



Netherlands Interdisciplinary Demographic Institute
PO Box 11650
NL 2502 AR The Hague
The Netherlands
++ 31 70 3565200
gaag@nidi.nl; erf@nidi.nl

Research Note

EUROPOP2008 compared with EUROPOP2004 scenarios

by Nicole van der Gaag and Rob van der Erf

Abstract:

A comparison of EUROPOP2008 with EUROPOP2004 for the Member States of the European Union over the period 2008-2050, shows that while under EUROPOP2004 by 2050 the total population in the EU-27 was estimated to be about 4 per cent smaller than in 2008, according to EUROPOP2008 the population in 2050 is expected to be still about 4 per cent larger than in 2008. For almost all countries the new scenario projects a larger population in 2050 compared to the previous scenario. For all countries that currently experience population growth, a significant postponement of the onset of population decline is foreseen. Although to a lesser extent, more or less comparable developments are expected with regard to the size of the working age population. For the former EU-15 countries the new scenario shows a slight slowing down of ageing. On the other hand, for most of the new Member States an acceleration of ageing is foreseen.

An important difference between the two scenarios is the framework of the assumptions. While the baseline scenario of EUROPOP2004 follows most closely a continuation of past trends, the 2150 variant of the convergence scenario of EUROPOP2008 explicitly introduces convergence in the assumptions. Assuming that socio-economic and cultural differences between the Member States of the European Union will fade out in the very long run, similar values for demographic indicators are imposed for the convergence year 2150. As a consequence of the long-term time horizon of the convergence perspective (from 2008 to 2150) however, convergence is less profound within the time horizon of the projections (2008-2060) than one might expect. In fact, the new scenarios are even less converging than the previous ones regarding fertility and migration assumptions as well as the outcomes in terms of population growth and dependency ratios.

Given the limited amount of information published with EUROPOP2008, it is difficult to fully understand the reasoning behind this scenario. Nevertheless, we acknowledge the value of the 2150 variant of the EUROPOP2008 convergence scenario as it can illustrate what will happen in the period 2008-2060 if by 2150 all countries would be similar as regards demographic indicators and taking into account that decreasing working age populations might be compensated by migration. Without additional information, however, we can not answer the question whether this scenario can be seen as a plausible alternative for, or sound update of the baseline scenario of EUROPOP2004.

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I. Introduction¹

In the last decades of the 20th century, demographic developments in Europe have changed significantly. Declining fertility levels and extended life expectancies have altered the age distribution of the population towards a general trend of ageing. At the same time international migration gained importance as component of population growth. Although at a world scale Europe may be considered a rather homogeneous region in terms of demographic trends, at national level there are certainly intra-European demographic differences.

Within the European Union, supra-national policies on various economic and social issues, require population projections that are based as far as possible on harmonized data, a common model and common assumptions. These supra-national policies can not be implemented with the aid of nationally compiled projections as the results of these projections are often incomparable across countries as each country has its own definitions and methods. For this reason, from 1980 onwards the European Commission (Eurostat) regularly compiles a set of internationally consistent population projections for the countries of the European Union. The latest set of national population scenarios, EUROPOP2008, covers the 27 Member States of the European Union, Norway and Switzerland over the period 2008-2060. In the present research note we compare for the countries of the EU-27 the input as well as the outcomes of the last two rounds of the projections: EUROPOP2004 and EUROPOP2008.

Eurostat's long-term national population scenarios EUROPOP2004 were compiled in 2004-2005. These scenarios concern projections for all Member States of the then EU-25, as well as Bulgaria and Romania, and cover the period 2004-2050. Acknowledging that the future is inherently unpredictable, five scenarios were prepared: a baseline, low, high, no migration and high fertility scenario. The baseline scenario describes the 'average development', i.e. the outcome of a continuation of current trends. The low and high scenarios describe contrasting variants of population growth, while the young and old scenarios describe contrasting variants of ageing. For the new Member States, except Cyprus and Malta, a slightly different approach was adopted as for those countries demographic patterns in the first years of the 21st century were still highly influenced by the turbulent years after the fall of the communism. In general, for the transition countries a process of convergence to western patterns of behaviour was assumed. The level of convergence and the path towards it, however, depended on country-specific developments.

Contrary to EUROPOP2004, the latest scenarios EUROPOP2008 have been developed in a consistent framework of convergence. The year 2150 has been chosen as the theoretical year in which the life expectancy, total fertility rate and net migration across countries will converge to similar values. For each country and each demographic component, the target values for 2060 are set by interpolating from the starting value in 2008 to the convergence values in 2150, and take out the resulting (partial convergence) values for 2060. The model of convergence is based on the assumption that socio-economic and cultural differences between the Member States of the European Union, Norway and Switzerland will fade out in the very long run and that this will bring a convergence of demographic drivers and thus of demographic values. The resulting population projections describe the possible future demographic developments assuming that across countries fertility and mortality converge to the "forerunners" (or best performers) within the EU. For mortality, the age and sex specific convergence figures are based on an EU-region population made up of 12 countries (the EU15 except Ireland, Luxembourg and Greece). For fertility in 2150 a common total fertility

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rate (TFR) of 1.85 and mean age at childbearing (MAC) of 30.3 are assumed². Concerning international migration it is assumed that migration flows will converge to zero net migration, however, migration has been adjusted upwards whenever the projections resulted in a shortage of the working age population.

Until now, one convergence variant has been compiled, the 2150 variant, resulting in two different scenarios: one with and one without migration. Both scenarios project the population at 1 January by sex and single years of age up to the age group of 80+. Currently Eurostat is investigating the options for additional variants based on different convergence years (e.g. 2100, 2200).

A previous comparison of the assumptions and results of EUROPOP2004 with earlier Eurostat scenarios, showed that for the EU-15 EUROPOP2004 was a sound successor to the earlier Eurostat population scenarios. As EUROPOP2004 was the first set of scenarios that cover all current Member States of the EU-27, it was not possible to make this comparison for the 12 new Member States (NMS-12). Differences between EUROPOP2004 and EUROPOP1999 could be attributed to differences between the expected patterns according to the 1999 scenarios and observed figures for the period 1999-2003. Only for mortality EUROPOP2004 assumed a somewhat more optimistic view towards long term developments in life expectancy. As a consequence of these more optimistic mortality assumptions together with on average more numerous populations at the start of the projections, according to EUROPOP2004 a slight postponement was expected of the onset of population decline. At the same time, somewhat higher levels of the working age population are foreseen as a consequence of higher expected net migration. Given the lower fertility assumptions, however, an earlier start of the decline of the working age population was expected, resulting in an acceleration of ageing. Although the expected size and composition of the population differed across the different scenarios of EUROPOP2004, the prospects in terms of dejuvenation and ageing were more or less similar in all scenarios: no appreciable difference in the young age dependency ratio together with a considerable increase in the old age dependency ratio.

In this research note we investigate in what respect the results of EUROPOP2008 differ from the results of EUROPOP2004 for the 27 countries of the European Union.

II. Assumptions

Fertility

Fertility rates for most of the countries of the EU-15 were rather stable in the 1990s, but start to rise from the turn of the century onwards. Fertility levels in the new Member States dropped significantly in the 1990s, but also start rising since 2000. The increasing pattern of the first few years of the current century continued until 2007. For most countries, much stronger increases were observed than expected under the baseline scenario of EUROPOP2004, resulting in higher starting values for total fertility rates in EUROPOP2008 than in EUROPOP2004. Only for Germany, Luxembourg, Malta and Portugal fertility in the base year of the projections was significantly lower than in EUROPOP2004 (see Table 1). Comparing the assumptions for 2050, we see fewer differences across countries and a stronger convergence under EUROPOP2004 than under EUROPOP2008. This is confirmed in Figure 1 where the (dotted) lines for EUROPOP2004 start at greater distance but converge more strongly than the lines for EUROPOP2008.

