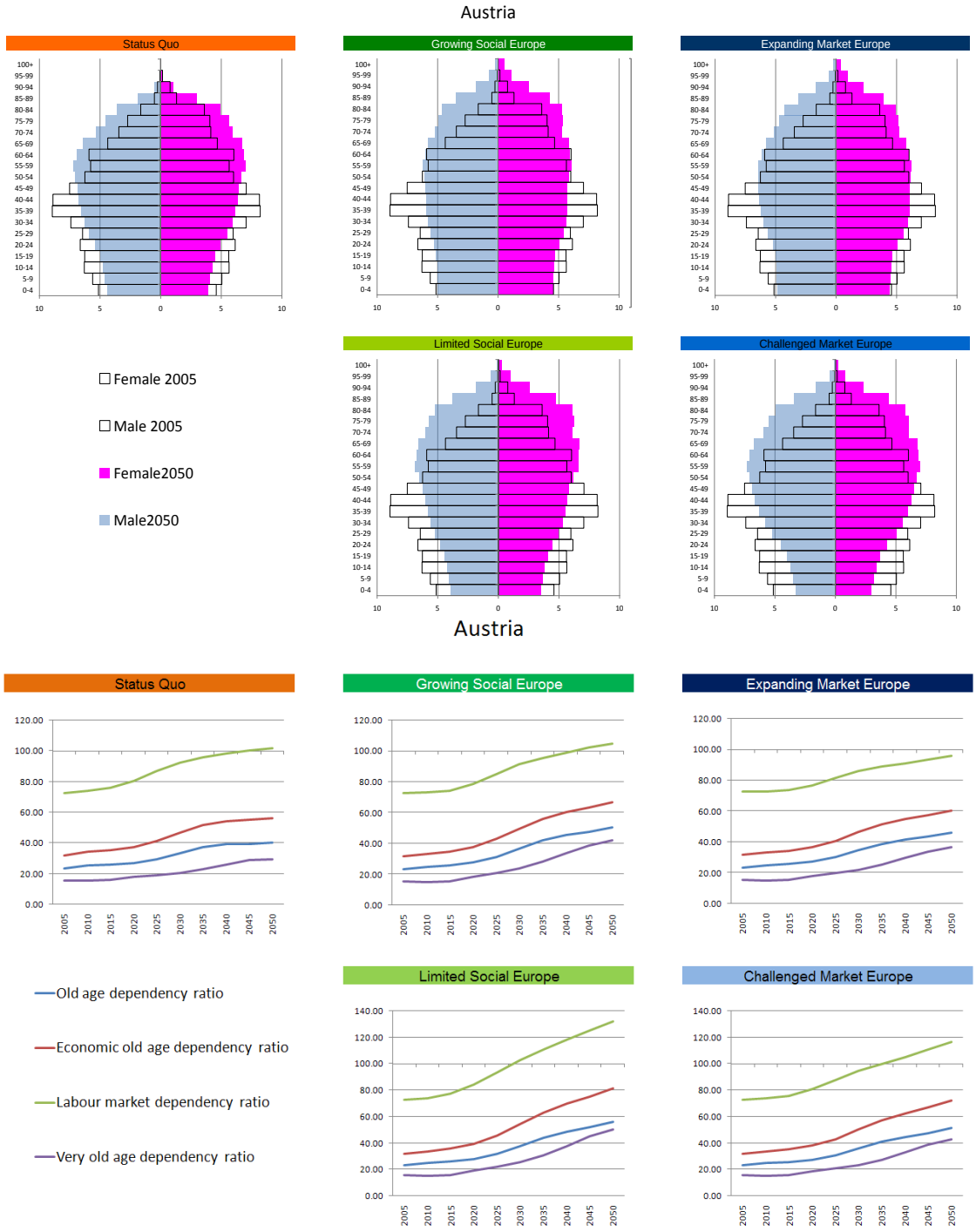

Figure A.30: Scenario profile for population ageing and dependency ratios, 2005-50: Austria

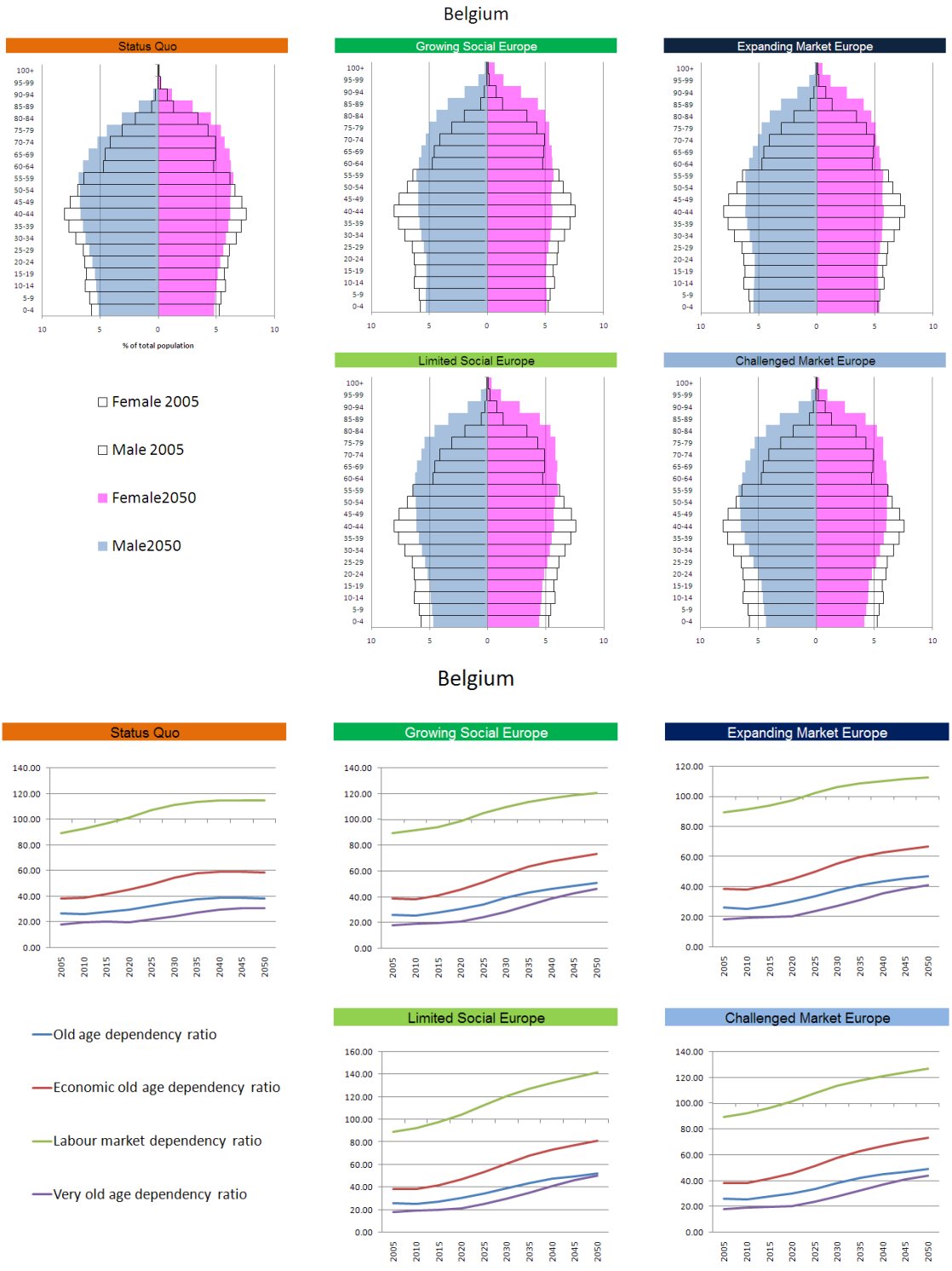

Figure A.31: Scenario profile for population ageing and dependency ratios, 2005-50: Belgium

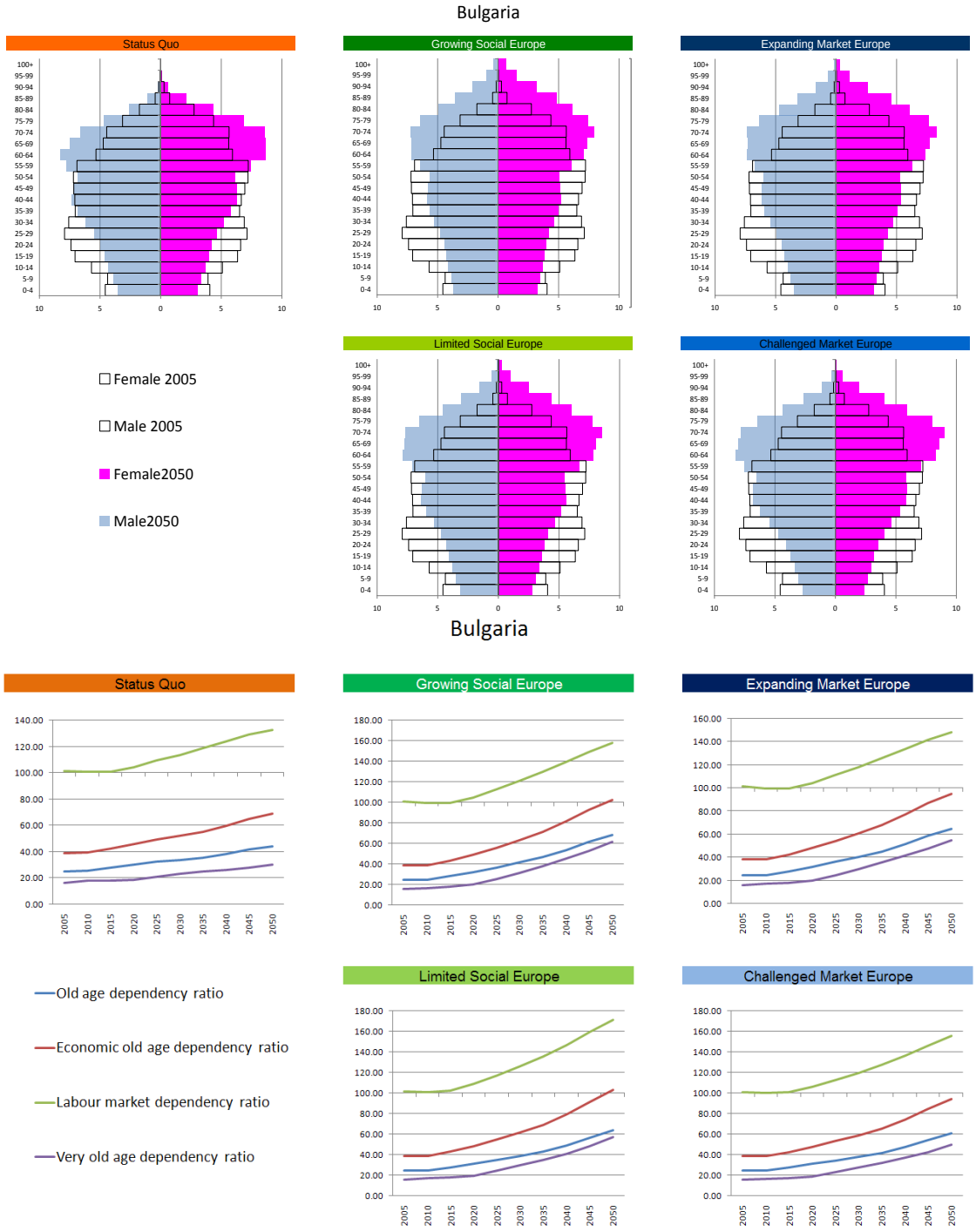

Figure A.32: Scenario profile for population ageing and dependency ratios, 2005-50: Bulgaria

