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IMPACT OF INTERNATIONAL MIGRATION ON POPULATION DYNAMICS AND LABOUR FORCE RESOURCES IN EUROPE

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Abstract: This paper presents the results of a research project on the impact of international migration on population dynamics and labour force resources in 27 selected European countries over the period 2002-2052. Firstly, the outcome of the forecasts of population and labour force is presented, followed by a set of simulations prepared under various assumptions on migration flows, as well as target sizes and structures of populations under study. The results are compared with the other similar research studies, most notably with the *Replacement Migration* report of the United Nations (2000). On the basis of the outcome of the project, recommendations for the development of the European migration policy are made. Herein, the strategic objectives of the European countries and the EU, expected impact of migration on policy developments, as well as the long-term plausibility of the proposed alternative policy solutions are taken into the account. The paper is accompanied by an extensive Annex presenting the most relevant results of the analysis for all countries under study.

Keywords: international migration, population dynamics, labour force resources, Europe

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Contents

1. Introduction

The study presents an analysis of interrelations between international migration, population ageing and labour force dynamics, followed by the recommendations for future migration policies in Europe. In geographic terms, the analysis covers 27 selected European countries: 23 countries of the European Union (without Cyprus and Malta), two EFTA countries (Norway and Switzerland), as well as two accession countries (Bulgaria and Romania). The timeframe of the study covers fifty years, from 2002 to 2052.

This paper contains the final results of the project Impact of international migration on population dynamics and labour force resources in Europe, financed by the Foundation Population, Migration, Environment from Zurich. The project has been conducted by the Central European Forum for Migration Research. The detailed description of the previous stages of research is deliberately omitted; they have been covered by separate studies available in the CEFMR Working Papers series. These papers include a critical analysis of the 'replacement migration' concept (Saczuk 2003), as well as an overview of migration policies in Europe (Kicinger, Saczuk 2004). In addition to this, the scenarios of future demographic developments have been provided separately (Bijak 2004), as well as the ones concerning international migration (Bijak et al. 2004) and labour force participation (Saczuk 2004). The scenarios presented in those papers have served as a direct input into the MULTIPOLES population forecasting model (Kupiszewski, Kupiszewska 1998; Kupiszewski 2002), which was used to obtain the results shown in the current study. All the mentioned papers and publications contain comprehensive background information underlying the presented research.

Section 2 of the current study presents selected theoretical aspects of population ageing, as well as some empirical evidence with respect to the magnitude of this phenomenon; it complements the paper of Saczuk (2003). The direct outcome of the calculations is presented in Sections 3 and 4 of the current study. Section 3 focuses on the population and labour force forecasts for Europe, presenting both the scenario with the most likely migration developments assumed, as well as the expected uncertainty span as concerns the international population flows. Section 4 presents two simulations prepared under assumptions of either constant migration flows or migration from countries of the world other than the 27 countries under study, to set a benchmark for comparison with other simulations and forecasts. Section 5 presents a simulation of migration flows from the outside of the system of 27 countries, potentially needed to maintain certain parameters of the population system understood as target sizes and structures of populations under study. The hypothetical trajectories of population and labour force developments alternatively assume: migration levels sufficient to keep the population size or various dependency ratios constant (the old-age, economic, and labour market ones). Various forecasts and simulations are subsequently compared from the point of view of their plausibility and the impact of different assumptions on counteracting the

negative economic effects of population ageing. The outcome of the analysis is compared with other similar research studies in Section 6. Most importantly, the Replacement Migration report of the United Nations (2000), hereafter also referred to as 'the UN report', is subject to the comparative analysis with the outcome of the current research, together with several other studies on the same topic (e.g., Feld 2000).

On the basis of the results of the research, recommendations for the development of the European migration policy are made, described in detail in Section 7 of this paper. In that section, the main objectives of European migration policies are outlined, taking into account the expected impact of migration flows on policy developments. On the basis of the empirical results, proposals for alternative policy directions are drafted, taking into account the strategic objectives of the European Union. The proposed solutions are evaluated according to their long-term plausibility, and on that basis, recommendations for the policy-makers are made. Finally, Section 8 offers a brief summary of the outcome of the study, as well as the most important conclusions and recommendations for the future. The most relevant empirical results of the analysis for all countries under study are presented in the Annex to this paper.

The quantitative analysis is based on population data from the official statistical registration of the countries under study, collected by the Council of Europe and Eurostat, as well as on the data on labour force participation gathered by the International Labour Organization. Details on the sources used, methodology of verification of their quality, as well as their preparation for input into the forecasting model can be found in the respective papers on demographic, migration and labour participation scenarios (Bijak 2004, Bijak et al. 2004, Saczuk 2004).

Throughout this paper, the term 'economically active population' is used in accordance with the international definitions (e.g., International Labour Organization 2003), to depict the overall labour supply, i.e. both the employed and unemployed. Activity rates (also: labour force participation rates) relate the number of the active to the overall size of the population, either total, or of the specific age group, depending on the context. In this paper, the terms 'economic activity' and 'labour force participation' are used interchangeably.

2. Population ageing and its consequences

This section offers a brief outline on the theoretical aspects of population ageing, as well as an empirical overview of the recent developments of this phenomenon in 27 European countries.

2.1. Population ageing: theory, determinants, consequences

Population ageing can be defined as a "process, by which older individuals become a proportionally larger share of the total population" (United Nations 2002: 1). Ageing is a consequence of low fertility and the related low family size, as well as longer life expectancy in the developed countries. As a direct outcome of the demographic transition processes, this phenomenon seems to currently have permanent and irreversible features (Coleman 2002).

From the theoretical point of view, two interrelated components of population ageing can be distinguished: the one caused by fertility decline and the one caused by the increased expectancy of human life. The former, historically the earlier one, directly decreases the size of the youngest cohorts, and is therefore referred to as 'ageing from the bottom' of the population pyramid. The latter one in turn becomes contemporarily increasingly important as the conditions for human survival and longevity steadily improve, directly increasing the number of the elderly. This component is referred to as the 'ageing from the top', currently outpacing the fertility-driven changes in the population structure (Coleman 2002). Presence of international migration additionally influences the outcome of the ageing process.

Population ageing became contemporarily a very important issue, as it appears to have wide-ranging consequences in various areas of social, economic and political life. The most important outcomes and side-effects of the ageing processes include (United Nations 2002):

- increasing public expenditure on pensions, social security and health services, caused directly by the growing number of elderly (and thus of pensioners) in the population;
- decreasing relative number of persons in the working age, causing a shrinkage of the labour force and an increase in the overall burden on the working population in terms of various intergenerational transfers: taxes, other contributions, direct care, family support, etc.;
- increasing risk of failure of the repartition (*pay-as-you-go*) components of the pension systems, given the factors discussed above;
- changing public health patterns, as the elderly are more susceptible to various chronic and degenerative diseases and require appropriate medical care;
- increasing gender bias among the elderly population due to the differences in the lifespan between males and females, combined with the 'ageing of the aged' – an increase of a share of the oldest-old population;

- increasing risk of the emergence of intergenerational conflicts, due to the changes in the patterns of resource distributions (growing pressure on facilitating increasingly more means for the elderly).