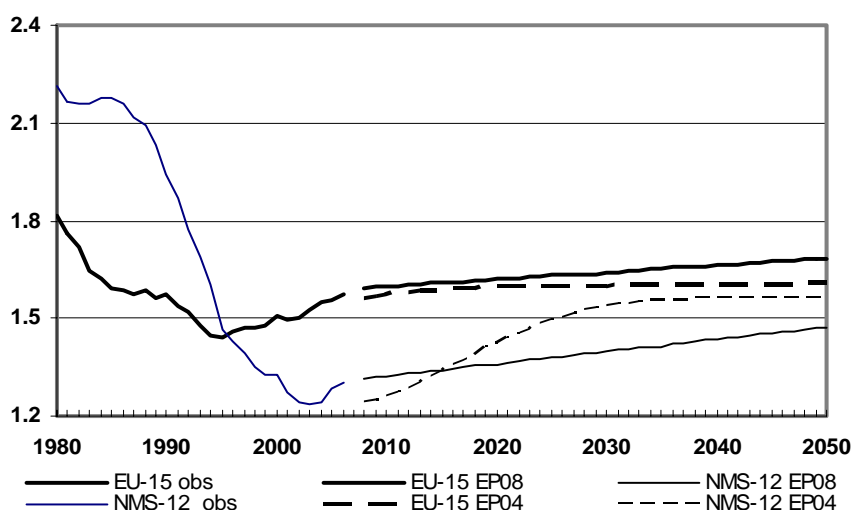
² Methodological notes are currently under preparation by Eurostat.

Table 1: Assumptions of total fertility rates (TFR), 2008 and 2050

	TFR 2008		TFR 2050	
	Europop 2004	Europop 2008	Europop 2004	Europop 2008
EU-27	1.50	1.54	1.60	1.65
EU-15	1.56	1.59	1.61	1.68
NMS-12	1.24	1.31	1.56	1.47
Austria	1.41	1.41	1.45	1.54
Belgium	1.65	1.75	1.70	1.78
Bulgaria	1.23	1.38	1.50	1.52
Cyprus	1.43	1.45	1.50	1.57
Czech Republic	1.20	1.33	1.50	1.49
Denmark	1.77	1.85	1.80	1.85
Estonia	1.43	1.55	1.60	1.64
Finland	1.78	1.84	1.80	1.84
France (excl. DOM)	1.88	1.98	1.85	1.94
Germany	1.40	1.34	1.45	1.49
Greece	1.37	1.41	1.50	1.54
Hungary	1.31	1.35	1.60	1.50
Ireland	1.91	1.90	1.80	1.88
Italy	1.36	1.38	1.40	1.52
Latvia	1.38	1.36	1.60	1.50
Lithuania	1.29	1.35	1.60	1.51
Luxembourg	1.71	1.65	1.80	1.71
Malta	1.53	1.38	1.60	1.52
Netherlands	1.75	1.72	1.75	1.76
Poland	1.18	1.27	1.60	1.44
Portugal	1.50	1.36	1.60	1.51
Romania	1.32	1.32	1.50	1.48
Slovakia	1.17	1.25	1.60	1.43
Slovenia	1.22	1.32	1.50	1.48
Spain	1.34	1.39	1.40	1.52
Sweden	1.82	1.85	1.85	1.85
United Kingdom	1.73	1.84	1.75	1.84

Source: Eurostat and NIDI estimates based on Eurostat data.

Figure 1: Total fertility rate (TFR), 1980-2006 observed, 2008-2050 forecast



Source: NIDI estimates based on Eurostat data.

Whilst under the baseline scenario of EUROPOP2004 the TFR varies from 1.40 for Italy to 1.85 for France and Sweden; under EUROPOP2008 the TFR varies from 1.43 for Slovakia to 1.94 for France. It is remarkable that for several countries (Hungary, Lithuania, Poland and Slovakia) the assumptions for 2050 in EUROPOP2008 are lower than under

EUROPOP2004, even though the value in 2008 exceeds the value projected under EUROPOP2004. This less converging pattern for EUROPOP2008 is striking as convergence was only ad hoc embedded in the previous scenarios, while it plays a major role in the latest ones. As a consequence of the long-term time horizon of the convergence perspective (from 2008 to 2150), with respect to fertility, convergence is less profound within the time horizon of the projections than one might expect.

Mortality

Looking at life expectancies in the past, two different patterns were observed for the countries of the former EU-15 and the 12 new Member States. Although life expectancies at birth in the EU-15 have been increasing ever since the 1960s, life expectancies of inhabitants of the new Member States initially lagged behind slowly, while the differences accelerated in the early 1990s. Especially in the Baltic States, life expectancy of males dropped sharply. Nowadays these differences are still considerable. For most of the new Member States life expectancy at birth for males is still below 70, while for most of the former EU-15 countries it is well above 75. For females the differences are less profound, but still there. This is reflected in the starting values for the projections (see Table 2). For most of the countries the value for 2008 is somewhat higher than according to the previous projections.

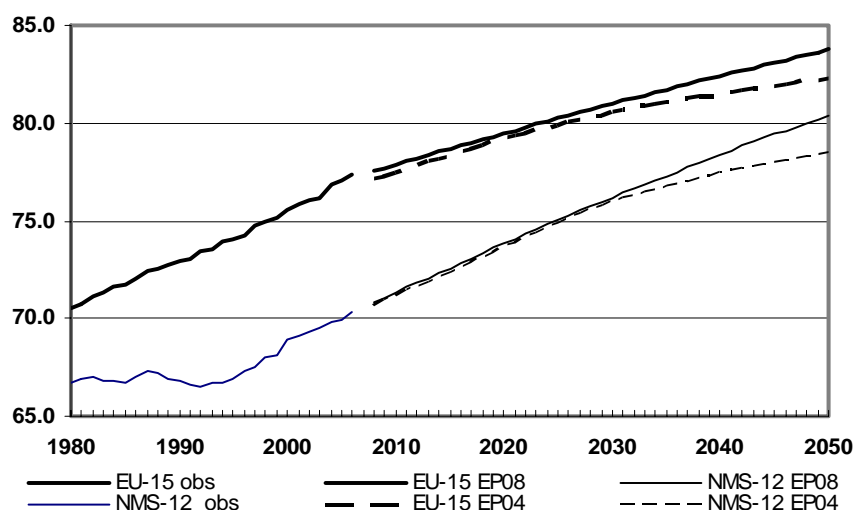
Table 2: Assumptions of life expectancy at birth (LE(0)), 2008 and 2050

	Males				Females			
	LE(0) 2008		LE(0) 2050		LE(0) 2008		LE(0) 2050	
	Europop 2004	Europop 2008	Europop 2004	Europop 2008	Europop 2004	Europop 2008	Europop 2004	Europop 2008
EU-27	75.8	76.1	81.6	83.2	81.9	82.1	86.7	87.9
EU-15	77.1	77.5	82.3	83.8	82.9	83.1	87.4	88.3
NMS-12	70.6	70.8	78.4	80.4	78.2	78.7	83.6	86.0
Austria	77.0	77.4	83.6	83.6	82.8	82.9	87.7	88.1
Belgium	76.4	76.7	82.3	83.1	82.5	82.3	88.3	87.8
Bulgaria	70.2	69.7	78.2	79.6	76.8	76.7	82.6	84.9
Cyprus	77.1	78.2	81.9	84.0	81.4	81.7	85.1	87.5
Czech Republic	73.2	73.9	79.7	81.6	79.5	80.2	84.1	86.5
Denmark	75.9	76.4	80.9	82.9	80.1	81.0	83.7	87.2
Estonia	66.2	68.0	74.9	78.8	77.5	78.7	83.1	86.1
Finland	76.2	76.1	81.9	83.0	82.5	83.0	86.5	88.2
France (excl. DOM)	77.1	77.5	82.7	83.9	84.1	84.3	89.1	89.1
Germany	76.8	77.3	82.0	83.6	82.4	82.6	86.9	88.0
Greece	76.9	77.4	80.3	83.6	81.9	82.6	85.1	87.6
Hungary	69.6	69.7	78.1	79.9	77.6	78.1	83.4	85.8
Ireland	76.4	77.5	82.4	83.9	81.4	81.9	87.0	88.0
Italy	78.1	78.5	83.6	84.3	83.8	84.2	88.8	89.0
Latvia	65.4	66.0	74.3	78.1	76.7	76.7	82.5	85.2
Lithuania	67.1	65.9	75.5	78.1	78.2	77.4	83.7	85.3
Luxembourg	75.9	76.3	81.6	83.2	82.1	81.2	86.7	87.3
Malta	77.1	76.0	81.8	83.0	81.4	81.1	85.0	87.4
Netherlands	76.8	77.9	80.2	83.7	81.2	82.2	83.6	87.8
Poland	71.5	71.4	79.1	80.7	79.3	79.9	84.4	86.7
Portugal	75.0	75.8	80.4	82.7	81.8	82.4	86.6	87.7
Romania	69.3	69.8	77.6	79.9	76.1	76.6	82.0	85.0
Slovakia	70.5	70.9	77.7	80.2	78.4	78.7	83.4	85.9
Slovenia	73.4	74.7	79.8	82.2	80.9	81.9	85.2	87.6
Spain	77.3	77.4	81.4	83.7	84.1	83.9	87.9	88.6
Sweden	78.8	79.0	83.3	84.3	82.9	83.1	86.5	88.3
United Kingdom	77.2	77.4	82.9	83.8	81.7	81.5	86.6	87.7

Source: Eurostat and NIDI estimates based on Eurostat data.