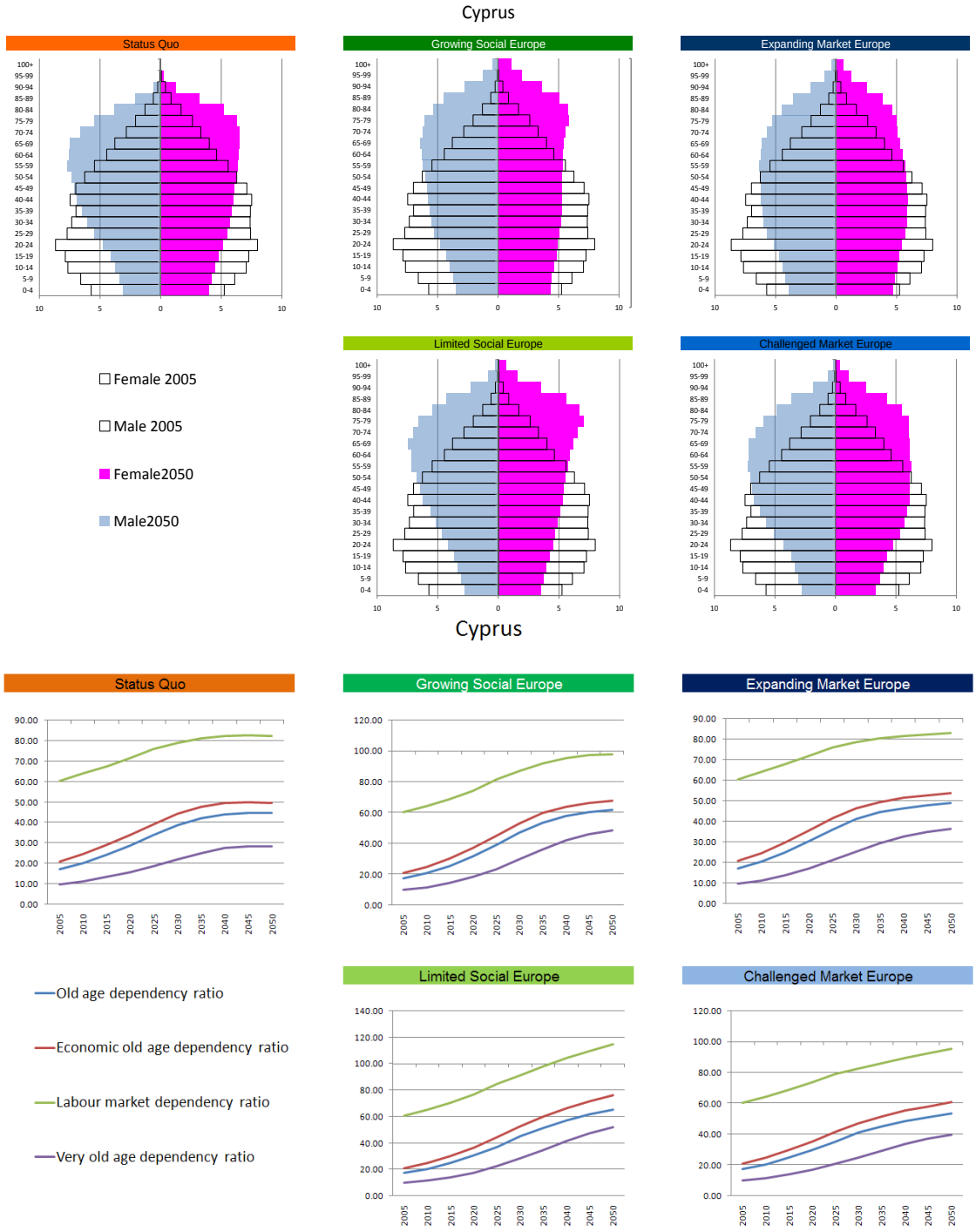

Figure A.33: Scenario profile for population ageing and dependency ratios, 2005-50: Cyprus

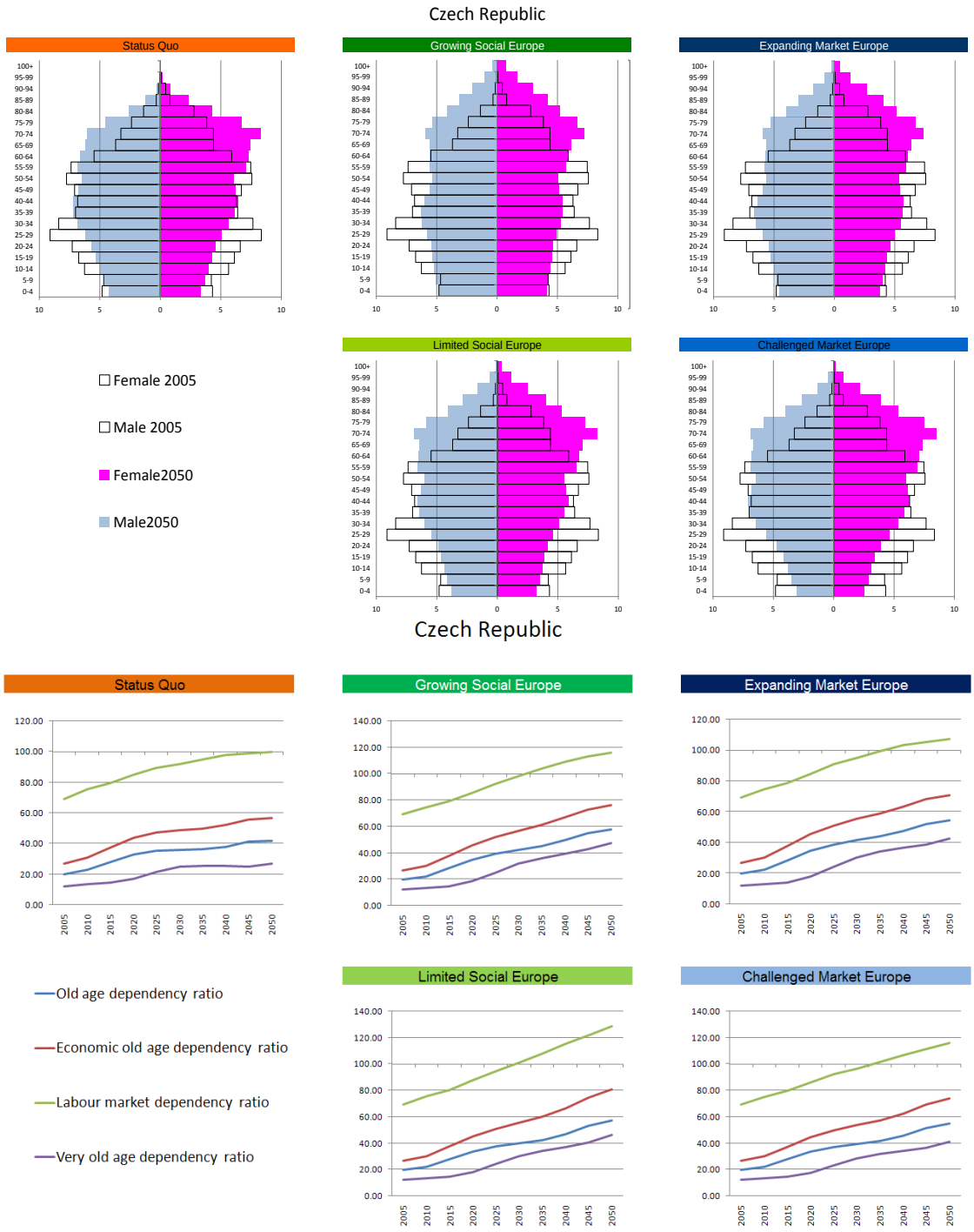

Figure A.34: Scenario profile for population ageing and dependency ratios, 2005-50: Czech Republic

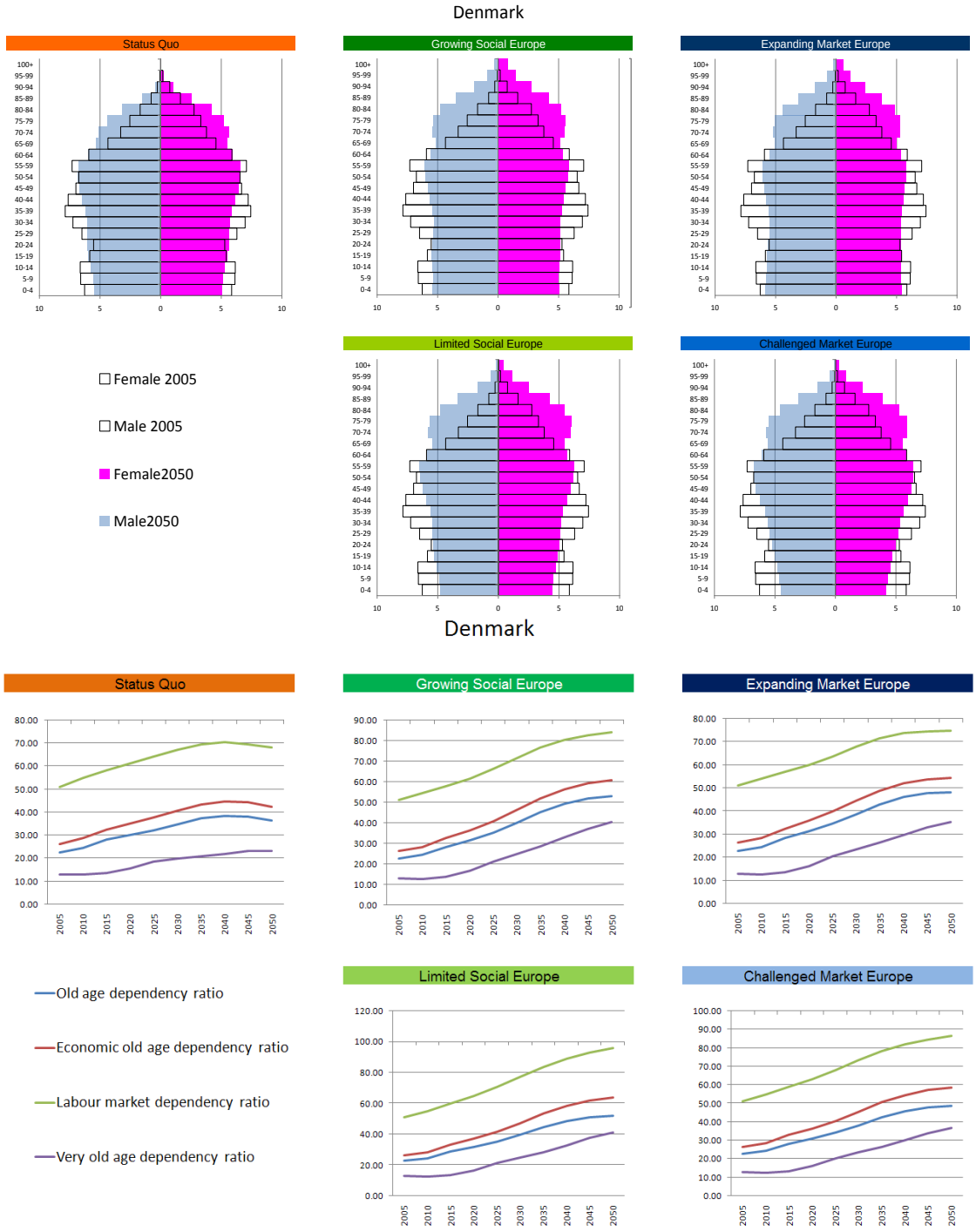

Figure A.35: Scenario profile for population ageing and dependency ratios, 2005-50: Denmark

Figure A.36: Scenario profile for population ageing and dependency ratios, 2005-50: Estonia

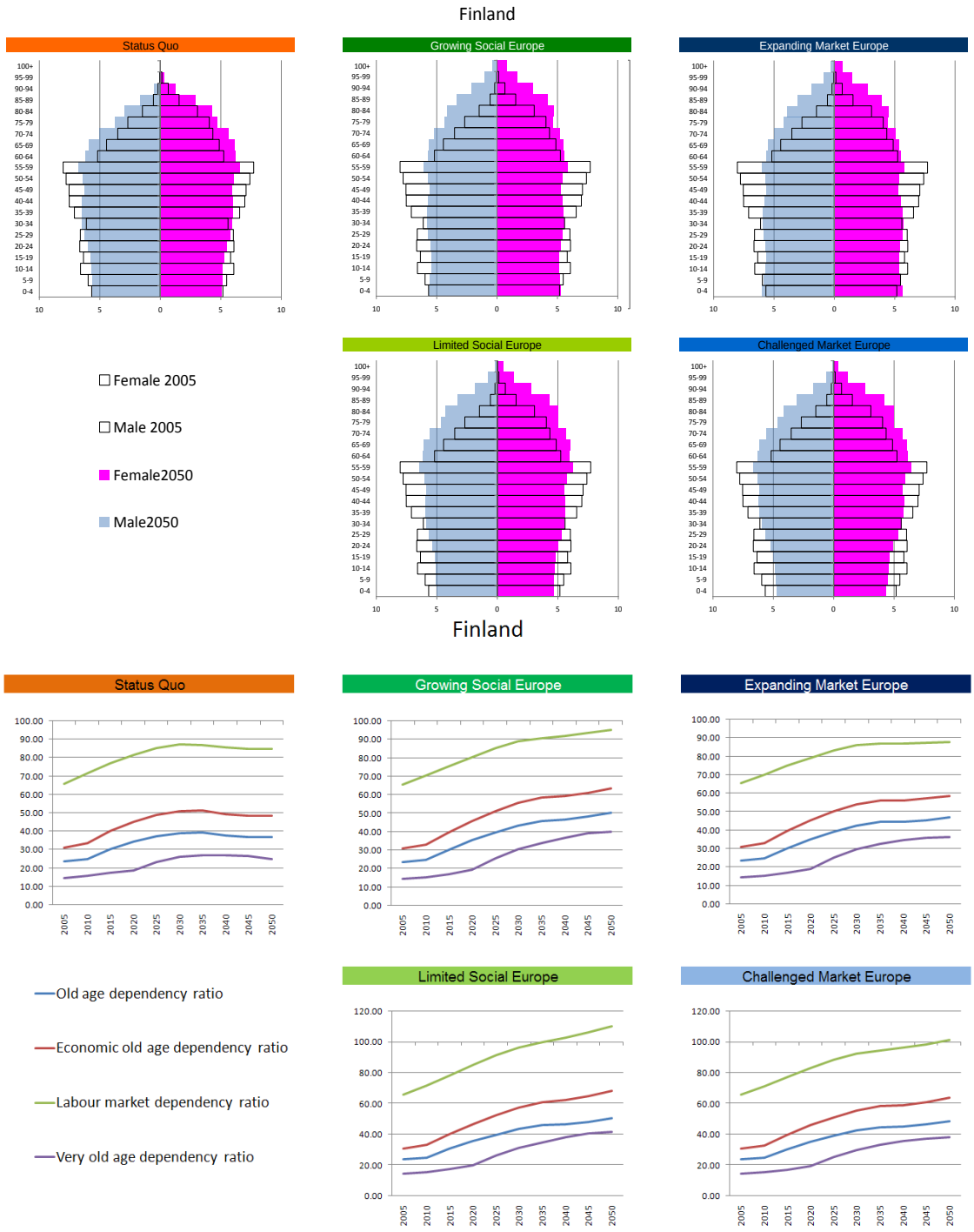

Figure A.37: Scenario profile for population ageing and dependency ratios, 2005-50: Finland