Although the mentioned problems are not yet critical, it needs to be realised by the policy-makers that to overcome the possible future consequences of ageing, appropriate measures should be implemented soon. This seems to be a very important policy challenge, embracing many areas of life: economy, social security systems, health care, education, as well as changes in the attitudes and practices towards the elderly and their role in the society (National Research Council 2001). In that respect it seems that there is no shortcut policy path, as there is no feasible solely demographic solution to population ageing, and the remedies for its negative outcomes need to be also sought among the non-demographic policies (Coleman 2002). On the other hand, certain measures aimed at counterbalancing the demographic changes, to any extent possible, can and should be considered, as a part of a wider set of policies aimed at dealing with the consequences of ageing.

With respect to the demographic determinants of ageing, the policies aimed at counterbalancing the negative effects of ageing cannot interfere with the increasing human lifespan, as this would be both unethical and infeasible. Measures aimed at increasing fertility are in turn very expensive, while their outcome is not certain – a return to above-replacement levels (i.e. more than 2.1 children per woman on average) is currently not expected for the future (United Nations 2000). The issue of 'replacement migration', with immigration considered at least partially as a measure against the effects of ageing is, not surprisingly, very controversial. The idea itself dates back to the mathematical demographic model of Pollard (1973), who showed that under certain conditions immigration can lead to obtaining a stationary population, with a stable age structure. The model was further corroborated by Espenshade et al. (1982), distinguishing two populations: local and foreign, as well as recently by Wu and Li (2003), who proved that such a stationary population would be less affected by the age-related dependency problems than it would be in the absence of immigration. The 'replacement migration' idea has been explored in the United Nations (2000) report, which received a substantial critique (including Coleman 2002, Espenshade 2001, and others). A thorough overview of the discussion on this issue has been provided by Saczuk (2003). To address a part of this criticism, the current study is going to include the analysis of selected economic aspects of ageing, not covered by the United Nations (2000) report, with focus on labour supply, similarly to the study of Feld (2000), although for a wider range of European countries. In particular, apart from size and structure of the overall population, similar features of the labour force are studied on the basis of the forecasts of labour force participation prepared by Saczuk (2004).

The current study is going to contribute to the debate, presenting and evaluating possible policy responses aimed at dealing with population ageing. A particular focus is going to be put on evaluation of international migration policies in this context.

2.2. Population ageing in Europe: an empirical overview

There are many measures to assess the magnitude of impact of ageing on population and labour force structures. With respect to the former, a commonly used measure is 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. For more transparency, throughout the current study the ODR values will be shown in percentages, i.e. multiplied by 100. Another simple indicator is the potential support ratio (PSR), a reciprocal of ODR, indicating how many people aged 15-64 in a given population can potentially support one person aged 65 years or more. The age limits of 15 and 65 years, dividing population into the pre-working, working and retirement age groups, are set arbitrarily (the same for all countries under study for the sake of comparison), following the United Nations (2000) report. Values of PSR changes since 1960 in 27 countries under study are presented in Table 2.1.

Table 2.1. Potential Support Ratio of population aged 15-64 to 65+ in Europe, 1960-2000

Country	1960	1970	1980	1990	2000
Austria	5.4	4.4	4.1	4.5	4.4
Belgium	5.4	4.7	4.6	4.5	3.9
Bulgaria	8.9	7.2	5.6	5.1	4.2
Czech Republic	6.8	5.6	4.6	5.3	5.0
Denmark	6.1	5.3	4.5	4.3	4.5
Estonia [1]	6.4	5.7	5.3	5.7	4.5
Finland	8.6	7.3	5.7	5.1	4.5
France	5.3	4.9	4.5	4.7	4.1
Germany	5.9	4.7	4.2	4.6	4.2
Greece	7.0	5.8	4.9	4.9	4.2
Hungary	7.3	5.9	4.8	5.0	4.5
Ireland	5.2	5.2	5.5	5.4	6.0
Italy	7.1	6.0	4.9	4.7	3.8
Latvia [1]	6.4	5.6	5.1	5.6	4.5
Lithuania	:	6.3	5.8	6.2	4.8
Luxembourg	6.3	5.2	4.9	5.2	4.7
The Netherlands	6.8	6.2	5.8	5.4	5.0
Norway	5.8	4.9	4.3	4.0	4.2
Poland	10.5	7.9	6.4	6.5	5.7
Portugal	8.0	6.7	5.6	5.0	4.2
Romania	:	:	6.1	6.4	5.2
Slovak Republic	9.0	7.0	6.0	6.3	6.0
Slovenia	:	6.8	:	6.5	5.1
Spain	7.8	6.6	5.8	4.9	4.1
Sweden	5.6	4.8	4.0	3.6	3.7
Switzerland	6.5	5.8	4.8	4.7	4.4
United Kingdom [2]	5.8	4.7	4.3	4.2	4.2
All 27 countries [3]	**6.5**	**5.4**	**4.8**	**4.9**	**4.3**

Colon (:) denotes no data available. [1] Figures for 1959 instead of 1960; [2] Figures for 1961 and 1971 instead of 1960 and 1970; [3] Summary figures exclude the countries with missing values for 1960, 1970 and 1980.

Source: own estimates based on Eurostat, New Cronos; UK 1961-71: National Statistics.

From Table 2.1 it can be seen that the process of ageing in Europe has been substantially progressing in the second half of the 20th century. The potential support ratio decreased from about 6.5 in 1960 to the recent 4.3 and this declining tendency cannot be reasonably expected to reverse in the coming years. Although there was a visible slowdown (or even a small reversal) in the decreasing trend between 1980 and 1990, mainly due to the births given by the post-war 'baby boom' cohorts, currently it seems that the whole process is back at the full speed. The magnitude of ageing, as measured by the PSR, varies from country to country and is strongly interrelated with past fertility changes.

With respect to the direction of the overall trend, three major groups of European countries can be distinguished. The first cluster comprises of the countries, where the PSR decline was relatively monotonous, without significant temporary increases in pace in the recent decades. This group includes the low-fertility countries of Southern Europe (Greece, Italy, Portugal and Spain), five Western European countries (Belgium, Finland, the Netherlands, Switzerland and the United Kingdom), as well as two countries from Central and Eastern Europe: Hungary and Bulgaria. It is worth noting that in some cases the initial PSR values estimated for 1960 were very high, most notably for Bulgaria (8.9), Finland (8.6) and Portugal (8.0).

The second group of countries is characterised by a temporary increase in PSR values around 1990, followed by a subsequent decline in the following decade. Such pattern is attributable to the mentioned size effect of the post-war 'baby boom' cohorts. These countries, many of them being among the demographically most affected by World War II, include Austria, the Czech Republic, France, Germany, Luxembourg, Poland, Romania, the Slovak Republic, as well as three Baltic States: Estonia, Latvia and Lithuania. In the case of Poland and the Slovak Republic (and presumably also Romania, should data be available), the PSR values in 1960 were very high, amounting to 10.5 and 9.0, respectively. This group of countries likely includes also Slovenia, another country, for which some observations are missing.

The third group comprises of three Scandinavian countries (Denmark, Norway and Sweden), which followed very similar patterns of PSR developments not only in the terms of direction, but also of magnitude. This group is, however, also characterised by the very recent increase in PSR values between 1990 and 2000, likely following the fertility increase since the late 1970s or early 1980s (Andersson 2003) due to the strong institutional framework supporting the childbearing. Finally, there is one visibly outlying European country (Ireland) that cannot be attached to any of the groups due to the fact that in the recent decades a PSR increase has been observed, rather than a decline. This is mostly a consequence of the persisting high fertility levels, as well as the unprecedented magnitude of recent immigration[1].