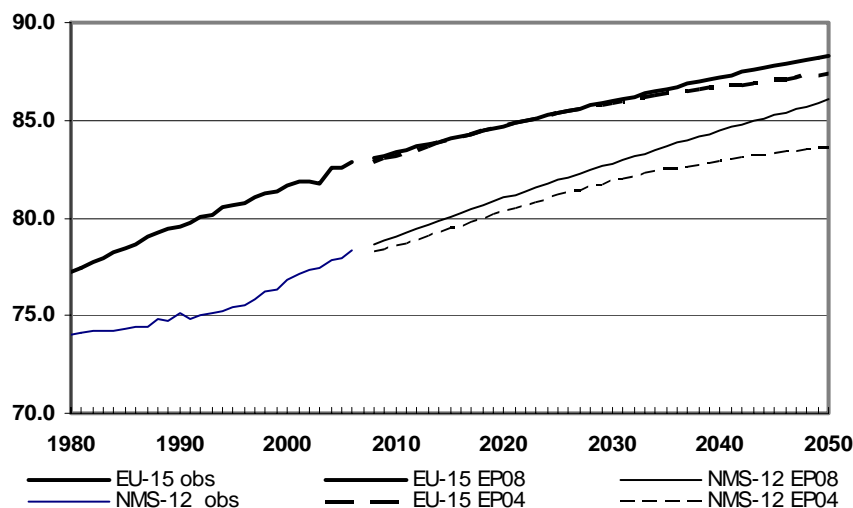
With only very few exceptions, for the years to come, a stronger increase of life expectancy is assumed under the latest projections compared to the previous ones and contrary to fertility some more convergence is assumed and a slightly smaller gap between males and females. Nevertheless, the differences between the new Member States and the former EU-15 countries will not have disappeared by 2050 (see also Figures 2a and 2b).

Figure 2a: Life expectancy at birth ($LE(0)$), males, 1980-2006 observed, 2008-2050 forecast



Source: NIDI estimates based on Eurostat data.

Figure 2b: Life expectancy at birth ($LE(0)$), females, 1980-2006 observed, 2008-2050 forecast



Source: NIDI estimates based on Eurostat. data.

Migration

Migration flows in Europe are often closely related to specific historical events such as the war in former Yugoslavia or the fall of the Iron Curtain, to economic developments and to policy decisions. This makes it very difficult to predict international migration flows. As a result not only migration numbers are very volatile, but also migration assumptions. Under EUROPOP1995 a decrease in net migration to the countries of the European Economic Area was expected mainly attributed to the fact that immigration policies were expected to become increasingly restrictive. For EUROPOP1999, in principle target values of the national

forecasts were used for long term migration, while the past trends were expected to influence the short-term prediction. According to EUROPOP2004 for the countries of the former EU-15, international migration assumptions were based on an extrapolation of trends, on analyses of the determinants of migration and on assumptions used in the national forecasts. Assumptions for the new Member States were based on the expected socio-economic situation of the countries concerned and on the gradual opening of the labour markets of the EU-15 countries for employees of the new Member States. This resulted in high emigration and a decrease of net migration in the short run, with a minimum in 2011, an increasing importance of immigration in the mid term, and positive values of net migration for all countries in the long run. In EUROPOP2008 international migration is assumed to converge to zero net migration in 2150, however, migration has been adjusted upwards whenever the projections resulted in a shortage of the working age population. Without additional information, it is difficult to fully understand the consequences of these adjustments.

Table 3 shows net migration figures for 2008 as well as 2050 according to EUROPOP2004 and EUROPOP2008. With a few exceptions, net levels of migration in 2008 are higher in the latest projections than in the previous one. Most notable differences are found for Germany Italy and Spain. While EUROPOP2004 was assuming that the high net migration numbers in Italy and Spain in the first years of this century would not persist and that in the long run Germany would remain the country with the highest net migration, according to EUROPOP2008, in the long run Italy will have the highest net migration, followed by Germany, Spain and the United Kingdom with almost similar net migration levels.

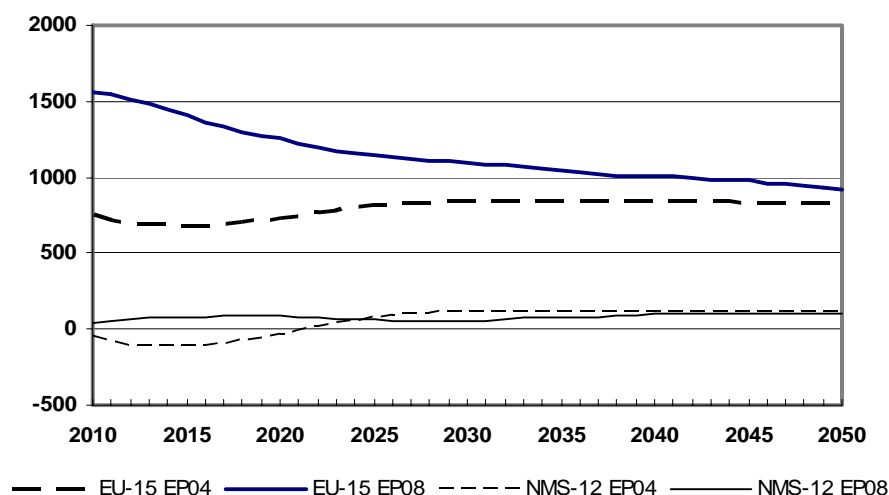
Table 3: Assumptions of net migration, 2008 and 2050

	Net migration (x 1000)			
	2008		2050	
	Europop 2004	Europop 2008	Europop 2004	Europop 2008
EU-27	821.1	1 683.9	833.2	924.3
EU-15	855.1	1 646.9	720.7	825.1
NMS-12	-34.0	37.1	112.5	99.3
Austria	23.9	33.1	20.3	24.7
Belgium	20.2	50.7	18.5	25.2
Bulgaria	-11.6	-1.4	2.5	1.6
Cyprus	6.3	9.3	4.9	6.6
Czech Republic	3.9	24.0	20.0	21.9
Denmark	7.4	9.7	6.6	5.7
Estonia	-1.9	-0.6	1.7	0.3
Finland	6.2	9.7	6.0	4.9
France (excl. DOM)	61.9	99.3	58.7	69.9
Germany	206.5	159.8	179.2	135.7
Greece	40.0	39.7	34.9	31.0
Hungary	14.2	19.6	20.1	17.9
Ireland	15.6	63.1	12.4	7.4
Italy	118.7	259.5	113.8	193.4
Latvia	-2.4	-1.0	2.8	0.7
Lithuania	-5.8	-2.2	4.3	1.2
Luxembourg	2.8	4.4	2.8	3.1
Malta	2.5	1.0	2.5	0.9
Netherlands	32.5	7.8	31.1	7.2
Poland	-29.2	-15.5	33.7	26.4
Portugal	20.9	51.8	14.9	38.8
Romania	-13.7	-5.6	8.6	12.7
Slovakia	-2.4	3.6	4.7	6.1
Slovenia	6.1	5.9	6.7	3.0
Spain	151.8	623.4	101.6	135.2
Sweden	24.7	46.8	21.3	16.7
United Kingdom	122.0	188.2	98.5	126.3

Source: Eurostat.