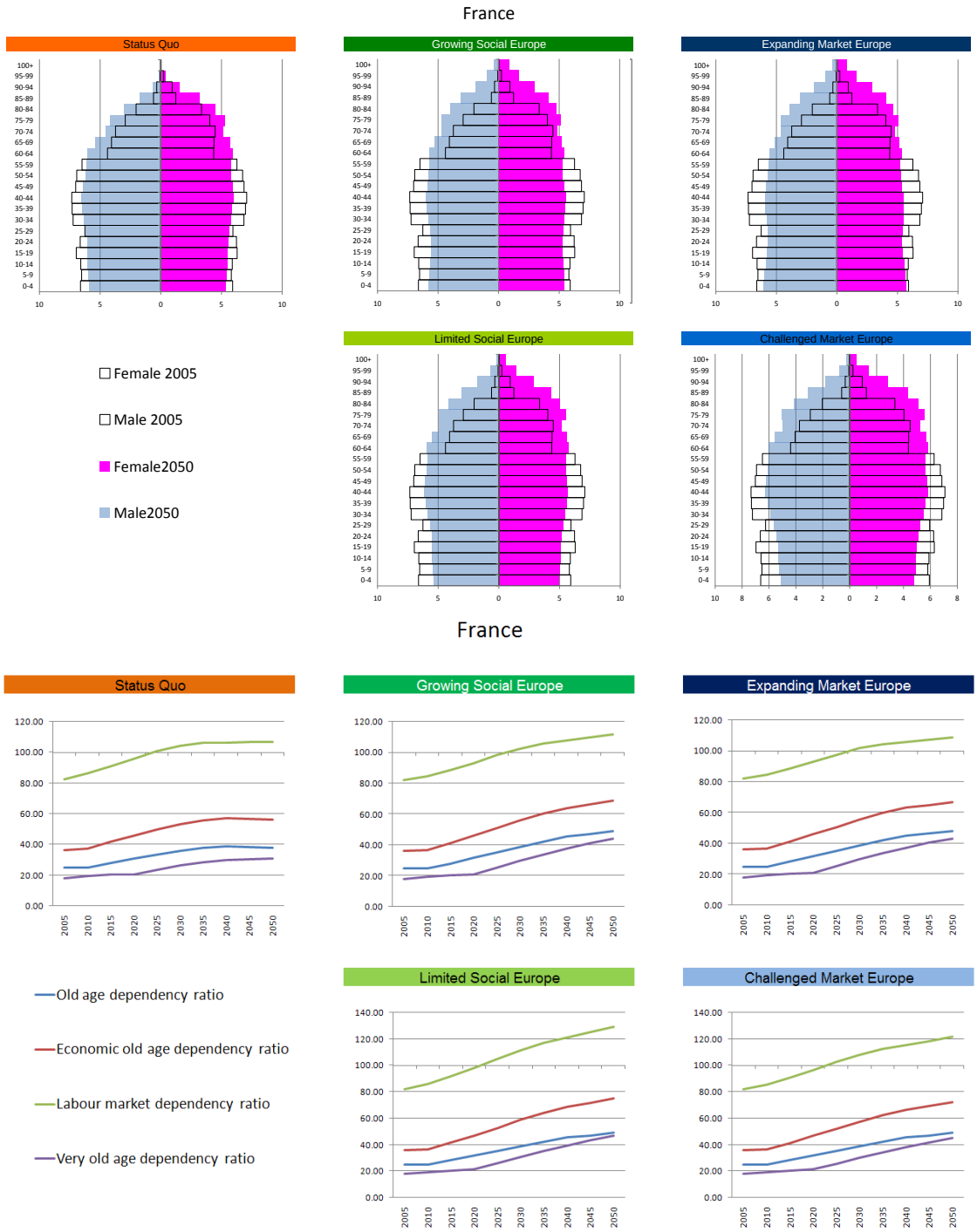

Figure A.38: Scenario profile for population ageing and dependency ratios, 2005-50: France

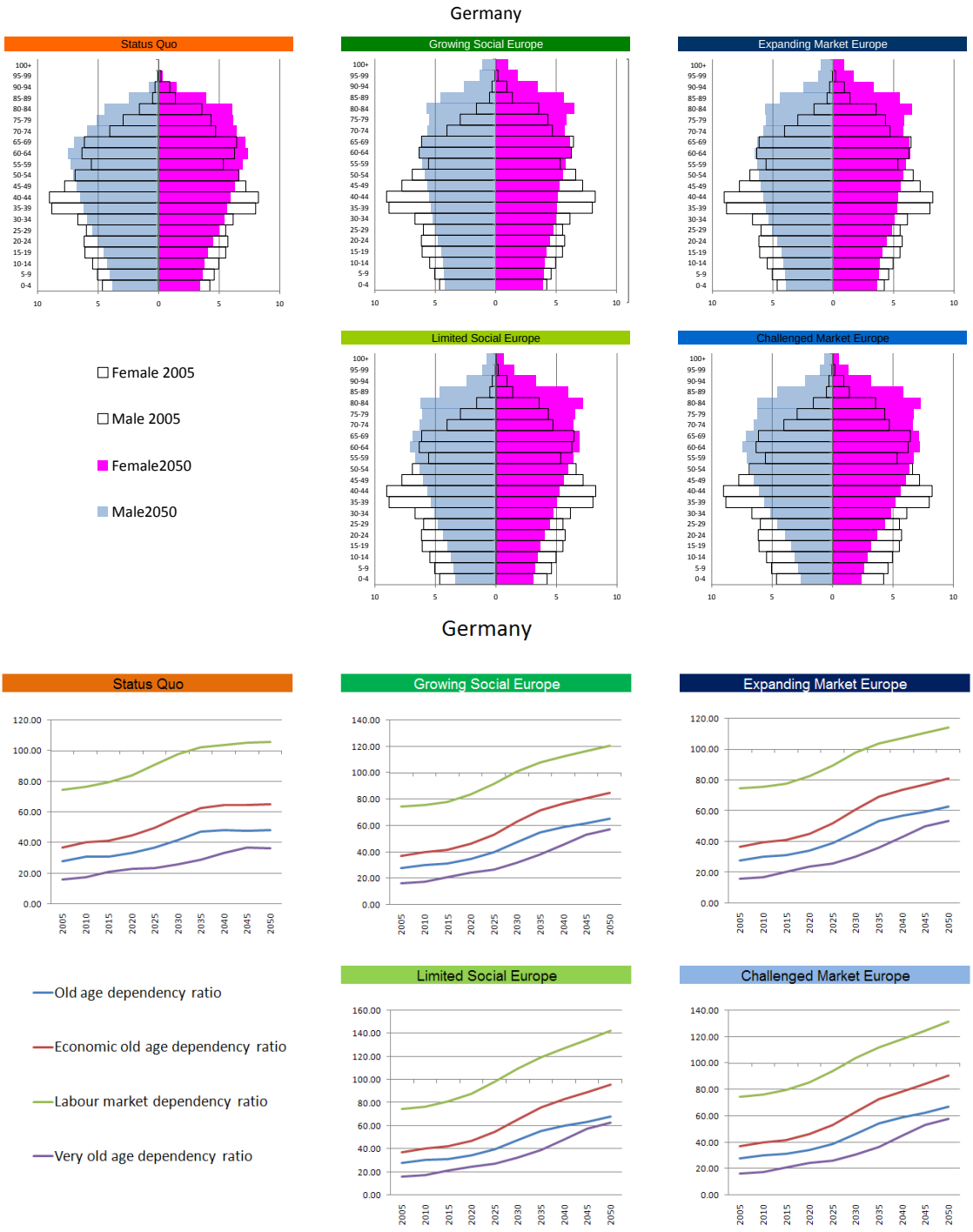

Figure A.39: Scenario profile for population ageing and dependency ratios, 2005-50: Germany

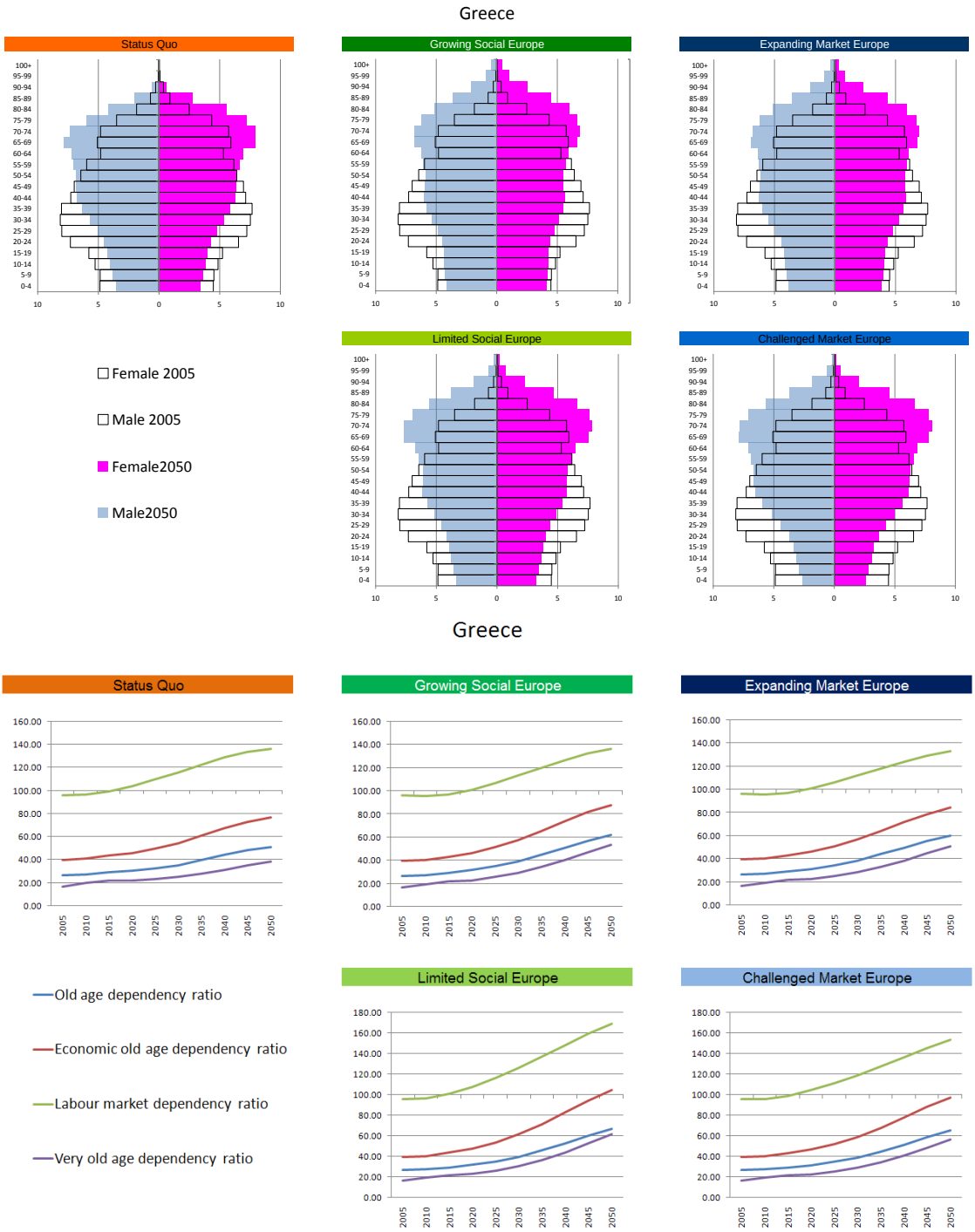

Figure A.40: Scenario profile for population ageing and dependency ratios, 2005-50: Greece