Another thing that can be seen in Table 2.1 is the decrease in variation of the PSR in Europe over time, which can support a hypothesis on convergence of trends with respect to the

[1] Fertility and migration issues have been more thoroughly discussed in Bijak (2004) and Bijak et al. (2004).

advancement of the ageing processes among the countries under study. While in 1960, the PSR values ranged from 5.2 for Ireland to 10.5 for Poland (difference of 5.3), in 2000 the span between the top and the bottom country on the list narrowed to 2.3 (minimum for Sweden: 3.7, maximum for Ireland and the Slovak Republic: 6.0). Again, an exceptional case of Ireland is clearly visible. Forty years ago it was most advanced in the ageing process among the countries under study, owing to the decades of continuing emigration especially of the younger people. Recently it turned to be the country, where the ageing processes are among the least advanced in Europe.

While the simple demographic measures of the advancement of ageing, like ODR or the PSR, are widely used in the research on ageing (e.g., United Nations 2000), they are only a rough approximation of the impact of the process on the economic situation of the societies. In order to take into the account not only changes in the age structure of the population, but also in the labour force participation, one can introduce alternative measures of the intensity of ageing. Further in this paper we will focus on two such measures: the *economic old-age dependency ratio* (ODRE) and the *labour market dependency ratio* (LMDR).

Let ODRE be defined as the ratio of the economically inactive population in the retirement age (i.e. persons of 65 years or more) to the whole active population aged 15 years or more. This measure describes the economic burden of inactive pensioners on the working population, and is therefore an important indicator of the effects of ageing from the point of view of sustainability of the pension systems.

Further, let LMDR be defined as the ratio of the whole economically inactive population to the whole active population (both considering people aged 15 years or more). This indicator can be interpreted as the overall economic burden of the inactive population on the labour market. LMDR is thus more general than ODRE, as it considers not only the pensioners, but also younger inactive generations, both of which have to be economically supported by the active population. Again, for the sake of more transparency of presentation, both ODRE and LMDR values will be shown as percentages, i.e. multiplied by 100, throughout the current study.

The values of ODR, ODRE and LMDR estimated for 2002 is presented in Table 2.2. The countries under study are separately ranked according to the values of all three indicators, in order to give an impression of both the advancement and the spatial differentiation of the ageing process in Europe. The presented aspects of the ageing process relate to the demographic structures (ODR), sustainability of the pension systems (ODRE) and the overall burdens on the labour markets (LMDR). The spatial distribution of the three measures is subsequently presented on the maps in Figures 2.1, 2.2 and 2.3.

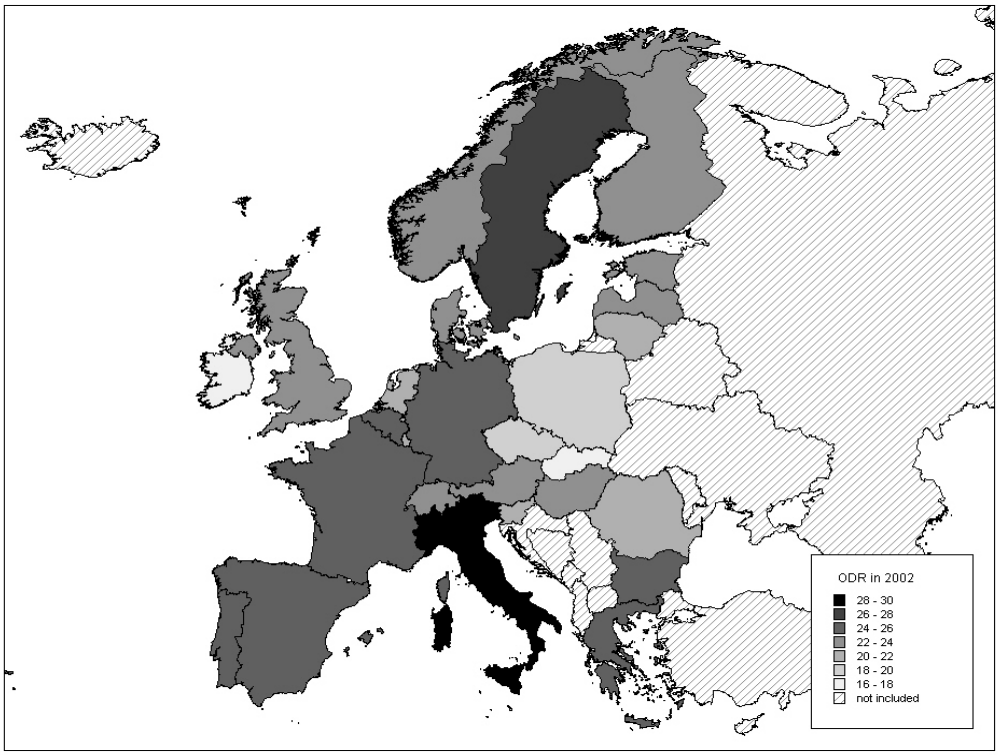
Table 2.2. Dependency ratios: old-age, economic and labour market, in Europe, 2002, %

Rank	Country	ODR	Country	ODRE	Country	LMDR
1	Slovak Republic	16.4	Romania	17.9	Switzerland	48.6
2	Ireland	16.4	Ireland	22.1	Denmark	50.2
3	Poland	18.2	Slovak Republic	23.3	Norway	51.0
4	Czech Republic	19.7	Denmark	25.5	The Netherlands	58.1
5	The Netherlands	20.2	The Netherlands	25.8	Portugal	61.1
6	Romania	20.5	Portugal	25.8	United Kingdom	61.3
7	Slovenia	20.8	Poland	26.1	Sweden	61.5
8	Luxembourg	20.8	Switzerland	26.2	Finland	62.1
9	Lithuania	21.8	Norway	26.2	Romania	62.9
10	Denmark	22.3	Czech Republic	26.5	Lithuania	63.4
11	Hungary	22.4	Slovenia	27.3	Slovak Republic	66.5
12	Finland	22.8	Lithuania	27.7	Czech Republic	67.4
13	Norway	22.8	Estonia	28.7	Ireland	69.7
14	Austria	22.8	United Kingdom	29.3	Austria	70.8
15	Switzerland	23.0	Finland	29.3	Slovenia	71.7
16	Latvia	23.1	Latvia	29.9	Germany	72.0
17	Estonia	23.2	Austria	31.0	Estonia	72.1
18	United Kingdom	23.8	Luxembourg	32.1	Latvia	74.0
19	Greece	24.2	Sweden	32.3	France	81.0
20	Portugal	24.6	Germany	34.1	Poland	81.8
21	Spain	24.7	Greece	35.0	Spain	86.8
22	Bulgaria	24.9	France	36.0	Luxembourg	87.2
23	France	25.0	Spain	36.5	Greece	88.5
24	Germany	25.6	Hungary	36.7	Belgium	93.4
25	Belgium	25.9	Bulgaria	38.2	Bulgaria	97.4
26	Sweden	26.5	Belgium	39.3	Hungary	103.9
27	Italy	28.2	Italy	45.3	Italy	113.3
	All 27 countries	**23.9**	**All 27 countries**	**32.4**	**All 27 countries**	**76.8**