Furthermore, the difference between the lowest and the highest net migration levels in 2050 according to EUROPOP2008 (193 thousand) is larger than the difference according to EUROPOP2004 (178 thousand). In Figure 3 it is confirmed that, similar to the TFR, net migration tends to converge less in EUROPOP2008 than in EUROPOP2004. Also if we take into account the size of the population in the different countries we find somewhat larger differences in the latest projections (net migration per thousand of the population in 2050 varying from 0.49 to 5.03, and from 0.27 to 5.24, respectively). We have to note here, that in the latest figures it is difficult to distinguish between the part of migration that is directly attributable to the convergence assumption of zero net migration and the part that is attributable to the adjustment made in case of shortages of the working age population³.

Figure 3: Assumptions of net migration, 2010-2050 (x 1000)



Source: Eurostat.

III. Outcomes of the projections

To what extent do differences in the assumptions affect the outcomes of the projections? In the current section we compare the outcomes of the baseline scenario of EUROPOP2004 with the 2150 variant of the convergence scenario of EUROPOP2008. We look at differences in the base population of 2008, the mid term population of 2025 and the long term population of 2050. As the main purpose of this research note is to compare the two different rounds of Eurostat scenarios and not to report on the results of EUROPOP2008, we only pay limited attention to developments up to 2060. Apart from the total population, we focus on developments in the following age groups: children (0-14), young people (15-24), young adults (25-39), adults (40-54), older workers (55-64), elderly people (65-79) and very elderly people (80+). In addition to the different age groups and the total population, we also pay attention to developments in the overall working-age group (15-64) and to the age dependency ratios.

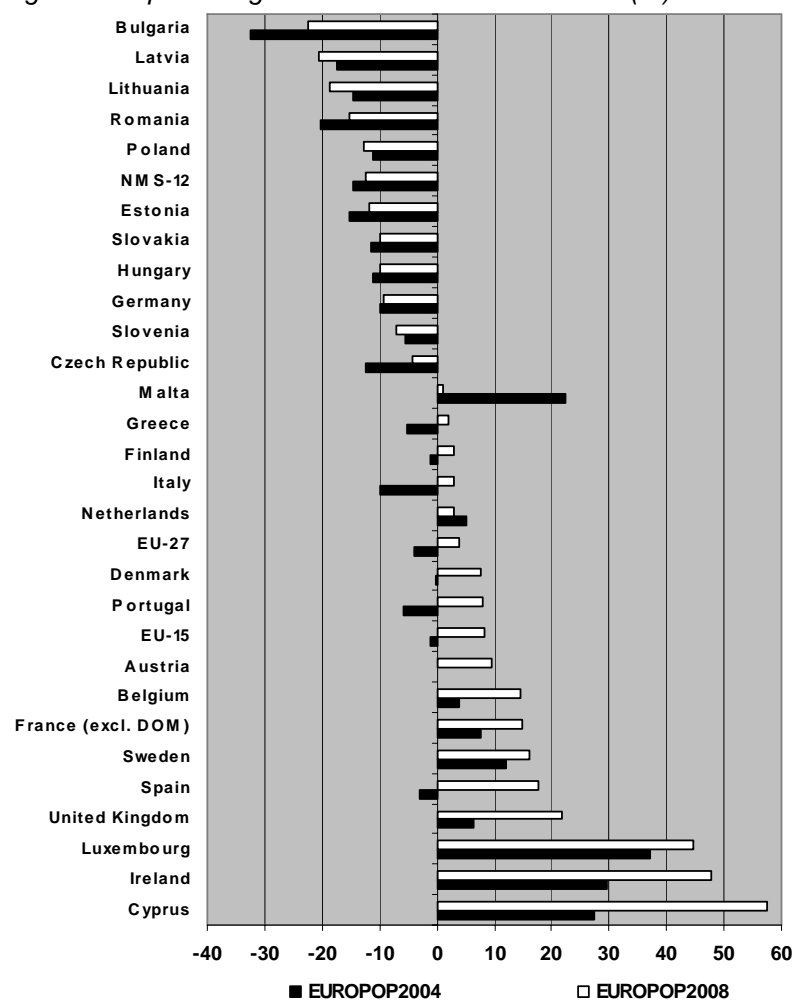
Population growth

European population growth in the last decades has been moderate to slow for the countries of the former EU-15, while most of the new Member States already experienced population decline. Under EUROPOP2004, for five countries only a continuous growth was foreseen

³ Although not reported in this research note, an analysis of standard deviations supports the conclusions on the comparison of assumptions of EUROPOP2004 and EUROPOP2008.

(Ireland, Cyprus, Luxembourg, Malta and Sweden)⁴. With the exception of Malta, these countries still may expect their populations to grow until the end of the projection period. However, this applies also for Belgium, Denmark, France and the United Kingdom. Under EUROPOP2004 for the period 2008-2050 for the EU-27 a population decline was expected of about 4 per cent; under EUROPOP2008 a population increase is expected of about 4 per cent. For most countries a higher percentage increase or a lower percentage decline is expected. Only for Latvia, Lithuania, Poland and Slovenia a somewhat higher percentage population decline is foreseen and for the Netherlands a somewhat lower percentage increase (see Figure 4).

Figure 4: Population growth between 2008 and 2050 (%)



Source: Eurostat.

For most of the countries of the former EU-15, the onset of population decline is postponed considerably (see Table 4). For Italy, Spain and Portugal it is postponed by more than 20 years. Also for the Czech Republic, Slovenia, and Slovakia, a significant postponement is expected. For the Netherlands the perspective for population decline is more or less similar under both scenarios, while the pace of population decline has been increased considerably in Germany and Malta.

⁴ The high growth figure in EUROPOP2004 for Malta appeared to be caused by a, for methodological reasons, overestimated start value of the TFR.

Table 4: First year of population decline

EUROPOP2004		EUROPOP2008
Cyprus, Ireland, Luxembourg, Malta, Sweden	>2050	Belgium, Cyprus, Denmark, France, Ireland, Luxembourg, Sweden, United Kingdom
	2046	Austria
	2045	Portugal, Spain
France	2042	
United Kingdom	2040	
	2038	Italy
Belgium	2037	
Netherlands	2036	Netherlands
Denmark	2032	
	2031	Finland
Austria	2029	
Finland	2028	Malta
	2026	Greece
Spain	2022	
	2021	Czech Republic
Greece	2020	
	2019	Slovakia, Slovenia
Portugal	2018	
Germany, Slovenia	2014	
Italy	2013	
Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia	<2008	Bulgaria, Estonia, Germany, Hungary, Latvia, Lithuania, Poland, Romania

Source: Eurostat.

Total population

Table 5 presents the total population for 2008 as predicted under the baseline scenario of EUROPOP2004, the base population for EUROPOP2008, as well as the percentage difference between both numbers. From Table 5 we may conclude that differences in the total population in the EU-27 in 2008 are negligible. This is not the case, however, for some of the countries. For Cyprus, Ireland, Luxembourg and Spain, the population in 2008 outnumbered the expected population according to the baseline scenario of EUROPOP2004 by more than two per cent. For, Germany, Lithuania, Malta, the Netherlands, Portugal and Romania, on the other hand, the population of 2008 was slightly less than expected (except for Malta, in all cases less than one per cent).

Looking at the midterm developments, the population expected under the latest scenario for the EU-27 outnumbers the one predicted by the previous one by more than four per cent. The largest positive differences can be found for Cyprus, Ireland and Spain, with differences of 13 to 15 per cent. However, for Malta, the Netherlands and Germany, the population estimates have been adjusted downwards. By 2050, the difference in total population for the EU-27 between the two scenarios is almost ten per cent.

While in 2025 the difference for the former EU-15 countries and the 12 new Member States was almost identical, by 2050 the additional population growth for the EU-15 triples the additional growth for the new Member States. In terms of percentages, the largest differences are still found for Cyprus, Spain and Ireland, but also remarkable is the high positive difference for Bulgaria (16 per cent). Was according to EUROPOP2004 Germany still the country with by far the most numerous population, according to EUROPOP2008, Germany and the United Kingdom are side by side in 2050, on short distance followed by France.