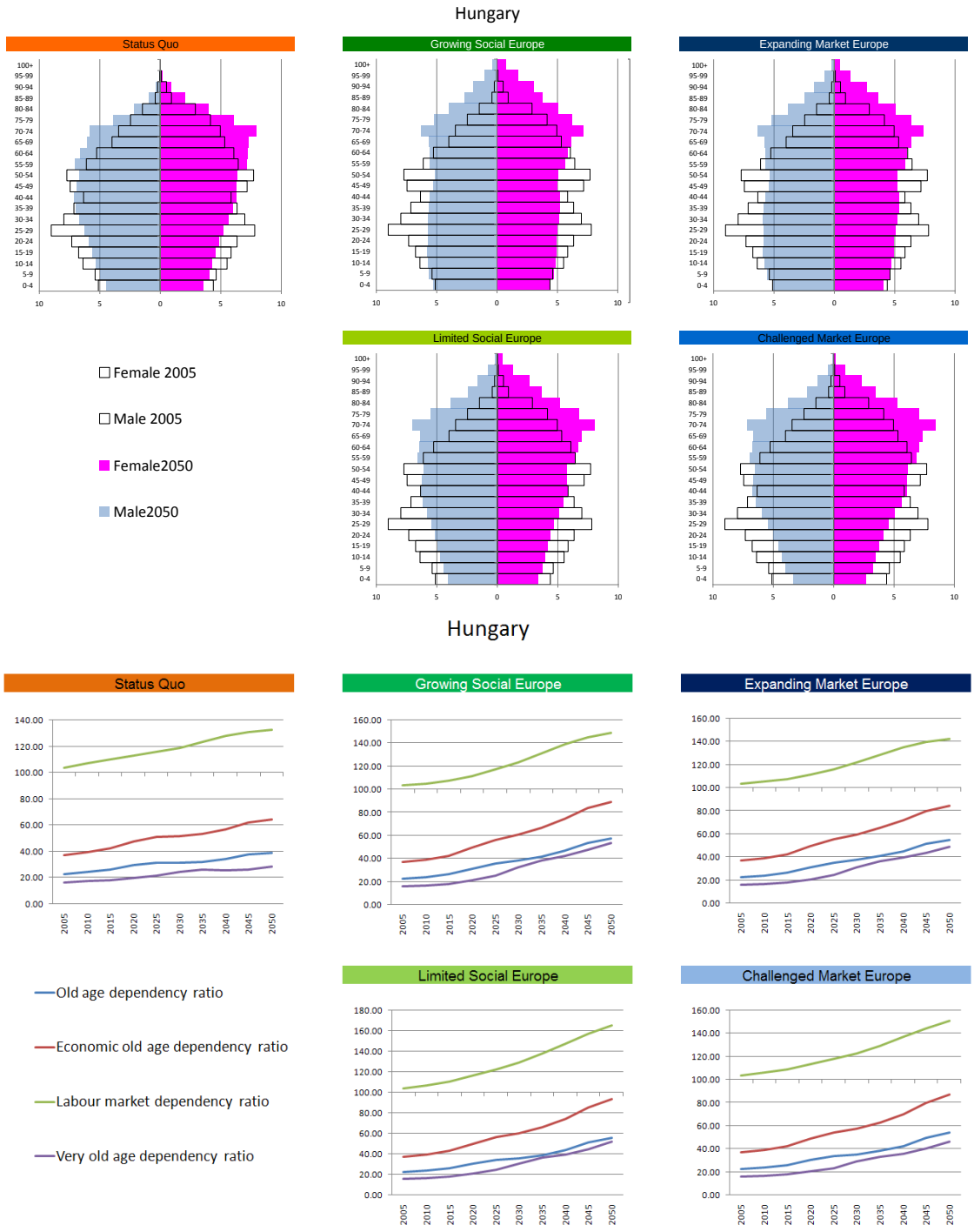

Figure A.41: Scenario profile for population ageing and dependency ratios, 2005-50: Hungary

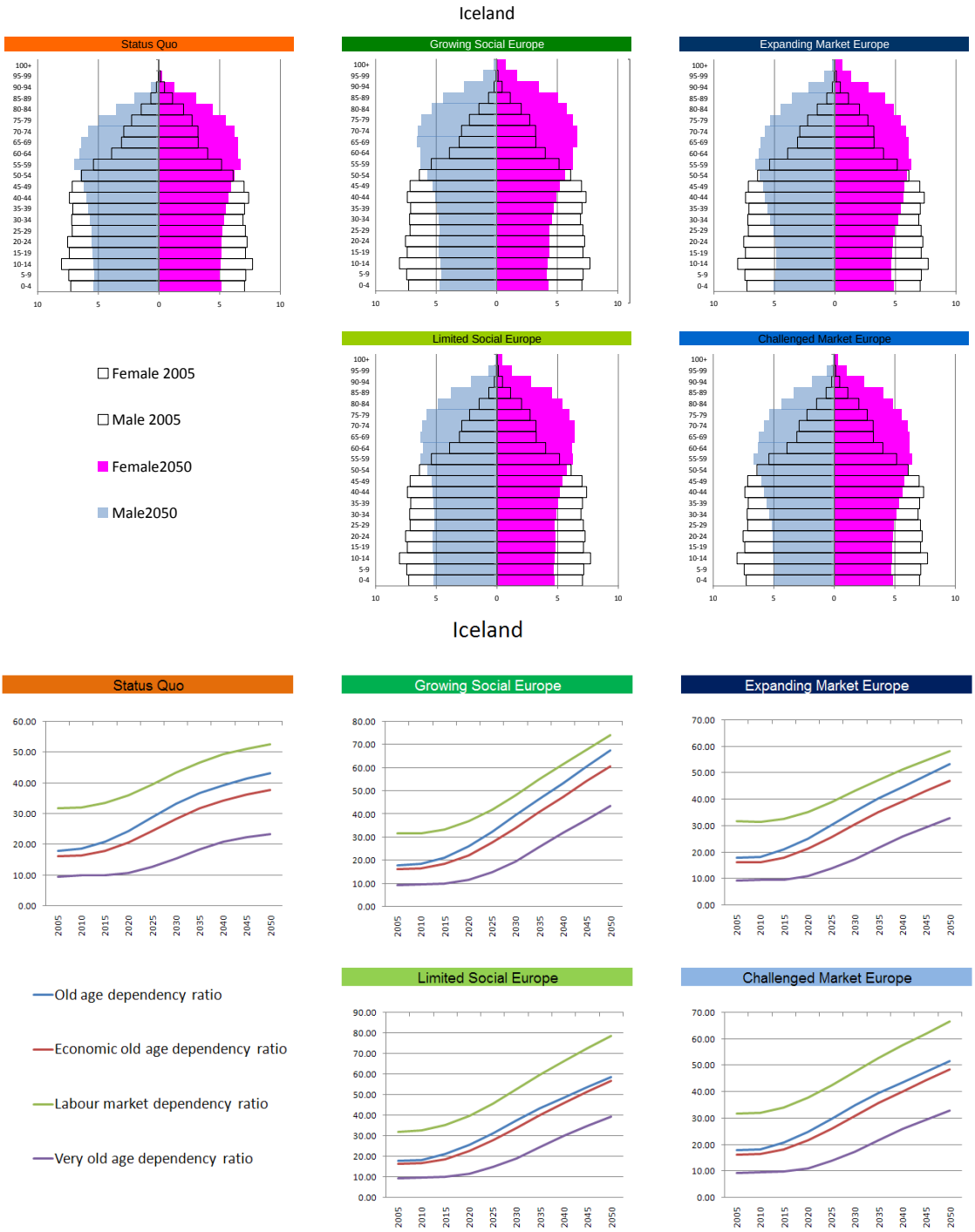

Figure A.42: Scenario profile for population ageing and dependency ratios, 2005-50: Iceland

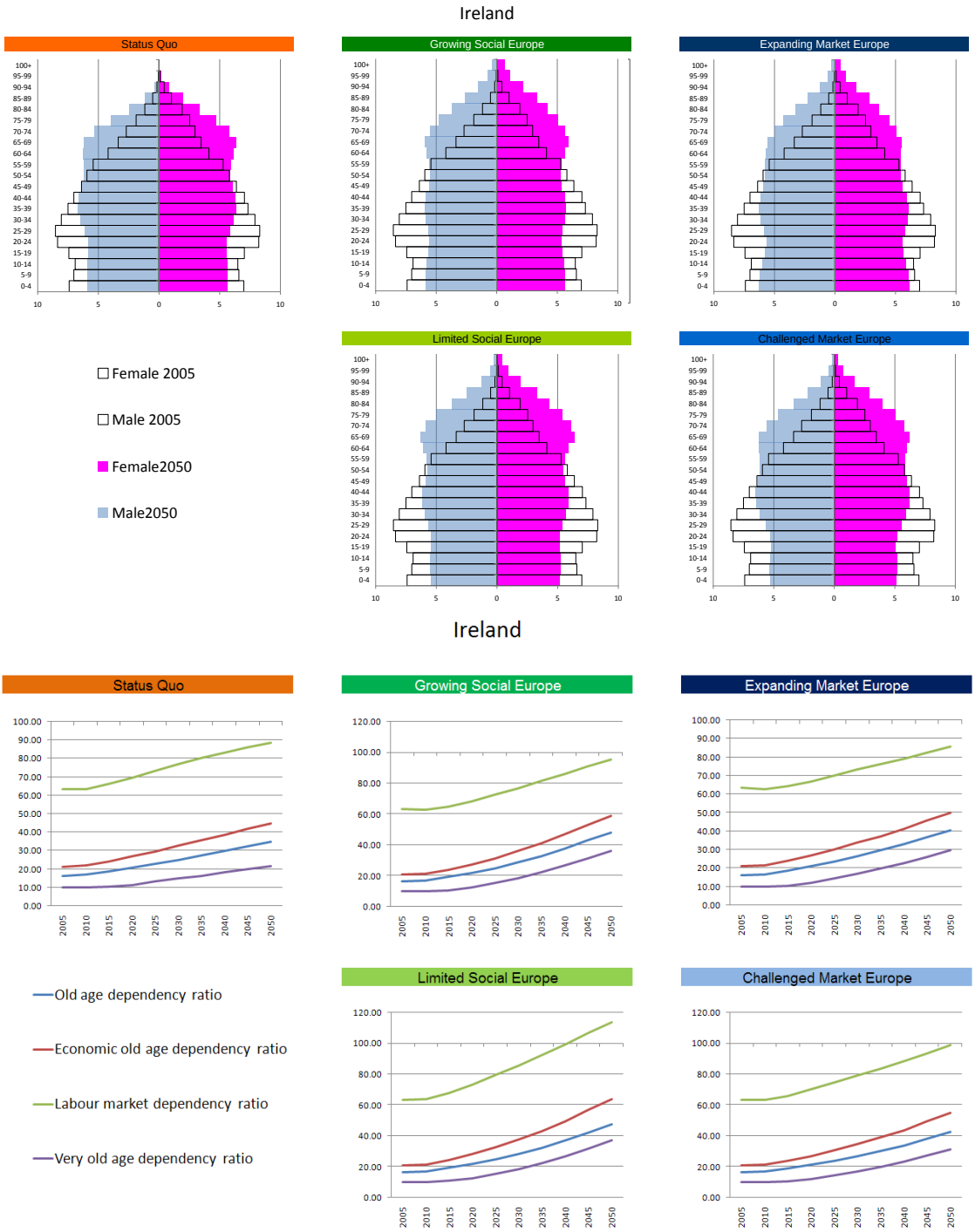

Figure A.43: Scenario profile for population ageing and dependency ratios, 2005-50: Ireland

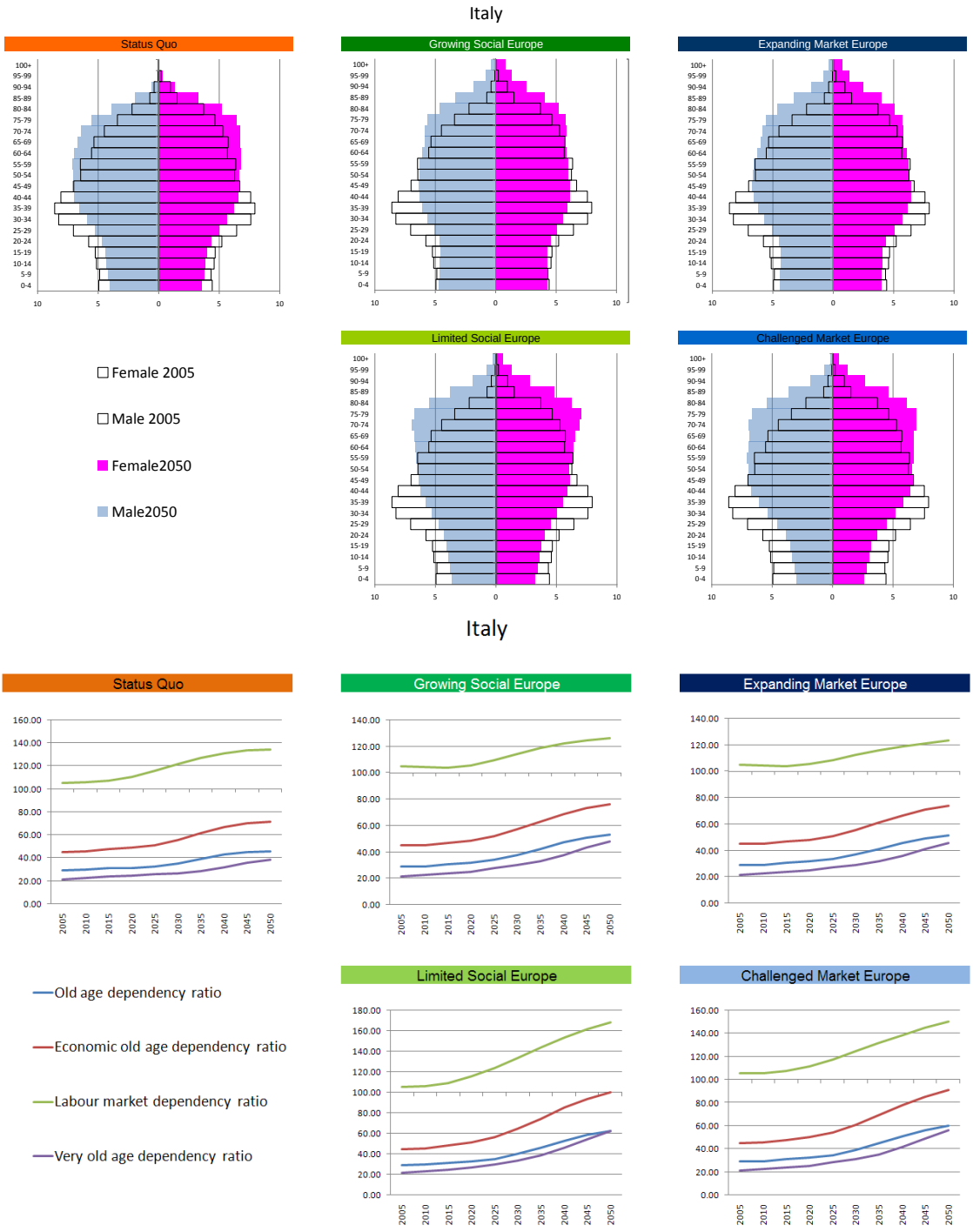

Figure A.44: Scenario profile for population ageing and dependency ratios, 2005-50: Italy