Sources: Eurostat, NewCronos; International Labour Organization (2003); own calculations

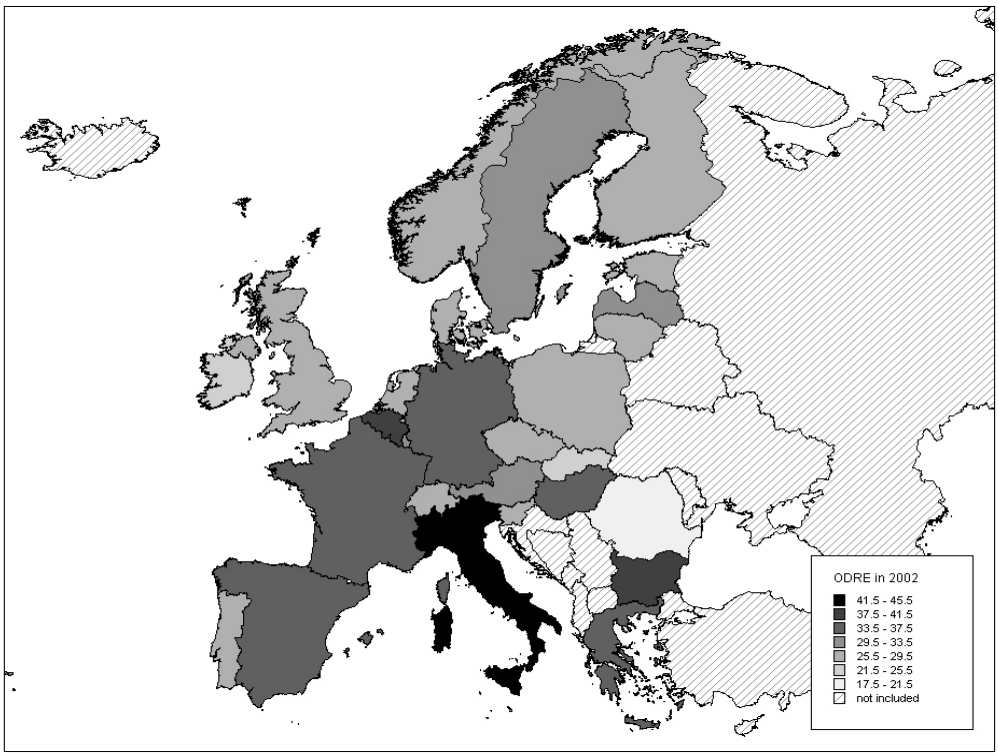
On the average, in the 27 European countries under study the recent value of ODR amounted to 23.9 percent, which means that in 2002, for each person aged 65 years or more there were 4.2 persons in the working age (15-64). The average ODRE of 32.4 percent indicates that each economically inactive person in the assumed post-retirement age group (65+) corresponded recently to 3.1 persons aged 15 years or more that were economically active. The average LMDR of 76.8 percent already denotes a heavy burden of the economically inactive population on the active one: each inactive person is supported by only 1.3 active participants of the labour market.

Figure 2.1. Old-age dependency ratio (ODR) in Europe, 2002



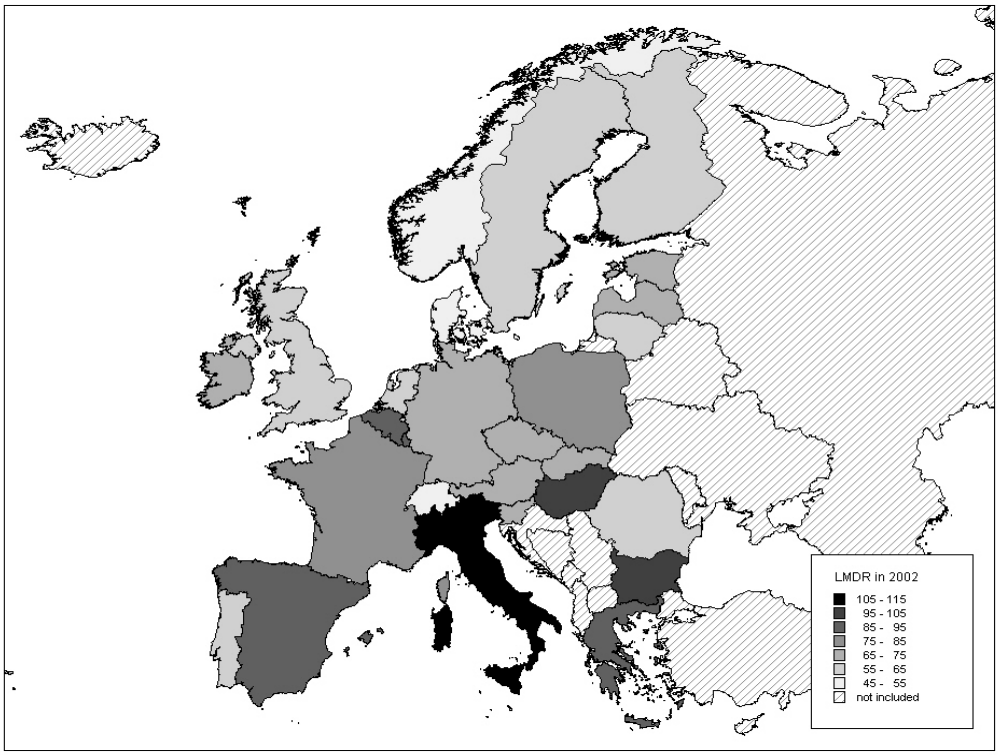
Sources: Eurostat, NewCronos; International Labour Organization (2003); own calculations

Figure 2.2. Economic old-age dependency ratio (ODRE) in Europe, 2002



Sources: Eurostat, NewCronos; International Labour Organization (2003); own calculations

Figure 2.3. Labour market dependency ratio (LMDR) in Europe, 2002



Sources: Eurostat, NewCronos; International Labour Organization (2003); own calculations

From Table 2.2 it can be also seen that the ODR values are relatively least dispersed, while the LMDR values – relatively most dispersed among the countries under study. The recent ODR percentages ranged from 16.4 for the Slovak Republic and Ireland, 18.2 for Poland and 19.7 for the Czech Republic (countries with values lower than the 0.15 quantile of ODR), to 25.6 for Germany, 25.9 for Belgium, 26.5 for Sweden and 28.2 for Italy (values higher than the 0.85 quantile). In the latter countries the ageing process, as seen from the purely demographic point of view, is therefore most advanced among the countries under study.

Taking the other measures into account, the order of countries is slightly different. In the case of the economic burden of inactive pensioners on the active population, measured by ODRE, the respective percentages vary from 17.9 for Romania, 22.1 for Ireland, 23.3 for the Slovak Republic and 25.5 for Denmark, to 36.7 for Hungary, 38.2 for Bulgaria, 39.3 for Belgium and 45.3 for Italy. It is worth noting that the exceptionally good position of Romania is solely due to applying a broad definition of economically active population combined with strong income effects in this country (Saczuk 2004).