Table 5: Total population on 1 January, 2008, 2025 and 2050 (x 1000)

	1 January 2008			1 January 2025			1 January 2050		
	Europop 2004	Europop 2008	Diff. %	Europop 2004	Europop 2008	Diff. %	Europop 2004	Europop 2008	Diff. %
EU-27	491 309	495 394	0.8	496 268	517 811	4.3	472 050	515 303	9.2
EU-15	388 614	392 222	0.9	398 780	416 994	4.6	384 356	424 878	10.5
NMS-12	102 695	103 172	0.5	97 489	100 817	3.4	87 694	90 425	3.1
Austria	8 212	8 334	1.5	8 501	8 866	4.3	8 216	9 127	11.1
Belgium	10 504	10 656	1.4	10 898	11 547	6.0	10 906	12 194	11.8
Bulgaria	7 557	7 642	1.1	6 465	6 974	7.9	5 094	5 923	16.3
Cyprus	766	795	3.8	897	1 017	13.3	975	1 251	28.3
Czech Republic	10 154	10 346	1.9	9 812	10 516	7.2	8 894	9 892	11.2
Denmark	5 447	5 476	0.5	5 557	5 736	3.2	5 430	5 895	8.6
Estonia	1 328	1 339	0.8	1 224	1 292	5.5	1 126	1 181	4.9
Finland	5 270	5 300	0.6	5 439	5 549	2.0	5 217	5 448	4.4
France (excl. DOM)	60 986	61 876	1.5	64 392	66 846	3.8	65 704	71 044	8.1
Germany	82 753	82 179	-0.7	82 108	80 907	-1.5	74 642	74 491	-0.2
Greece	11 200	11 217	0.1	11 394	11 575	1.6	10 632	11 445	7.7
Hungary	10 029	10 045	0.2	9 588	9 790	2.1	8 915	9 061	1.6
Ireland	4 225	4 415	4.5	4 922	5 673	15.3	5 478	6 531	19.2
Italy	58 533	59 529	1.7	57 751	61 683	6.8	52 709	61 240	16.2
Latvia	2 265	2 269	0.2	2 068	2 095	1.3	1 873	1 804	-3.7
Lithuania	3 379	3 365	-0.4	3 134	3 158	0.8	2 881	2 737	-5.0
Luxembourg	469	482	2.8	544	579	6.4	643	697	8.5
Malta	415	410	-1.2	468	431	-7.9	508	415	-18.4
Netherlands	16 542	16 404	-0.8	17 429	17 069	-2.1	17 406	16 909	-2.9
Poland	37 957	38 116	0.4	36 836	37 612	2.1	33 665	33 275	-1.2
Portugal	10 638	10 617	-0.2	10 730	11 224	4.6	10 009	11 449	14.4
Romania	21 477	21 423	-0.2	19 746	20 484	3.7	17 125	18 149	6.0
Slovakia	5 359	5 399	0.7	5 237	5 402	3.2	4 738	4 859	2.6
Slovenia	2 009	2 023	0.7	2 014	2 047	1.6	1 901	1 878	-1.2
Spain	44 203	45 283	2.4	45 556	52 101	14.4	42 834	53 229	24.3
Sweden	9 117	9 183	0.7	9 769	10 094	3.3	10 202	10 672	4.6
United Kingdom	60 517	61 270	1.2	63 792	67 543	5.9	64 330	74 506	15.8

Source: Eurostat.

NB Diff.=Difference of 2008 value minus 2004 value in percentage of the 2004 value.

Population by sex and age

Table 6 as well as Figures 5 and 6 show the differences between EUROPOP2008 and EUROPOP 2004 as regards the sex and age distribution. Looking at midterm developments, we see that all differences between EUROPOP2008 and EUROPOP2004 are positive for both the EU-15 and the NMS-12. For the EU-15 especially the estimated number of children (0-14) and younger workers (25-39) outnumber the estimates under EUROPOP2004. For the NMS-12 differences are on average smaller and more similar among different age groups, although the increase in the number of women of age 80+ is remarkable (8.8 per cent).

For the long term developments up to 2050, we see increasing differences for all age groups for the EU-15. Especially for the youngest age groups (0-14, 15-24 and 25-39) the differences are considerable, varying from 15 to 19 per cent, but also for the elderly the differences are substantial. Among the eldest age groups, differences are stronger for males than for females. The picture for the new Member States is quite different. Whilst for the EU-15 strong positive differences are expected for the younger age groups, for the NMS-12 for the ages up to the age of 25 less numerous populations are expected compared to EUROPOP2004. At the same time, much higher differences are expected for the elderly, but contrary to the EU-15, the strongest differences are expected for women.

Table 6: Population by sex and age groups, 1 January 2025 and 2050 (x 1000)

	Men				Women			
	1 January 2025		1 January 2050		1 January 2025		1 January 2050	
	Europop 2004	Europop 2008	Europop 2004	Europop 2008	Europop 2004	Europop 2008	Europop 2004	Europop 2008
EU-27								
0-14	36 729	39 916	32 487	37 257	34 696	37 683	30 653	35 157
15-24	26 712	28 008	23 507	26 109	25 411	26 834	22 253	24 791
25-39	45 322	48 973	39 989	45 090	43 689	47 367	38 248	43 137
40-54	51 194	53 233	42 272	45 759	50 904	52 598	41 222	44 728
55-64	34 604	34 785	29 975	32 323	35 806	36 146	30 130	32 505
65-79	36 911	37 038	41 850	43 849	43 412	43 603	46 379	47 958
80+	11 540	11 924	21 394	22 976	19 339	19 704	31 690	33 664
total	243 012	253 877	231 474	253 364	253 257	263 934	240 576	261 940
EU-15								
0-14	29 620	32 603	26 642	31 661	27 981	30 746	25 150	29 848
15-24	21 777	22 833	19 330	22 127	20 723	21 887	18 296	20 984
25-39	35 804	38 983	32 530	37 502	34 499	37 675	31 055	35 835
40-54	39 813	41 508	34 729	37 922	39 540	40 936	33 778	37 038
55-64	28 758	28 826	23 737	25 736	29 407	29 655	23 620	25 715
65-79	30 096	30 103	33 498	34 942	34 282	34 317	36 559	37 691
80+	10 046	10 380	18 360	19 678	16 435	16 542	27 072	28 198
total	195 914	205 235	188 826	209 569	202 866	211 758	195 530	215 309
NMS-12								
0-14	7 109	7 313	5 845	5 596	6 715	6 936	5 503	5 308
15-24	4 935	5 175	4 177	3 982	4 689	4 947	3 958	3 807
25-39	9 518	9 990	7 459	7 588	9 190	9 692	7 193	7 302
40-54	11 381	11 725	7 543	7 837	11 364	11 663	7 444	7 690
55-64	5 846	5 960	6 238	6 587	6 399	6 491	6 511	6 790
65-79	6 814	6 935	8 352	8 907	9 130	9 286	9 820	10 267
80+	1 494	1 544	3 035	3 298	2 905	3 161	4 618	5 466
total	47 097	48 641	42 648	43 795	50 391	52 176	45 046	46 630

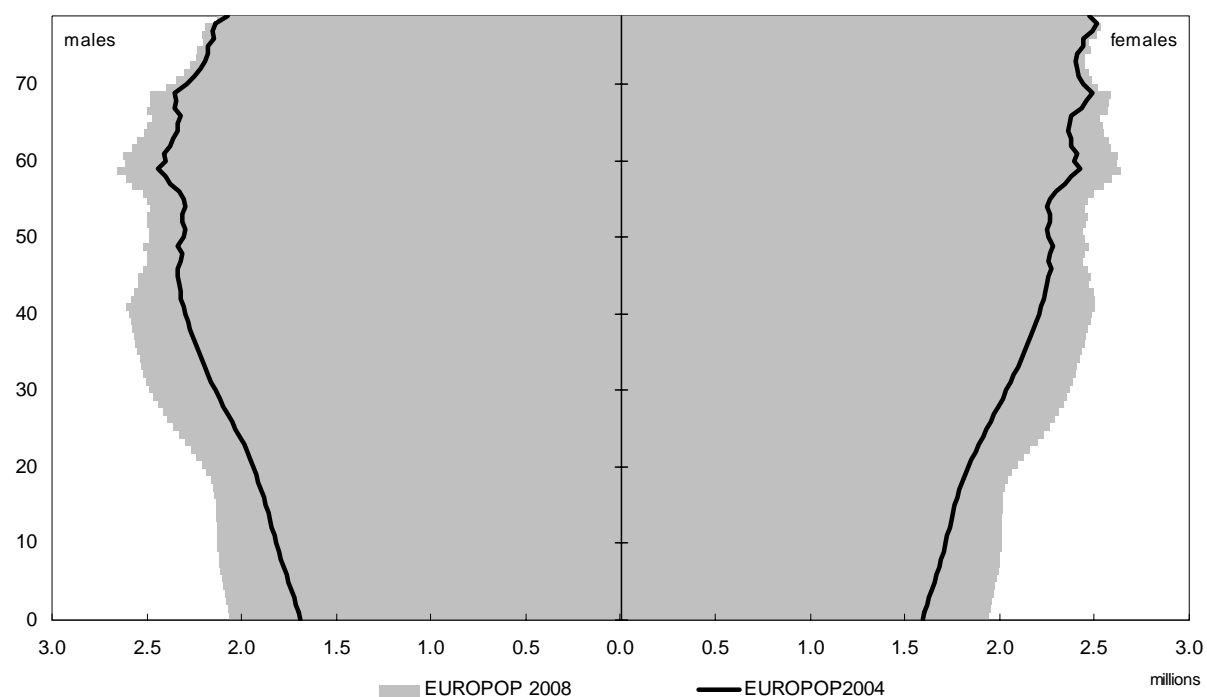
Source: Eurostat.