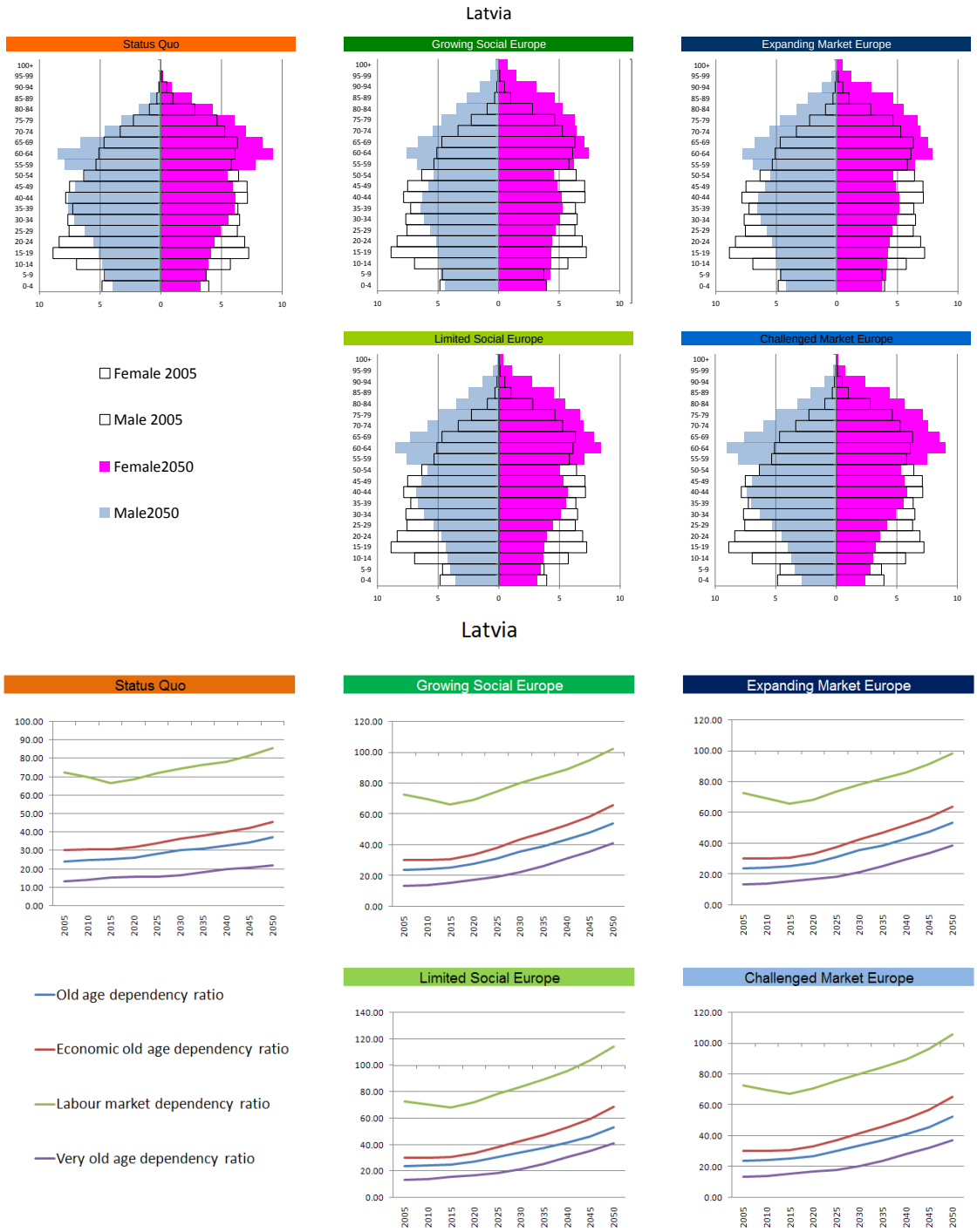

Figure A.45: Scenario profile for population ageing and dependency ratios, 2005-50: Latvia

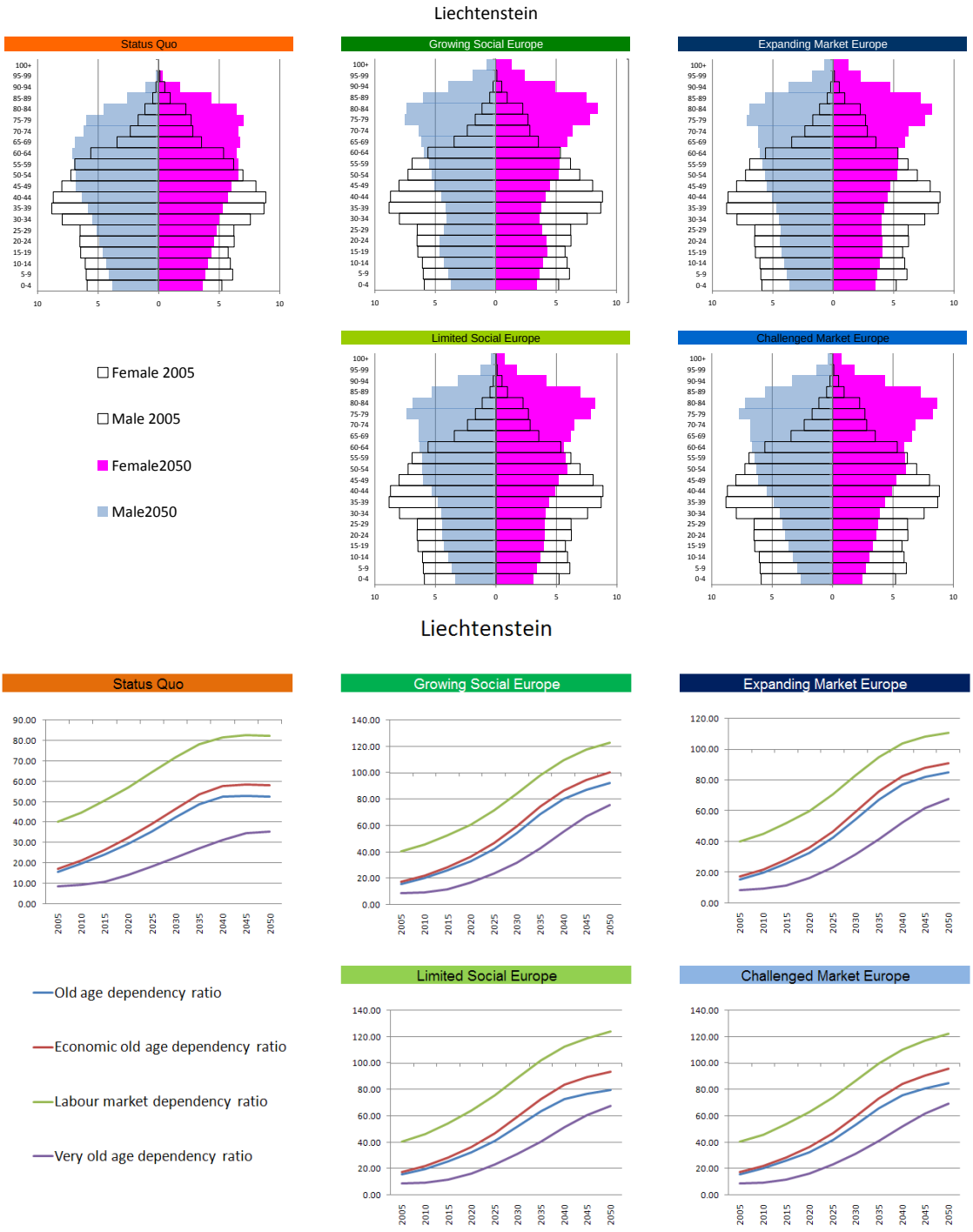

Figure A.46: Scenario profile for population ageing and dependency ratios, 2005-50: Liechtenstein

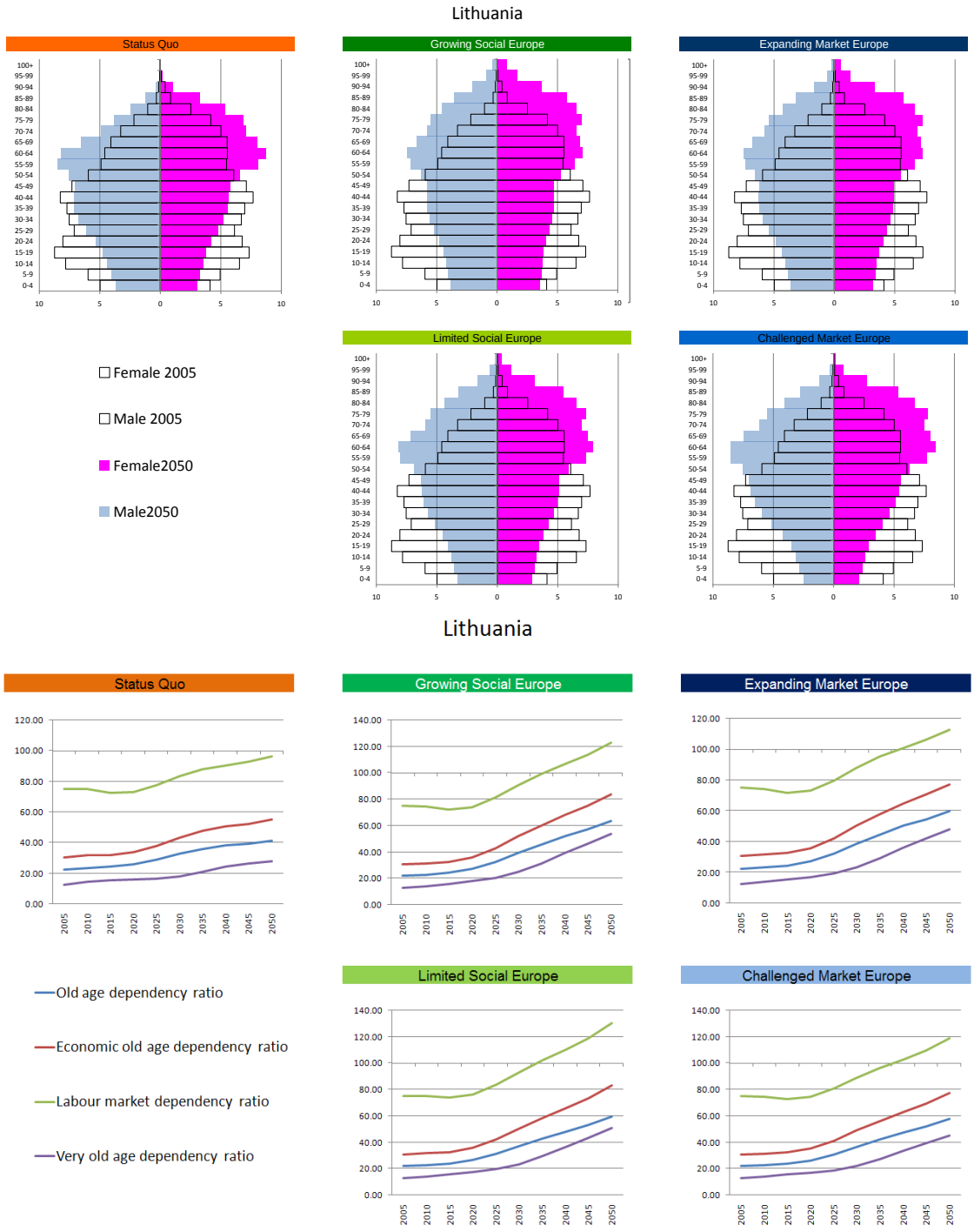

Figure A.47: Scenario profile for population ageing and dependency ratios, 2005-50: Lithuania