With respect to the labour market burden measured by LMDR, in 2002 the best situation was observed in Switzerland (48.6), Denmark (50.2), Norway (51.0) and the Netherlands (58.1), while the worst – in Belgium (93.4), Bulgaria (97.4), Hungary (103.9) and Italy (113.3). It can be clearly seen that in two latter countries, the economically inactive have already outnumbered the active participants of the labour market, while Bulgaria and Belgium are

also slowly approaching the 100% threshold of LMDR. Interestingly, the countries with the best situation are characterised not only by high levels of economic activity, but also by very low unemployment rates and high income per capita (World Bank 2003, United Nations 2003, cf. Bijak et al. 2004: 19). The detailed analysis of labour force participation patterns in particular countries, underlying the spatial variation of LMDR in Europe, has been presented by Saczuk (2004).

Summing up the current situation of particular European countries with respect to the effects of population ageing, Italy is clearly outlying not only in terms of the advancement of the process, but also considering the negative economic and labour market effects of ageing. The difficult situation of Italy in that respect is clearly a result of a combination of two independent factors: very low fertility levels and very low labour force participation rates. A serious situation on the labour markets due to the population ageing can be also observed for other European countries, in particular for Belgium, Bulgaria and Hungary. Taking all aspects of population ageing into the account (demographic structures, sustainability of the pension systems and the overall burdens on the labour markets), a relatively good situation with respect to a combination of various dependency ratios can be so far observed in Denmark, the Netherlands, Switzerland, Portugal, Ireland and the Slovak Republic. In four former cases, the effect can be attributed to the relatively high economic participation rates, while in two latter – mainly due to the young population structures.

The contemporary spatial variation of the advancement of the ageing processes in Europe is no doubt partially a legacy of the past demographic and labour force participation trends. The forecasts of the future developments of population ageing and its economic and labour market effects are presented in the subsequent section.

3. Population and labour force forecasts for Europe

This section is devoted to the presentation of the results of the population and labour force forecasts for 27 countries under study. After a brief description of the forecasting model *MULTIPOLES*, three variants of forecasts are presented, depending on the assumptions on international migration developments: Base, considered to be the most likely one, as well as High and Low, setting the limits of expected uncertainty span (details in Bijak et al. 2004). For fertility, mortality and labour force participation, single, fairly standard scenarios are assumed (Bijak 2004, Saczuk 2004), common for all the forecasts. For simplicity, it is assumed that immigrants acquire demographic and economic patterns of host populations immediately upon arrival, as a more thorough research on this issue remains beyond the scope of our study.

3.1. The MULTIPOLES forecasting model – introductory notes

The population forecasting model applied in this study, *MULTIPOLES* (MULTIstate POpulation model for multiLEvel Systems), has been originally created by Kupiszewski and Kupiszewska (1998) basing on the ideas of P. H. Rees (Rees et al. 1992, Rees 1996). The *MULTIPOLES* is a multiregional model, constructed according to the modelling paradigm set out by Rogers (1975), combining the features of two methodological traditions of forecasting population dynamics: geographic and demographic. Such a model describes therefore "[the] population as a system, and migration as a link between elements thereof" (Kupiszewski 2002: 145).

The demographic tradition is present in the model in its roots in the cohort-component model, which used to be a principal tool of population forecasting for many years. Fertility and mortality are modelled using age-specific occurrence-exposure rates, albeit the assumptions on future development of both components of natural change of the populations under study are prepared respectively in terms of Total Fertility Rates (TFR) and life expectancy at birth (e0). The assumptions have been discussed in more detail in the study of Bijak (2004).

The geographical tradition, originating from the models of the spatial redistribution of population based on the theory of Markov chains, focuses on the migratory component of the overall population change. In the current study, the *MULTIPOLES* model deals with international migration on two geographical levels. The first level is population exchange between the countries under study, while the second level depicts migration between each of the countries and the rest of the world. The migration between the 27 European countries is modelled in terms of emigration rates, thus relatively to the population at risk, while the second level element in terms of crude net migration numbers. A detailed overview of the

assumptions on both components of overall migration flows prepared for the purpose of this study has been presented by Bijak et al. (2004).

Additionally to modelling and forecasting the overall population change, the *MULTIPOLES* model allows for including assumptions on future labour force participation trends, and is therefore suitable also for labour force projections. The *MULTIPOLES* model can be therefore used for forecasting multi-country population systems, as well as labour force resources in three dimensions: region (country), age and gender. It is thus "a forecasting tool for a period of unification of the nations of Europe, an increasing role of international migration in population dynamics and increasing globalisation of economic and in consequence also of demographic processes" (Kupiszewski 2002: 145).

For practical use, the model has been programmed as specialised computer software, developed and continuously improved by D. Kupiszewska since 1996. A thorough description of the model itself is available in the studies of Kupiszewski and Kupiszewska (1998), as well as of Kupiszewski (2002). Specifically for the purpose of the current study, several new features have been added recently to the model and to the software. Most importantly, they include a possibility of conducting population and labour force development simulations, under certain assumptions of constancy of specific demographic or socio-demographic parameters (population size, ODR, ODRE or LMDR). Also, the methodology for setting international migration scenarios has been redesigned.

3.2. Base Scenario: the most likely international migration developments

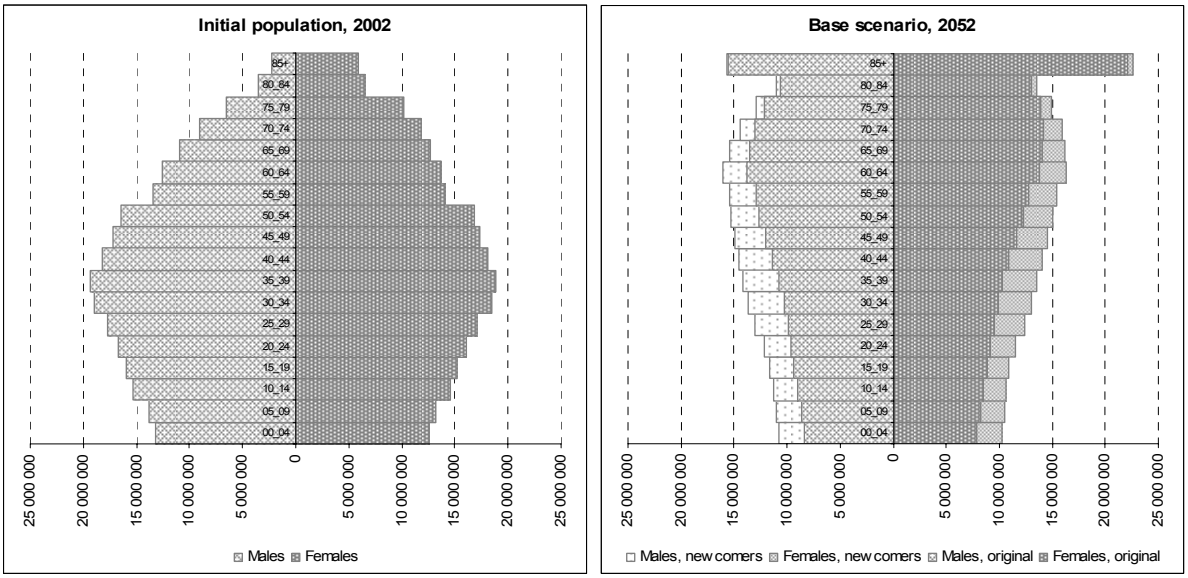
In the current study, the Base scenario of international migration developments has been developed under the assumption of a stable socio-economic situation in Europe, a sustainable economic growth and a long-term convergence of income levels in the European countries. Within Europe an overall increase in mobility is expected, following the increase of job opportunities. In a short- and middle-term this issue is expected to be of key importance for the East-West migration, taking into account the gradual opening of Western European labour markets for the citizens of Central and Eastern Europe. On the world-wide scale, in turn, the Base scenario also assumes a moderate improvement of economic, political and social situation, resulting in moderate overall population inflow from the developing regions of the world into Europe. Migration policies in this scenario are not assumed to be very restrictive, due to a stable socio-economic situation in the countries under study.