Developments in the working age population

In general, in the second half of the past century, the number of people of working age (approximated by the population aged 15-64) in the European Union has been growing. For the EU-27 as a whole, a slightly further growth is expected in the near future, but for most Member States a long period of decline is expected to start in the coming decade. Almost all countries that get away unscathed through this period, will sooner or later follow. Only Luxembourg will not be confronted with a declining potential labour force until 2060. For some countries, however, an alternating pattern of growth and decline is foreseen. This is for instance the case for Belgium, France, Ireland, Cyprus, Sweden and the United Kingdom.

Comparing EUROPOP2004 and EUROPOP2008, the differences in the onset of the decline of the working age population are only limited. For Belgium, Spain and Portugal the onset has been postponed by more than 10 years, while for the United Kingdom the delay is even almost 40 years. Only for Malta an earlier decline is expected (see Table 7).

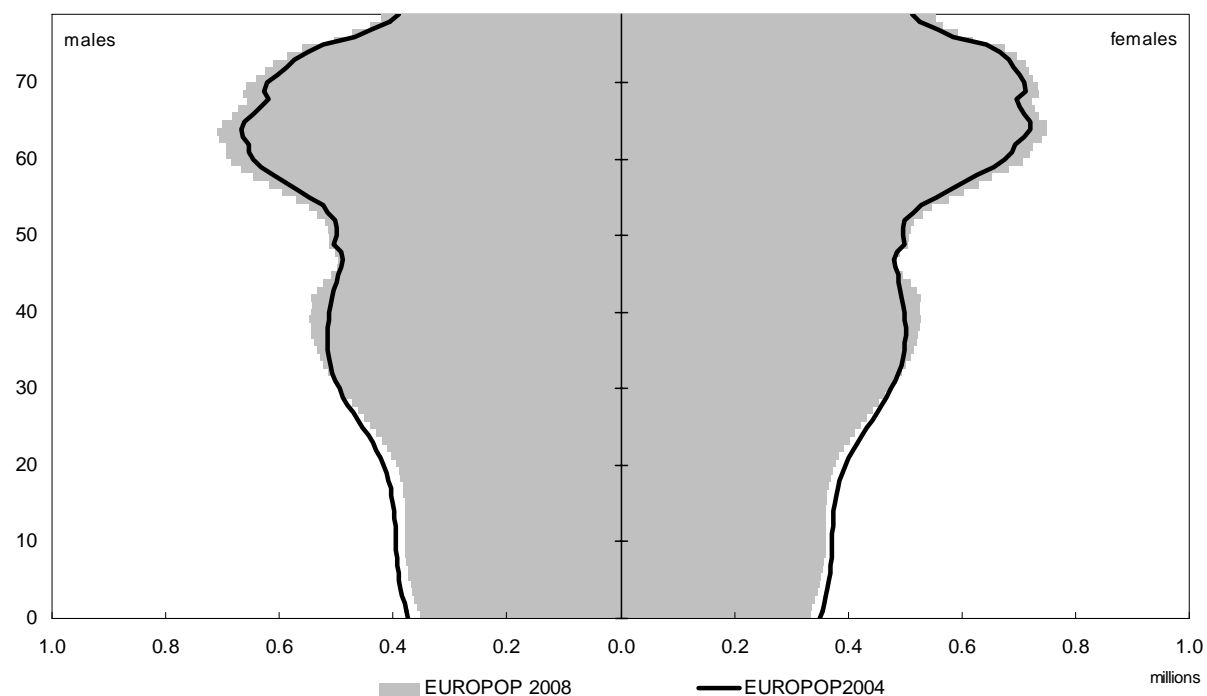
Figure 5: Population of the EU-15 by sex and age, 1 January 2050



Source: Eurostat.

NB No detailed information available for ages starting with 80; category 80+ men: EUROPOP2008 19.7 million, EUROPOP2004 18.4 million; category 80+ women: EUROPOP2008 28.2 million, EUROPOP2004 27.1 million.

Figure 6: Population of the NMS-12 by sex and age, 1 January 2050



Source: Eurostat.

NB No detailed information available for ages starting with 80; category 80+ men: EUROPOP2008 3.3 million, EUROPOP2004 3.0 million; category 80+ women: EUROPOP2008 5.5 million, EUROPOP2004 4.6 million.

Table 7: First year of decline of working age population

EUROPOP2004		EUROPOP2008
Luxembourg	>2050	Luxembourg, United Kingdom**
	2048	Cyprus**
Cyprus	2043	
	2040	Ireland**
Ireland	2035	
	2025	Spain
	2022	Belgium**, Portugal
	2020	Austria
Austria, Malta**	2012	Germany
Belgium, France, Netherlands*, Poland, Slovenia, United Kingdom*	2011	France**, Italy, Netherlands, Poland, Sweden**, Slovakia, Slovenia
Finland*, Greece, Spain, Slovakia	2010	Finland*, Greece
Sweden**	2009	Denmark*, Malta
Denmark*, Portugal	2008	
Bulgaria, Czech Republic, Estonia, Germany*, Hungary, Italy, Latvia, Lithuania, Romania	<2008	Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania

Source: Eurostat.

* A general declining trend with for some years growth or an alternating pattern of growth and decline.

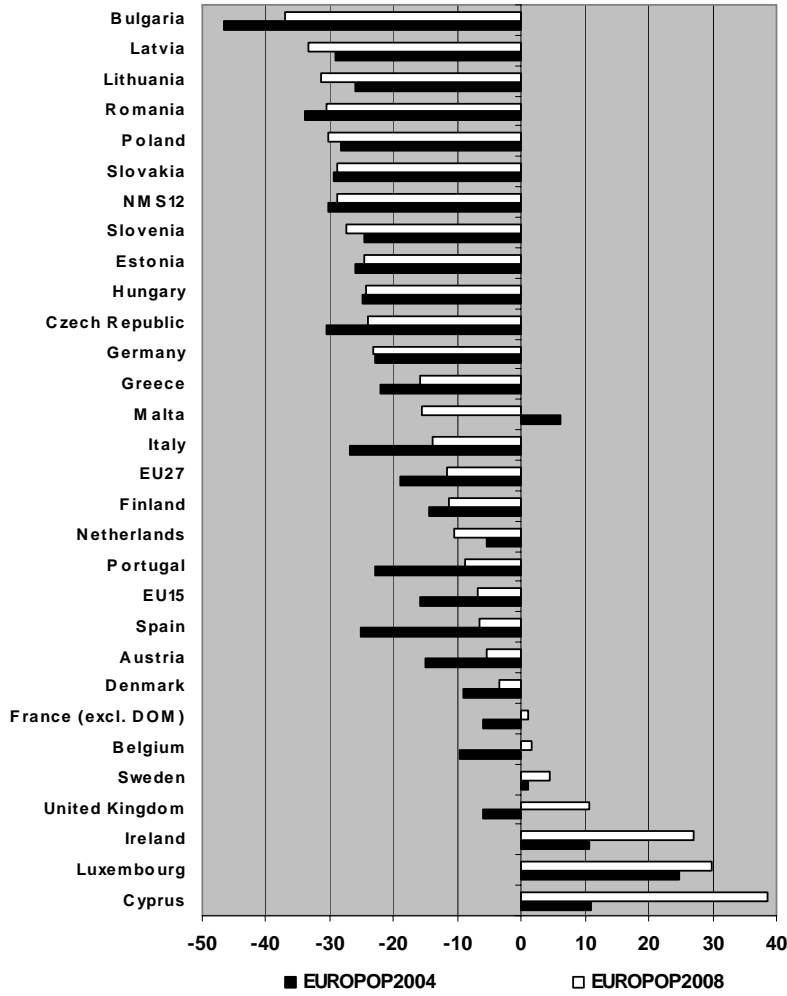
** No general declining trend but for some years decline or an alternating pattern of growth and decline.