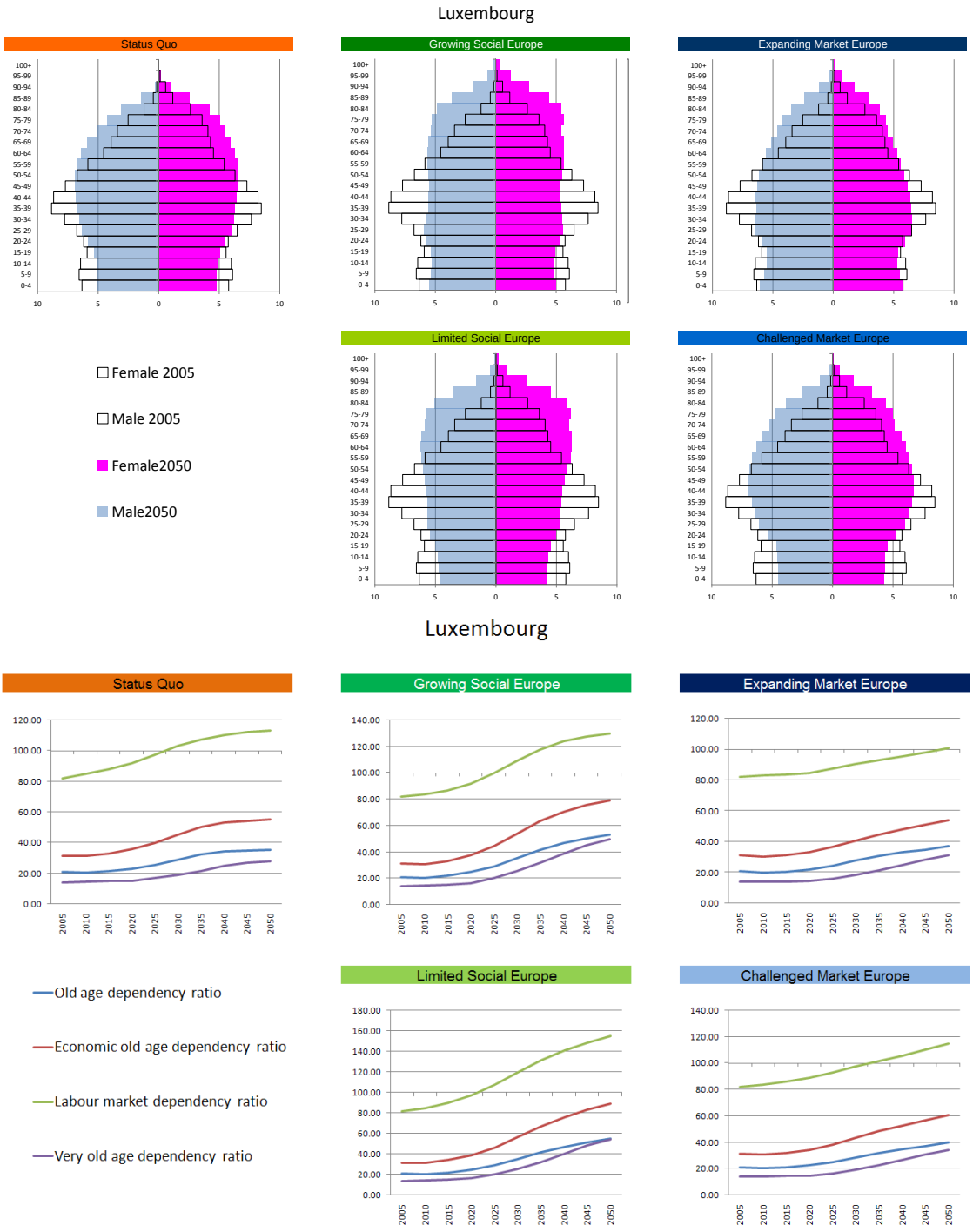

Figure A.48: Scenario profile for population ageing and dependency ratios, 2005-50: Luxembourg

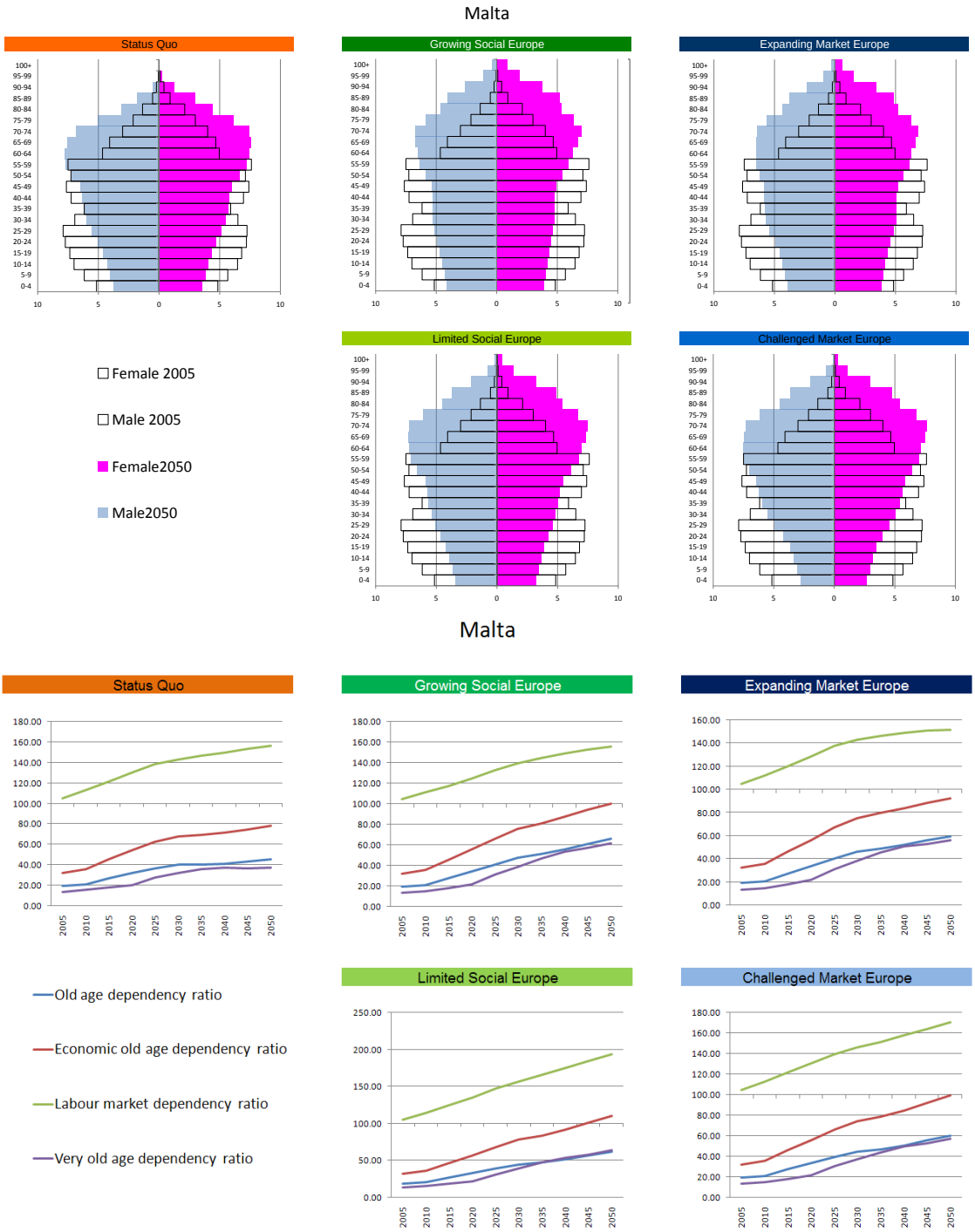

Figure A.49: Scenario profile for population ageing and dependency ratios, 2005-50: Malta

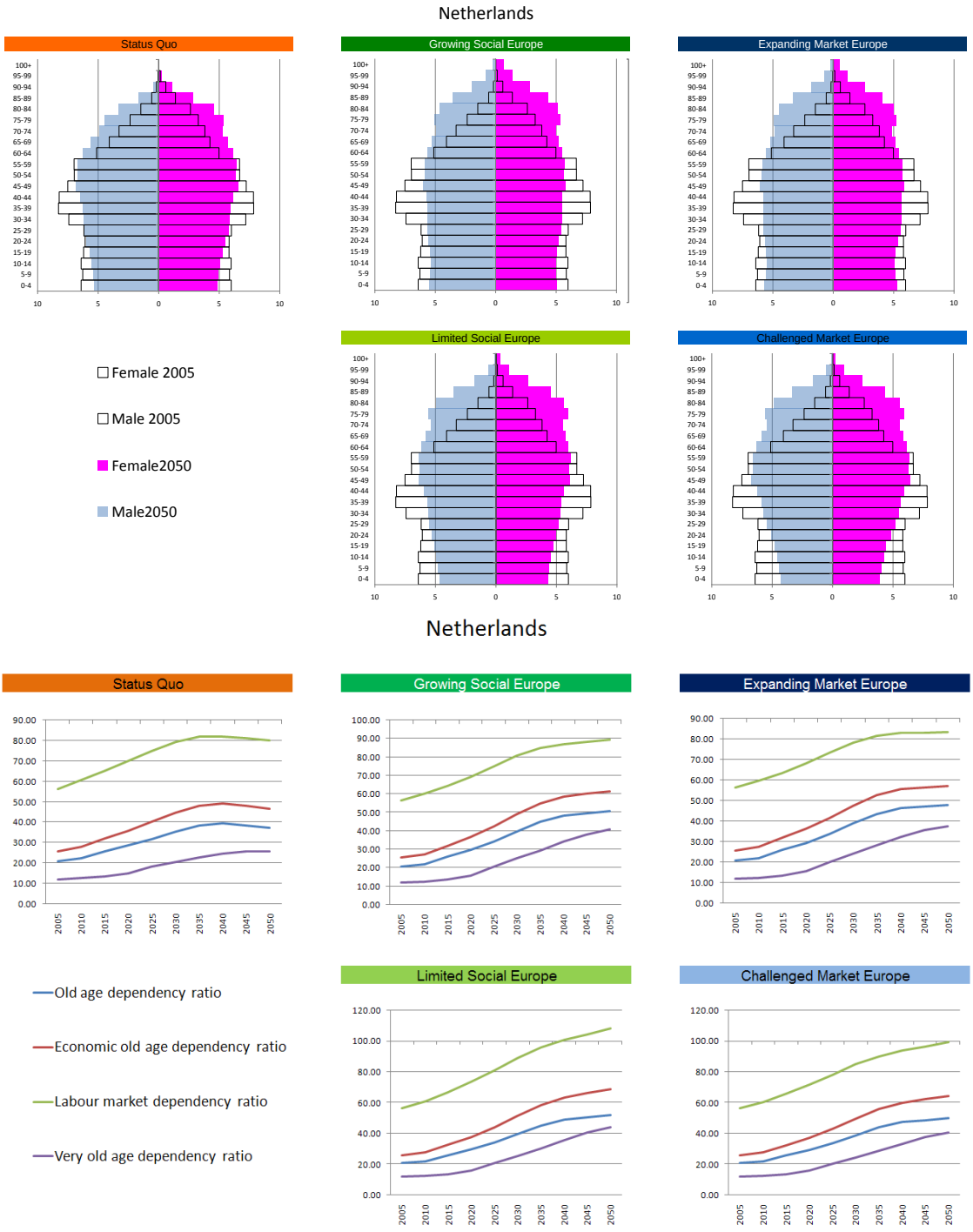

Figure A.50: Scenario profile for population ageing and dependency ratios, 2005-50: Netherlands

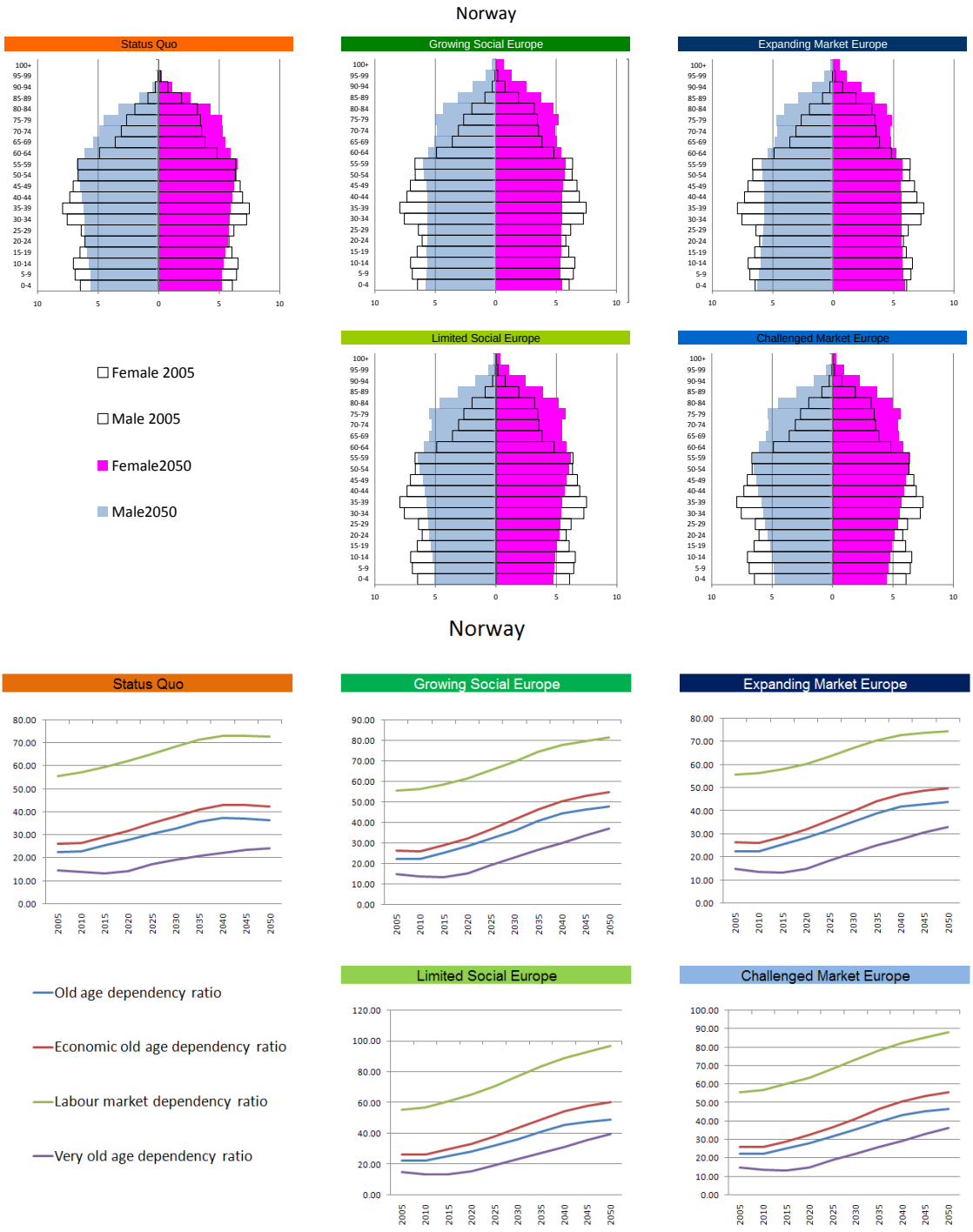

Figure A.51: Scenario profile for population ageing and dependency ratios, 2005-50: Norway