Under the said assumptions on international migration, the overall population size of all 27 countries under study is hardly going to change over the next 50 years: from the initial 494.1 million in 2002, to 494.9 million half a century later. However, this stability is to a large extent owing to immigration from the other parts of the world. The post-2002 immigrants from outside the system of 27 European countries together with their descendants amount to

80.2 million people at the end of the forecast period. During the half of a century, for which the forecast is made, 58.5 million people are expected to immigrate to the countries under study in the Base scenario (on average: 1.2 million persons yearly). In the other words, should only natural change and migration between the countries under study be considered, the 2052 population of the 27 countries would be smaller on average by 16%.

The important changes that are expected to concern European countries in the coming 50 years are related to shifts in the age structures, being a consequence of advancement in the processes of population ageing. A visible decline in the number and proportion of people in younger ages is forecasted, combined with an increase in the older age groups, including the oldest-old (85 years or more). The most numerous age group is expected to shift from 35-39 years of age in 2002 to 60-64 years fifty years ahead. A comparison of the age pyramids for the countries under study between 2002 and 2052 is presented in Figure 3.1. The graphs for 2052 include the differentiation between the demographic structure of the population present in the countries under study already in 2002 ('original' population, darker shading) and the one of the post-2002 immigrants and their descendants ('newcomers', lighter shading). To differentiate between the former and the latter, a simulation of population developments has been used, assuming no migration from the other countries of the world than the 27 ones under study. This simulation is described in more details in Section 4.2.

Figure 3.1. Changes in the age structure in 27 countries, 2002-2052: Base scenario

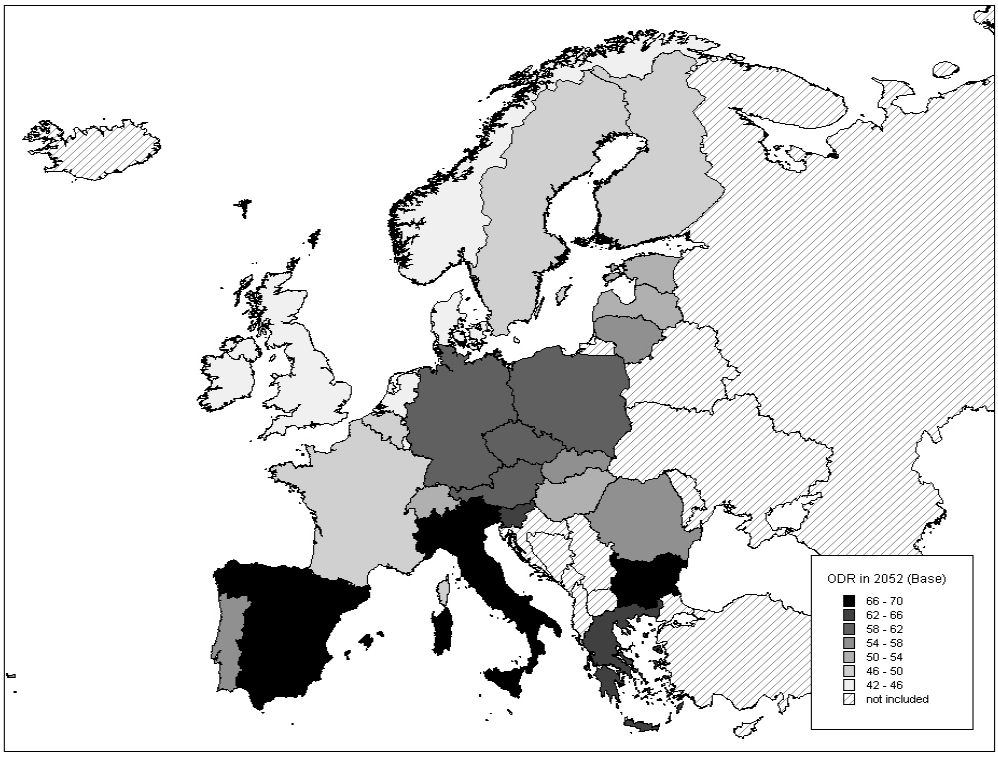


Source: Eurostat, NewCronos; own calculations

The advancement of ageing can be also seen in terms of aggregate measures assessing its impact on population, defined in Section 2.2. The ODR is expected to increase from 23.9 to 54.9 percent, thus more than double (growth by 130%). A reciprocal, the PSR is thus going to decline from 4.2 persons in the working age (15-64 years) per one aged (65 years or more), to the value of 1.8. On the country level, the ODR values expected for 2052 range from 43.0 for Ireland (PSR of 2.3) to 67.4 for Italy and 67.5 for Spain (PSR of 1.5). The other countries,

where the ageing processes are expected to be relatively least advanced over the next half a century, are the ones with relatively high-fertility levels. This concerns especially the Benelux, with Luxembourg (ODR of 44.2) and the Netherlands (44.5), as well as Scandinavia, with Denmark (44.7) and Norway (44.9). On the other extreme are the countries of Southern and South-Eastern Europe, including Bulgaria (ODR of 66.5), Slovenia (62.8) and Greece (62.6). The spatial distribution of the ODR values forecasted for 2052 is presented on a map in Figure 3.2.