If we look at the size of the decline, differences between 2008 and 2050 were much stronger for EUROPOP2004 than for EUROPOP2008. The strongest decline under EUROPOP2004 was expected for Bulgaria (a decline of 47 per cent), while the working age population in Cyprus in 2050 still was 11 per cent larger than in 2008. Under EUROPOP2008 for 2050 for Bulgaria a decline compared to 2008 was expected of 37 per cent, while for Cyprus an increase of 39 per cent is foreseen. Nevertheless there are a few countries for which a less numerous working age population is expected under EUROPOP2008 than under EUROPOP2004. These countries are Germany, Latvia, Lithuania, Malta, the Netherlands, Poland, and Slovenia (see Figure 7)

Age dependency ratios

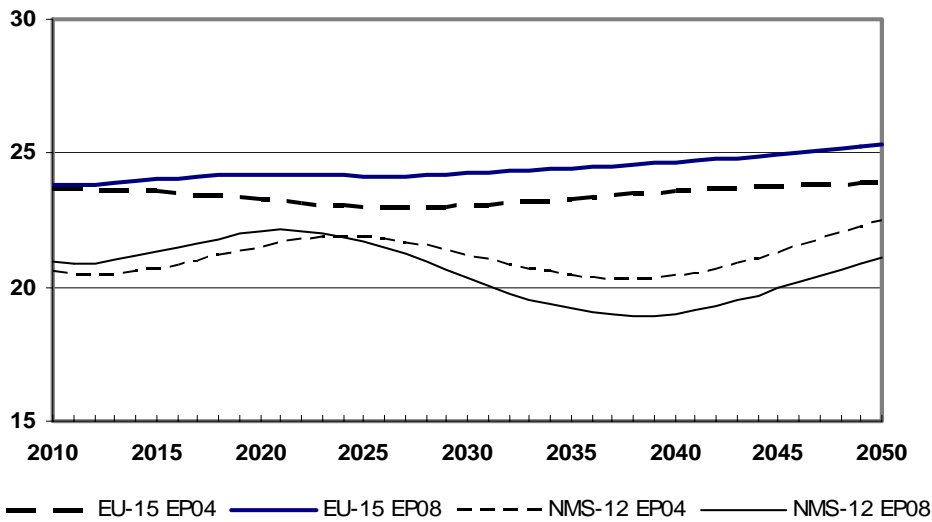
Age-dependency ratios are often used as indicators of the economic burden that the productive part of the population, must carry to take care of the youth and the elderly. A distinction is usually made between people under the age of 15, people between 15 and 64 and people of 65 and older. Due to declining fertility levels and increasing life expectancies, in the past dejuvenation and ageing took place in all European countries. In the decades to come, dejuvenation will not keep pace with ageing. Today in most European countries dejuvenation has come to an end. Under both EUROPOP2004 and EUROPOP2008 more or less stable young age dependency ratios are expected, However, the gap between the EU-15 and the NMS-12 countries will be wider in the future according to EUROPOP2008 (see Figure 8 and Table 8).

Figure 7 Growth of the working age population between 2008 and 2050 (%)



Source: Eurostat.
Working age population is defined as population aged 15-64.

Figure 8 Young age dependency ratio, 2010-2050 (%)



Source: Eurostat.
Defined as population aged 0-14 as a percentage of the population aged 15-64.

Table 8: Young and old age dependency ratios, 1 January 2008 and 2050

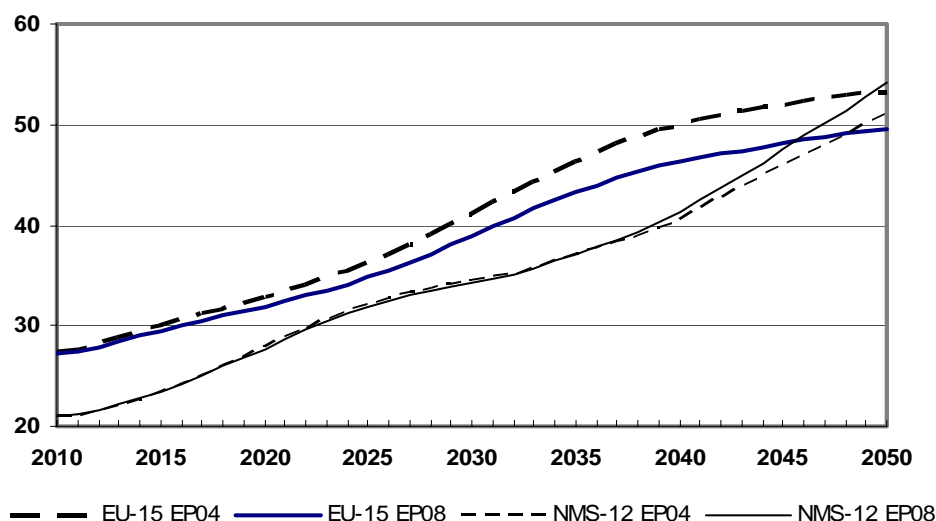
	Young age dependency ratio				Old age dependency ratio			
	1 January 2008		1 January 2050		1 January 2008		1 January 2050	
	Europop 2004	Europop 2008	Europop 2004	Europop 2008	Europop 2004	Europop 2008	Europop 2004	Europop 2008
EU-27	23.2	23.3	23.6	24.6	25.5	25.4	52.8	50.4
EU-15	23.8	23.8	23.9	25.3	26.8	26.7	53.2	49.6
NMS-12	21.2	21.4	22.5	21.1	20.7	20.8	51.1	54.2
Austria	22.8	22.7	21.5	23.2	25.6	25.4	53.2	48.3
Belgium	25.1	25.6	25.4	26.8	26.0	25.8	48.1	43.9
Bulgaria	18.7	19.3	21.0	21.9	25.2	25.0	60.9	55.4
Cyprus	25.4	25.0	22.0	24.4	18.5	17.7	43.2	37.7
Czech Republic	19.6	20.1	22.2	22.3	20.7	20.6	54.8	54.8
Denmark	28.0	28.0	26.0	27.5	23.5	23.6	40.0	41.3
Estonia	21.3	21.8	24.8	24.9	24.9	25.2	43.1	47.2
Finland	25.2	25.3	26.4	27.3	24.6	24.8	46.7	46.6
France (excl. DOM)	28.0	28.1	27.7	29.7	25.4	25.3	47.9	44.7
Germany	20.9	20.7	21.1	21.5	30.1	30.3	55.8	56.4
Greece	21.1	21.3	22.3	23.7	27.6	27.8	58.8	57.0
Hungary	21.7	21.8	23.7	22.4	23.6	23.5	48.3	50.8
Ireland	30.7	29.8	27.7	29.8	16.9	16.3	45.3	40.4
Italy	21.3	21.3	21.0	22.3	30.7	30.5	66.0	59.2
Latvia	19.8	19.8	25.0	21.8	25.1	25.0	44.1	51.2
Lithuania	22.5	22.3	23.0	21.1	23.3	23.0	44.9	51.1
Luxembourg	27.1	26.9	27.1	26.6	21.4	20.9	36.1	37.8
Malta	23.8	23.3	23.9	21.5	19.0	19.8	40.6	49.8
Netherlands	26.8	26.5	26.1	25.6	21.4	21.8	38.6	45.6
Poland	21.5	21.8	22.6	20.4	18.8	18.9	51.0	55.7
Portugal	23.3	22.8	23.8	22.9	25.8	25.9	58.1	53.0
Romania	21.8	21.8	21.6	20.6	21.3	21.3	51.1	54.0
Slovakia	21.6	21.8	22.2	19.9	16.6	16.6	50.6	55.5
Slovenia	19.5	19.8	22.9	23.3	22.9	23.0	55.6	59.4
Spain	21.5	21.3	21.7	24.1	24.7	24.1	67.5	58.7
Sweden	25.5	25.6	27.5	27.6	26.7	26.7	40.9	41.9
United Kingdom	26.1	26.4	25.0	27.4	24.5	24.3	45.3	38.0

Source: Eurostat.