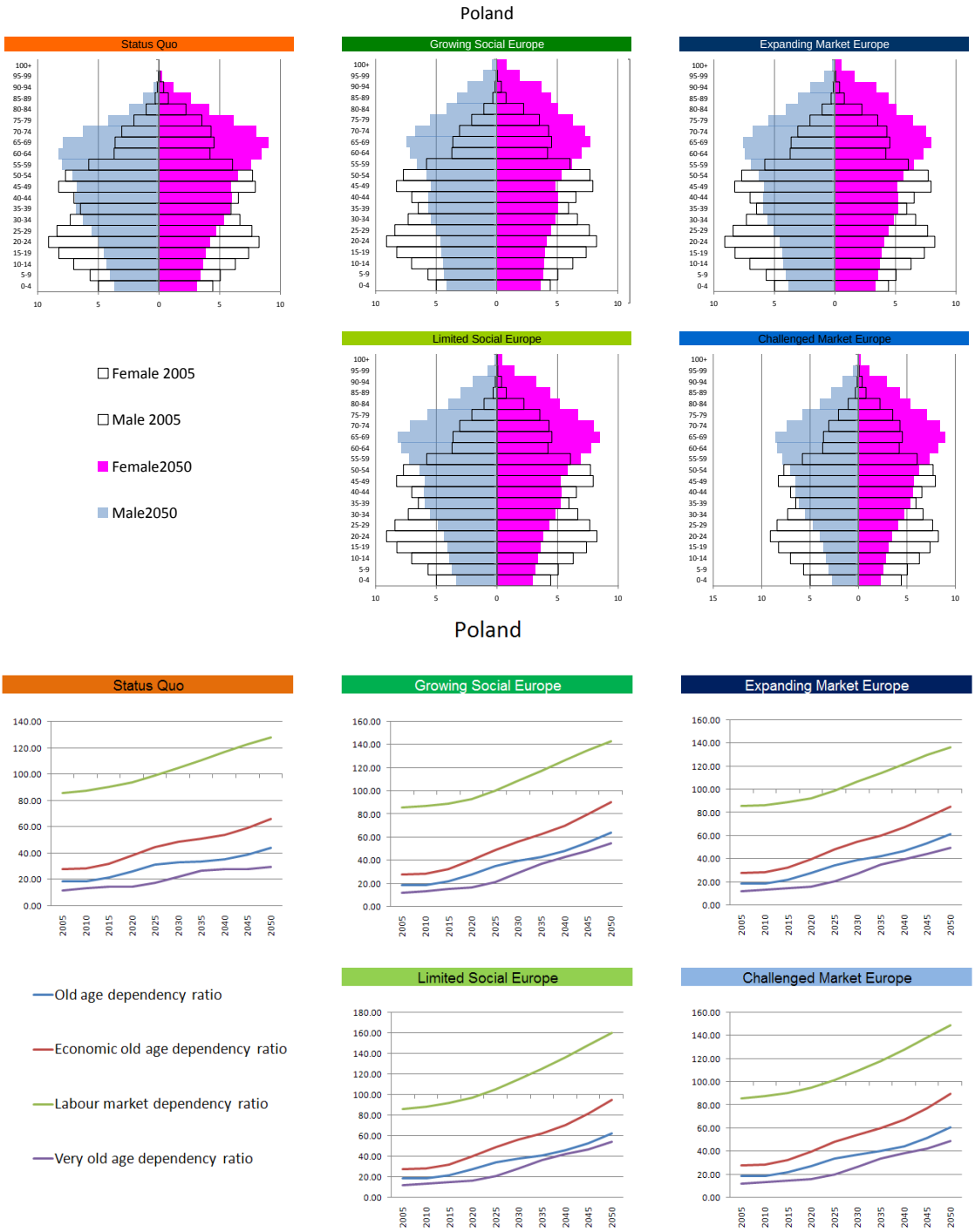

Figure A.52: Scenario profile for population ageing and dependency ratios, 2005-50: Poland

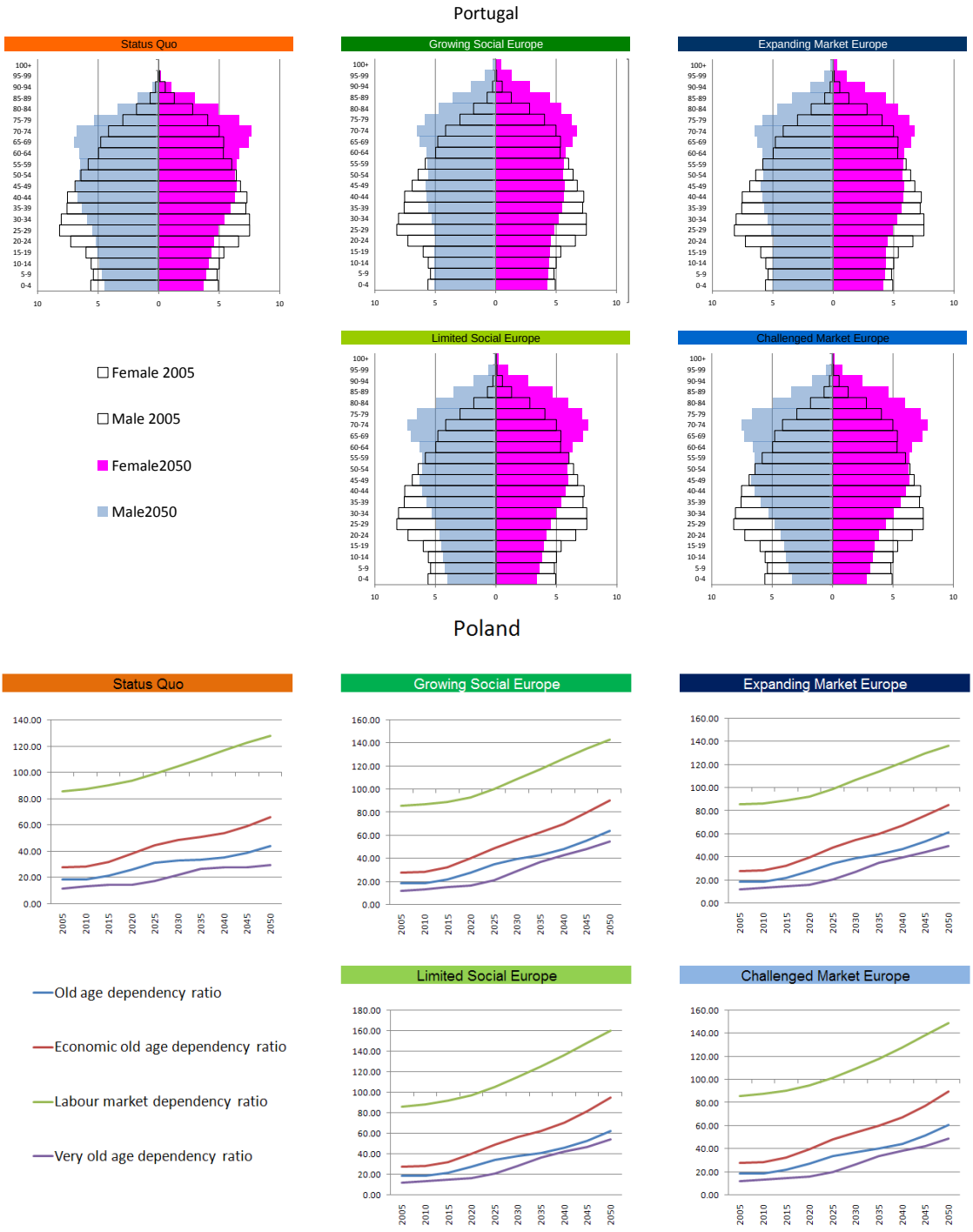

Figure A.53: Scenario profile for population ageing and dependency ratios, 2005-50: Portugal

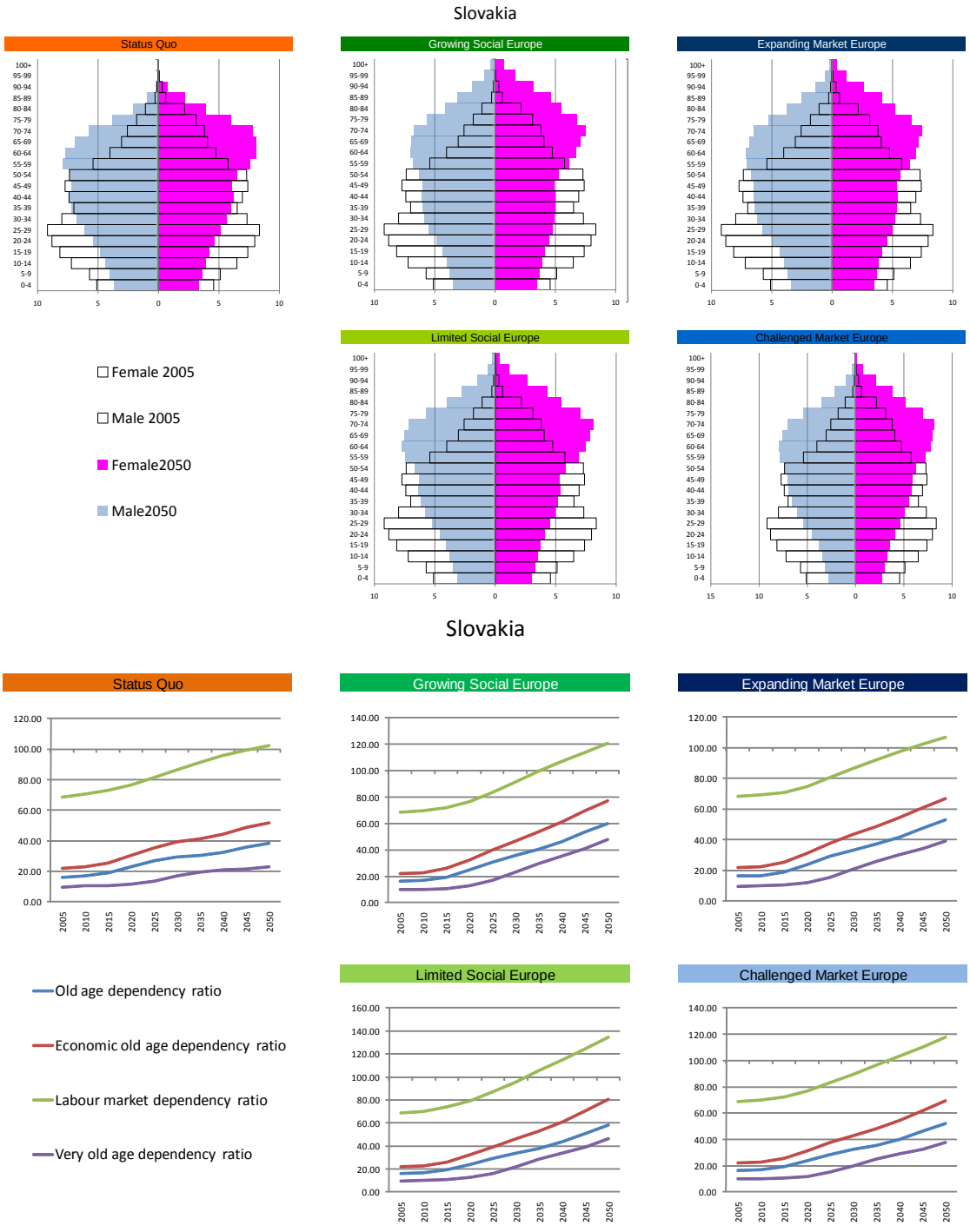

Figure A.54: Scenario profile for population ageing and dependency ratios, 2005-50: Slovakia