Figure 3.2. Old-age dependency ratio (ODR) in Europe in 2052: Base scenario



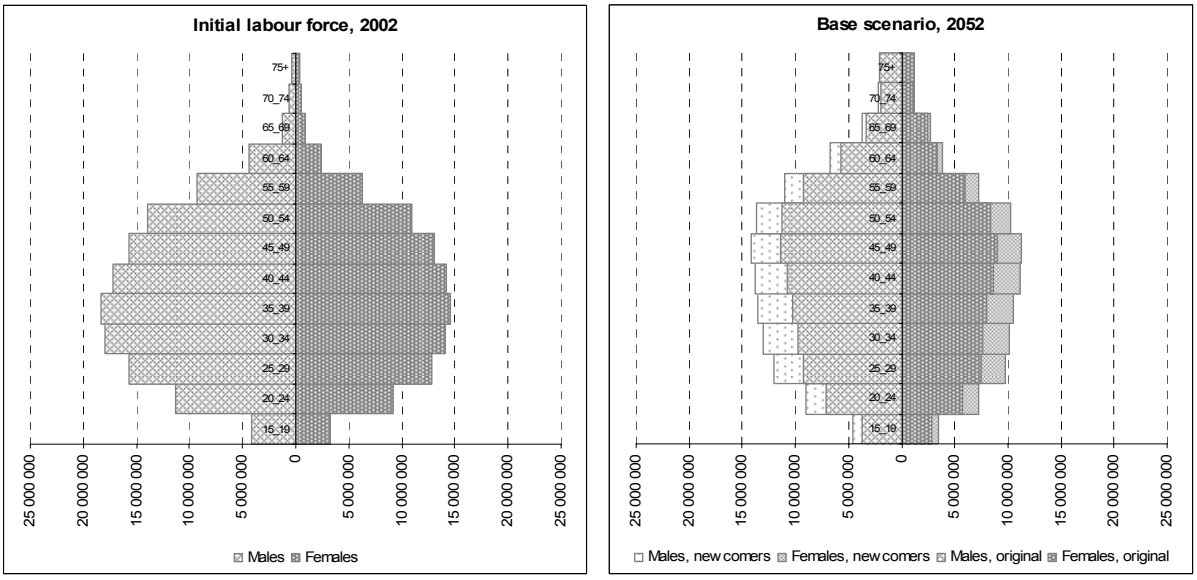
Source: own computations

The changes are even more visible in the development of the labour force resources. In the Base scenario, between the years 2002 and 2052, the decline of the labour force by almost 10% , from 232.8 to 209.7 million people is forecasted. The decline is, however, moderate in comparison to what would happen without migration from outside the countries under study. Without immigrants from the other parts of the world, labour force resources in the 27 countries would decrease by 28% (65 million people). In the Base scenario, immigrants and their descendants are going to account for one fifth of the total labour force in the 27 countries by 2052. Moreover, the decline in size of the labour force is accompanied by the decline of its share in the total population. The labour force participation rate for total population, equalling 47.1% in 2002, is expected to decrease to 42.4% half a century later.

Apart from the changes in size, significant changes in structure of the labour force are expected. As in the case of total population, these changes are going to decrease the

proportions of middle age groups. Between the years 2002 and 2052, the proportion of older workers (55+) is expected increase by 78% (from 11.3% to 20%), mainly at the expense of middle age groups (25-54). The proportion of the young age groups (15-24) in the labour force is envisaged to remain almost the same: 12% in 2002 and 11.6% in 2052. This is mainly due to substantial increases in participation rates expected in the age group of 15-19 years. The most significant changes can be expected for the older age groups (65+), for which both size and proportion in the total labour force is going to more than triple. This is a result of a forecasted increase of labour force participation of older people, as well as of the increase of the share of persons aged 65+ in total population. The growing significance of older age groups in the total labour force will, no doubt, require developing the institutional facilities of their active participation in the labour market. Comparison of the labour force age pyramids for all 27 countries in years 2002 and 2052 is presented in Figure 3.3.

Figure 3.3. Change in the age structure of the labour force in 27 countries, 2002-2052: Base scenario



Sources: Eurostat, NewCronos; International Labour Organization (2003); own calculations

The changes in both population and labour force structures are reflected by ODRE and LMDR, economic indicators of ageing and the burden of social security systems on the labour force, forecasted for the year 2052. In the 27 European countries, the burden of inactive persons in the retirement age on active persons is expected to more then double over the next 50 years, with ODRE increasing from 32.4 in 2002 to 66.4 in 2052. In the country with the most advanced process of ageing (Italy), ODRE is going to reach the level of 93.4.

The burden of the whole inactive population aged 15+ on the labour force, measured by LMDR, is expected to rise by 27%, from 76.8 in 2002 to 105.2 in 2052 in the 27 countries under study. It means that on average every economically active person in these countries will support more then one inactive person (excluding children).

The values of both indicators (ODRE and LMDR) for particular countries follow similar patterns to the one of the ODR. At the end of the forecast period the order of countries ranked by ODRE and LMDR values is very similar to their ranking by fertility levels, modified by the expected labour force participation patterns and only with a very limited effect of the advancement of the ageing process prior to 2002. The rankings of countries by ODRE and LMDR at the beginning and at the end of the forecast period are shown in Table 3.1.

Table 3.1. Dependency ratios: economic and labour market, 2002 and 2052, %

	ODRE				LMDR			
Rank	**Country**	**2002**	**Country**	**2052**	**Country**	**2002**	**Country**	**2052**
1	Romania	17.9	Norway	49.9	Switzerland	48.6	Norway	77.2
2	Ireland	22.1	Denmark	50.7	Denmark	50.2	Denmark	78.9
3	Slovak Rep.	23.3	France	51.5	Norway	51.0	Sweden	79.8
4	Denmark	25.5	U.K.	54.0	Netherlands	58.1	Switzerland	83.9
5	Netherlands	25.8	Sweden	54.1	Portugal	61.1	France	84.4
6	Portugal	25.8	Netherlands	54.2	U.K.	61.3	Finland	86.7
7	Poland	26.1	Portugal	54.6	Sweden	61.5	Portugal	87.5
8	Switzerland	26.2	Ireland	55.1	Finland	62.1	Netherlands	88.7
9	Norway	26.2	Finland	56.2	Romania	62.9	U.K.	89.9
10	Czech Rep.	26.5	Switzerland	56.4	Lithuania	63.4	Romania	93.0
11	Slovenia	27.3	Romania	56.6	Slovak Rep.	66.5	Estonia	93.2
12	Lithuania	27.7	Estonia	57.7	Czech Rep.	67.4	Ireland	98.2
13	Estonia	28.7	Luxembourg	59.8	Ireland	69.7	Latvia	99.3
14	U.K.	29.3	Belgium	61.3	Austria	70.8	Lithuania	102.8
15	Finland	29.3	Latvia	63.0	Slovenia	71.7	Belgium	104.8
16	Latvia	29.9	Hungary	64.0	Germany	72.0	Hungary	105.8
17	Austria	31.0	Lithuania	66.5	Estonia	72.1	Luxembourg	105.9
18	Luxembourg	32.1	Germany	70.3	Latvia	74.0	Germany	106.6
19	Sweden	32.3	Slovak Rep.	71.9	France	81.0	Slovenia	108.6
20	Germany	34.1	Austria	72.5	Poland	81.8	Slovak Rep.	112.1
21	Greece	35.0	Slovenia	72.7	Spain	86.8	Austria	112.8
22	France	36.0	Czech Rep.	73.6	Luxembourg	87.2	Czech Rep.	113.5
23	Spain	36.5	Poland	74.0	Greece	88.5	Poland	114.4
24	Hungary	36.7	Bulgaria	80.2	Belgium	93.4	Bulgaria	116.5
25	Bulgaria	38.2	Greece	83.5	Bulgaria	97.4	Greece	133.7
26	Belgium	39.3	Spain	90.6	Hungary	103.9	Spain	141.3
27	Italy	45.3	Italy	93.4	Italy	113.3	Italy	147.5
	All countries	**32,4**	**All countries**	**66,4**	**All countries**	**76,8**	**All countries**	**105,2**

Sources: Eurostat, NewCronos; International Labour Organization (2003); own calculations

Construction of the indicators makes labour market dependency ratio (LMDR) more sensitive to labour force participation pattern than economic old-age dependency ratio (ODRE). For this reason, the order of countries ranked by LMDR is almost identical to the one of the participation rates for total population (and thus also for population aged 15+).