Old age dependency ratios currently vary from 16 per cent in Ireland to 30 per cent in Italy with an overall ratio of 25 per cent for the EU-27, 27 per cent for the former EU-15 countries and 21 per cent for the new Member States. This is almost similar to the expected ratios under EUROPOP2004. In the coming decades under both scenarios the old age dependency ratios will rise sharply as a result of an increase in the number of retired people combined with a decline in the working age population (Figure 9 and Table 8).

The overall ratio for the EU-27 is expected to be 50 per cent by 2050, which is slightly lower than was expected under EUROPOP2004 (53 per cent). Although there is a common trend throughout the EU, the rate of change and levels of dependency differ. By 2050 the old age dependency ratio is expected to differ from 38 per cent in Cyprus to 59 in Slovenia. Overall this means somewhat less differences in ageing between countries compared to the previous set of scenarios. However, if we look at the former EU-15 countries and compare them with the new Member States, then we see that under the previous scenarios both groups of countries were more or less comparable in terms of old age dependency ratios, with a slightly higher value for the EU-15 countries, while under the latest scenarios by 2050 ageing will be stronger in the new Member States (54 versus 50 per cent). This diverging trend will be reinforced in the last ten years of the projection period, with values of old age dependency ratios in 2060 of 65 per cent for the new Member States and 51 per cent for the former EU-15.

Figure 9: Old age dependency ratio, 2010-2050 (%)



Source: Eurostat.

Defined as population aged 65+ as a percentage of the population aged 15-64.

The role of migration

In the no migration scenario of the EUROPOP2008 2150 variant, the assumptions on fertility and mortality are combined with zero migration. Table 9 shows the results of both scenarios.

If we look at the results for the EU-27 we see that without migration the total population will start to decline in 2012, which means that migration will postpone the population decrease by more than 20 years. For the countries of the former EU15 as a whole this is even 30 years. As expected the largest differences are found in the age groups 0-14 and 15-64. The absolute numbers of the elderly are less affected. As a result the prospects in terms of dejuvenation will not be much different in the two scenarios, but ageing will be more profound in the no migration scenario. This is especially the case for the former EU-15 countries.

IV. Discussion and conclusions

In this final section we combine the information presented in an isolated way in the previous sections to one overall picture of the differences and similarities of the two latest rounds of EUROPOP scenarios. The main outcomes can be summarized as follows.

According to EUROPOP2004 for the period 2008-2050 for the EU-27 a 4 per cent smaller population was expected for 2050 compared to 2008, while according to EUROPOP2008 a 4 per cent larger population is expected. According to the latest scenario by 2050 for almost all countries a larger population is expected than under the previous scenario. For all countries that currently experience population growth, a significant postponement of the onset of population decline is foreseen.

Table 9: EUROPOP2008 scenarios with and without migration

	1-1-2008	1-1-2060		difference %
		with migration	without migration	
EU-27				
Total population (x1000)	495 394	505 719	416 544	21.4
Age group 0-14 (x1000)	77 544	70 952	54 152	31.0
Age group 15-64 (x1000)	333 248	283 293	223 378	26.8
Age group 65+ (x1000)	84 602	151 474	139 014	9.0
Onset of population decline		2035	2012	
Young age dependency ratio (%)	23.3	25.0	24.2	3.3
Old age dependency ratio (%)	25.4	53.5	62.2	-14.1
EU-15				
Total population (x1000)	392 222	420 530	336 785	24.9
Age group 0-14 (x1000)	62 011	60 881	45 151	34.8
Age group 15-64 (x1000)	260 680	237 717	181 514	31.0
Age group 65+ (x1000)	69 531	121 932	110 120	10.7
Onset of population decline		2044	2014	
Young age dependency ratio (%)	23.8	25.6	24.9	3.0
Old age dependency ratio (%)	26.7	51.3	60.7	-15.5
NMS-12				
Total population (x1000)	103 172	85 189	79 759	6.8
Age group 0-14 (x1000)	15 533	10 072	9 001	11.9
Age group 15-64 (x1000)	72 569	45 576	41 864	8.9
Age group 65+ (x1000)	15 071	29 541	28 895	2.2
Onset of population decline		<2008	<2008	
Young age dependency ratio (%)	21.4	22.1	21.5	2.8
Old age dependency ratio (%)	20.8	64.8	69.0	-6.1

Source: Eurostat.

NB Difference between 2060 value with migration minus 2060 value without migration in percentage of the 2060 value without migration.

Looking at the working age population we see for almost all of the EU-15 countries a smaller decline or an increase compared to EUROPOP2004; for the NMS-12 differences are less profound. In general a slight postponement of the onset of the decline of the working age population is expected.

Especially due to the differences in fertility assumptions between the two rounds of scenarios on the one hand and the EU-15 and NMS-12 on the other hand, a levelling off of the old age dependency ratios to a lower level compared to EUROPOP2004 is expected for the EU-15, while almost similar values are expected for the NMS-12 until 2035, after which an acceleration of ageing is foreseen that surpasses the values of the EU-15 from 2046 onwards.

The most important difference between the two scenarios is the framework of the assumptions. Similar to earlier rounds of EUROPOP scenarios, the baseline scenario of EUROPOP2004 follows most closely a continuation of past trends, with convergence embedded in an ad hoc basis of expert opinions. EUROPOP2008, on the other hand, explicitly introduces convergence in the assumptions. Assuming that socio-economic and cultural differences between the Member States of the European Union will fade out in the very long run, similar values for demographic indicators are imposed for the convergence year 2150. Why this framework of convergence has been chosen, however, is not explained.

Although in the long run convergence has been assumed in EUROPOP2008, this became hardly manifest in the assumptions and results of the projections over the period 2008-2060. Only the consistent higher levels of life expectancies for all countries indicate systematically into the direction of more convergence compared to EUROPOP2004. For fertility, the long run time horizon for convergence resulted for the new Member States for the period 2008-2060 in much lower estimations of fertility rates compared to EUROPOP2004. As a

consequence, in the end there is only a very slight converging trend that is much weaker than the converging pattern of EUROPOP2004. Given the stronger increase in fertility for the new Member States in the recent past than estimated under EUROPOP2004, this is at least a striking difference.

The migration assumptions are the most difficult to compare. Although in EUROPOP2008 international migration is assumed to converge to zero net migration in 2150, migration has been adjusted upwards whenever the projections resulted in a shortage of the working age population. Without additional information, it is very difficult to gain insight in the consequences of these adjustments. In our view, however, the idea of adjusting migration upwards whenever the projections result in a shortage of the working age population contradicts the assumption of a development towards zero net migration. In fact, if we look at the differences between the outcomes of the EUROPOP2008 variants with and without migration, we find it hard to avoid the impression that the way in which migration assumptions have been implemented in EUROPOP2008 are more economy driven than directing towards zero net migration. Apart from this, the assumption of zero net migration in the long run might be questionable in its own. In general, the same applies for the convergence year of 2150 and the fact that all countries are assumed to converge to the same values.

To conclude, without additional information it is difficult to fully understand the assumptions and outcomes of EUROPOP2008. As long as it is not clear why 1) convergence is assumed for the year of 2150 and not for instance for 2100; 2) all countries are assumed to converge in the long run to the same values as the forerunners now (why not distinguish between a few different groups?); 3) how policy measures are included in the migration assumptions; and 4) under what socio-economic circumstances this scenario seems to be plausible, it is difficult to answer the question whether EUROPOP2008 can be seen as an alternative for, or update of EUROPOP2004. We strongly advise Eurostat to publish more background information on the scenarios, not only on the methodology, but also on the ideas behind the assumptions, and to compile some other variants in addition to the 2150 variant in order to be able to place the scenarios in a proper context. Having said this, we acknowledge the value of the 2150 variant of the EUROPOP2008 convergence scenario as such, as it can illustrate demographic developments in a 'what if'-context. What will happen in the period 2008-2060 if by 2150 all countries are similar as regards demographic indicators, taking into account that decreasing working age populations might be compensated by migration? Definitely an interesting question with interesting results.