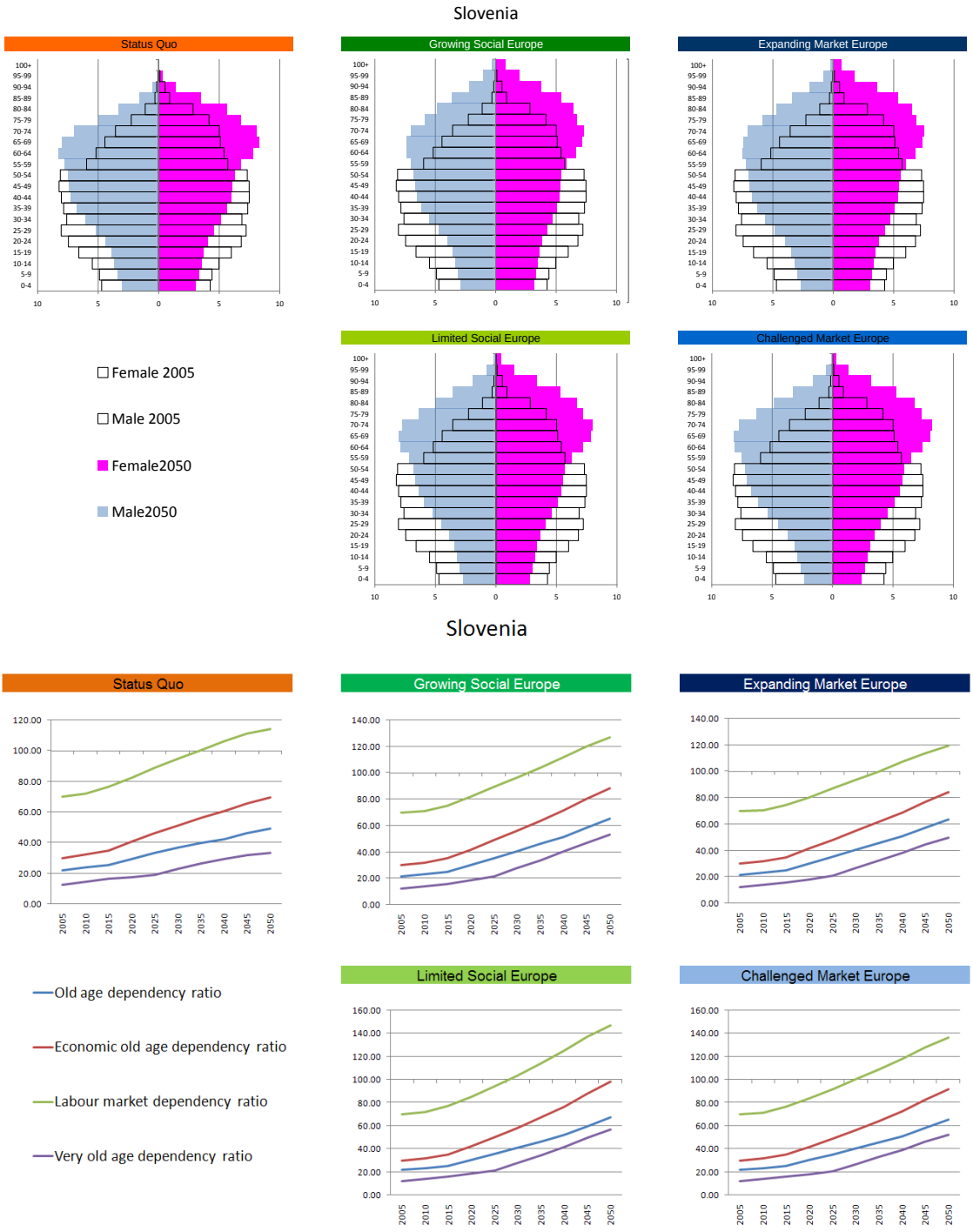

Figure A.55: Scenario profile for population ageing and dependency ratios, 2005-50: Slovenia

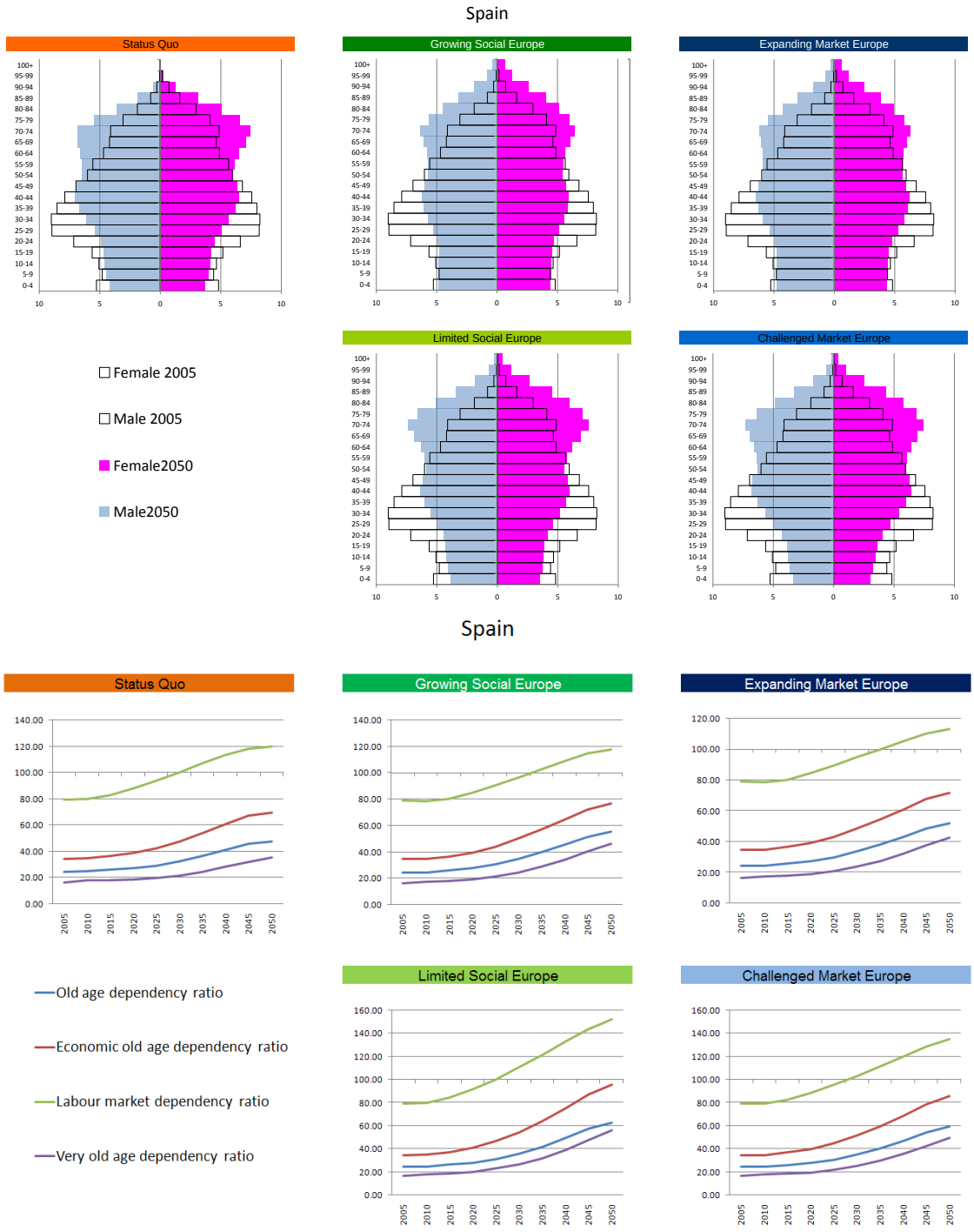

Figure A.56: Scenario profile for population ageing and dependency ratios, 2005-50: Spain

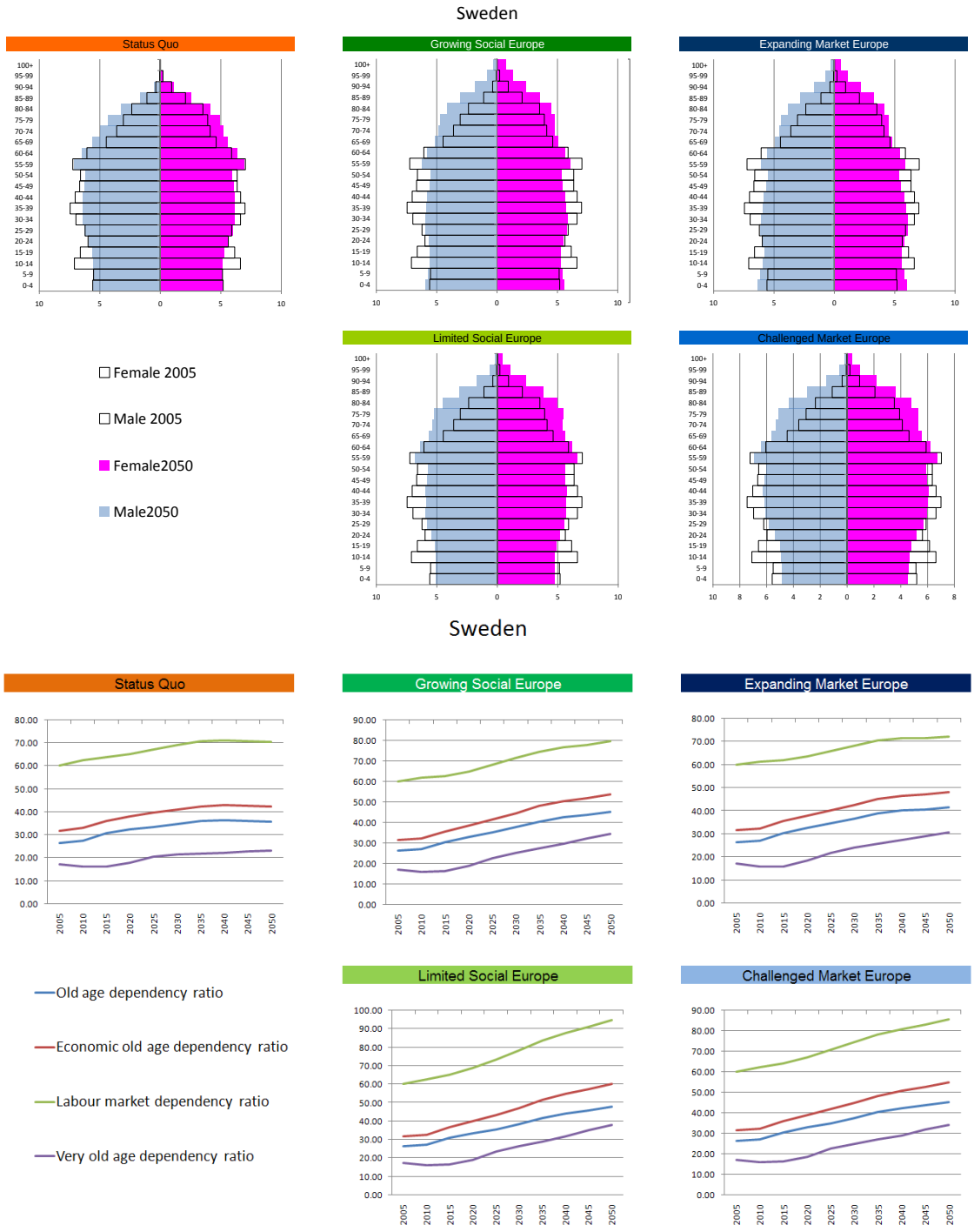

Figure A.57: Scenario profile for population ageing and dependency ratios, 2005-50: Sweden

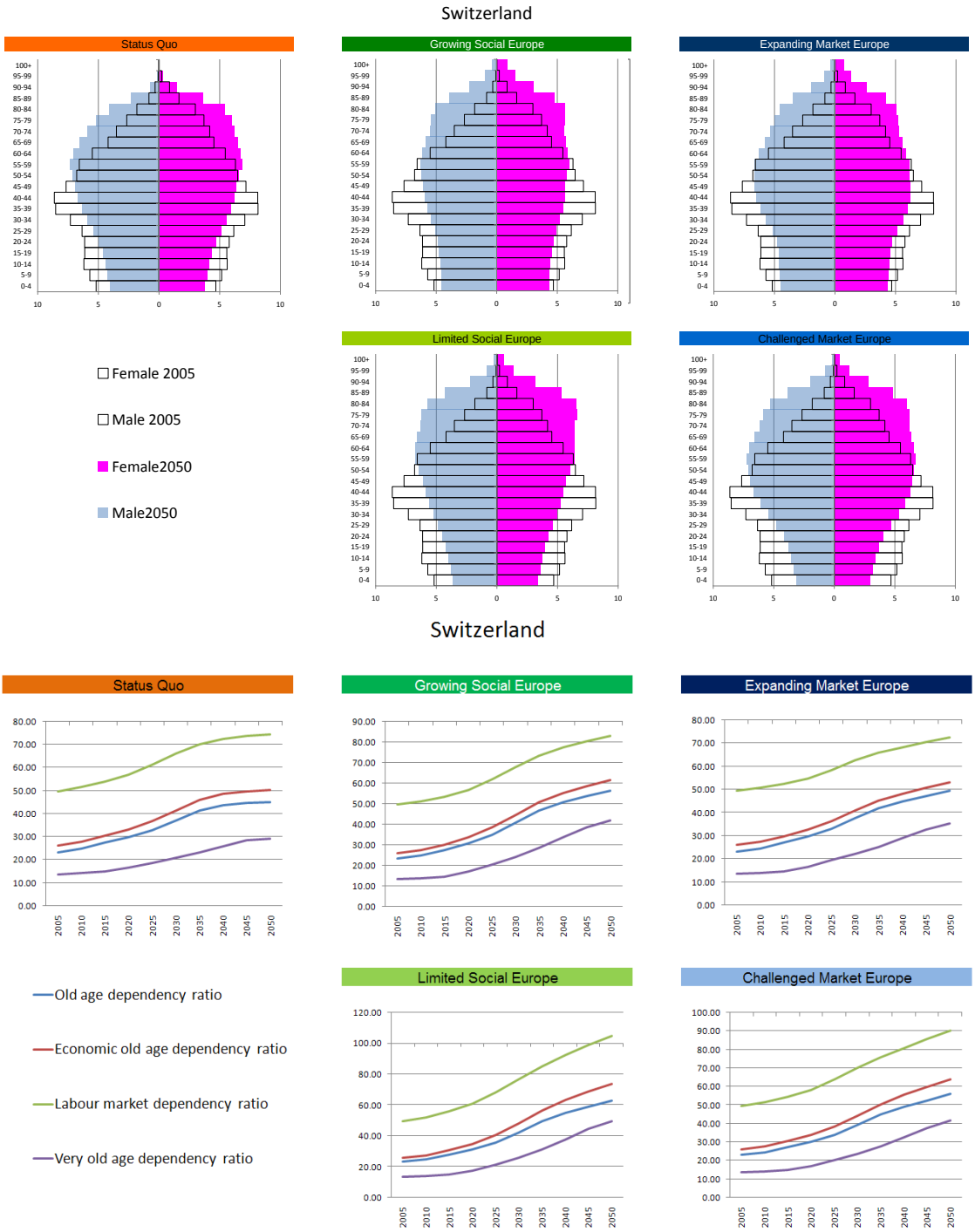

Figure A.58: Scenario profile for population ageing and dependency ratios, 2005-50: Switzerland