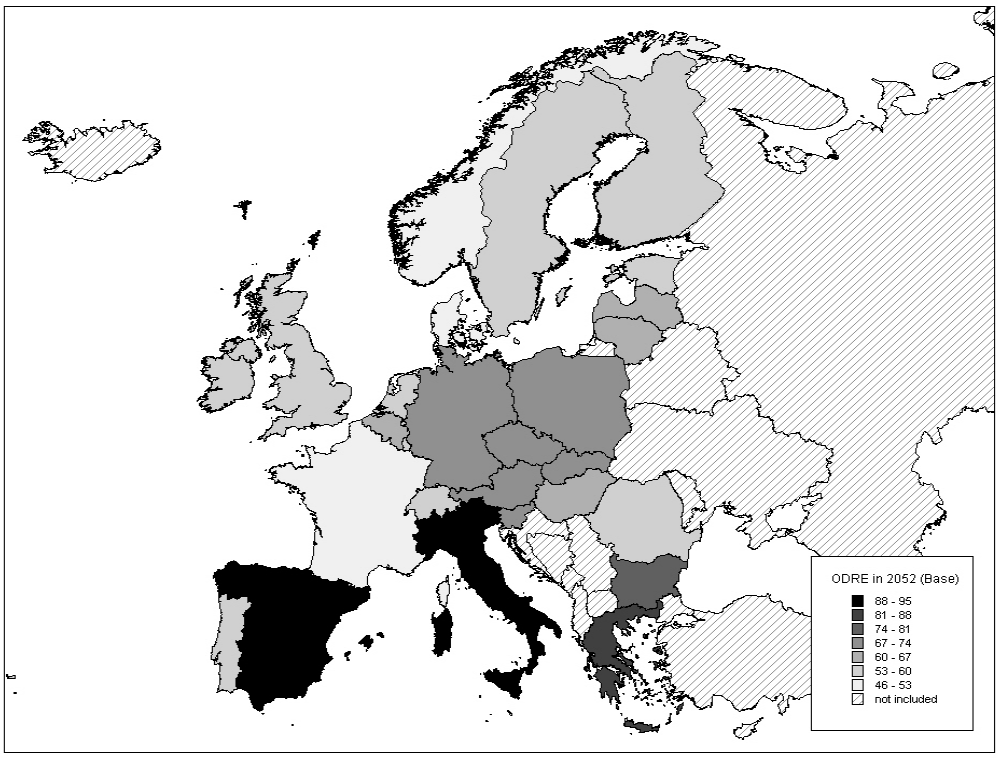
The analysis of the countries' order by ODRE and LMDR provides interesting hints about the relative importance of various determinants of population and labour force change. This information can be useful in particular in identifying effective means to mitigate the consequences of aging. Notably, the relatively high ranks of Central and Eastern European countries are mostly due to young population structures at the beginning of the forecast

period. Their ranks fifty years ahead, however, prove that this factor, as expected, ceases to matter in the long run, being much less important than the pertaining low fertility levels. The case of the Scandinavian countries is opposite: their population structure was regressive already in 2002, which lowers their ranks especially by ODRE. The relatively high fertility and economic activity levels during the whole forecast period place them at the top of the rankings in 2052. The significance of high fertility is demonstrated by France, while the case of Switzerland proves that relatively high labour force participation can, to the great extend, make up for low fertility and resulting unfavourable changes in the population structure.

Southern European countries (Italy, Greece and Spain) demonstrate, to what extent the ageing process in Europe can develop. Their position in both rankings stems from the lowest fertility and economic activity levels; it is expected that half a century ahead the share of active population in all three countries will be less than 40%. With respect to the high position of Romania in the rankings, the remarks from Section 2.2 remain in force. It should be noted that although in Romania very high economic activity is observed, especially in the oldest age groups, its character is different than in the rest of the countries under study (Saczuk 2004) and thus the results are not directly comparable.

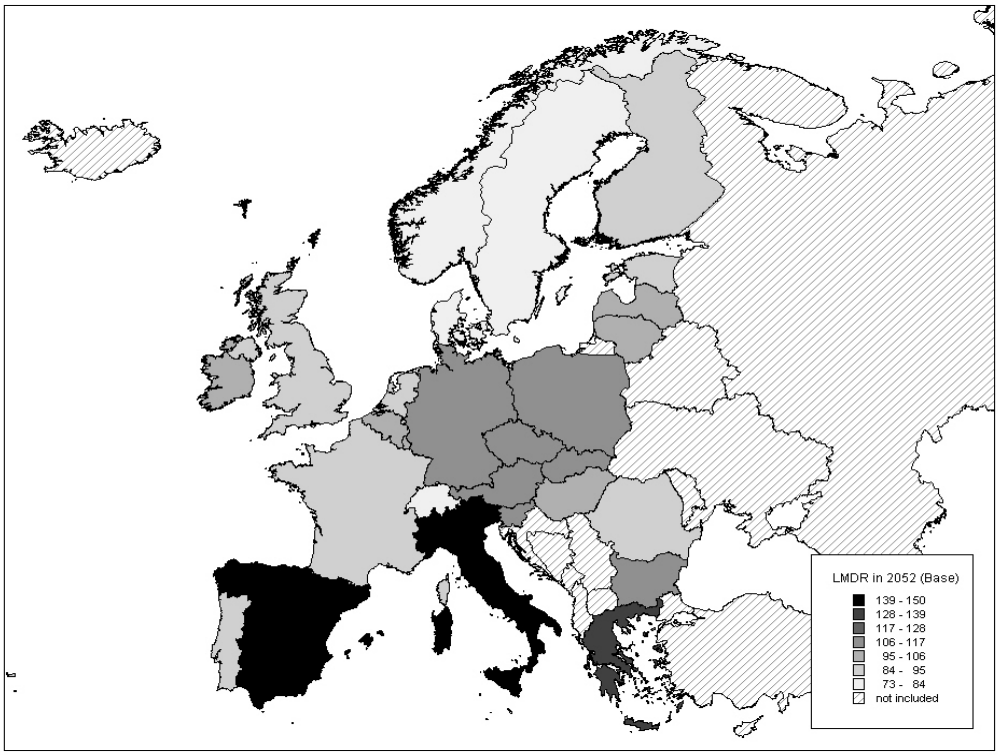
The spatial distributions of ODRE and LMDR forecasts for 2052 are presented in Figures 3.4 and 3.5, while a detailed overview of the numbers and time series for particular countries can be found in the Annex.

Figure 3.4. Economic old-age dependency ratio (ODRE) in Europe in 2052: Base scenario



Source: own computations

Figure 3.5. Labour market dependency ratio (LMDR) in Europe in 2052: Base scenario



Source: own computations

The comparison of the indicators for two periods indicates that high fertility and high economic activity can slow down the progress of the ageing process and its negative economic consequences. It is evident, however, that only combination of both can bring the most promising results.

3.3. High and Low Scenarios: the uncertainty span

Further to the Base scenario expectations on future migration, considered as the probable future developments, the High and Low scenarios have been developed to take into the account the expected uncertainty of the migratory phenomena in Europe. In the current study, assumptions on future direction and magnitude of population flows in all forecast variants (Base, High and Low) are made subjectively, following a qualitative analysis of migration factors presented in a background study (Bijak et al. 2004). It is worth noting that the assumptions for the High and Low scenarios are meant to provide the envisaged bounds of the possible migration developments, rather than the 50-years-long trajectories for the countries under study. It seems hardly possible that the conditions for very high net migration gains, respectively losses, would be so persistent.

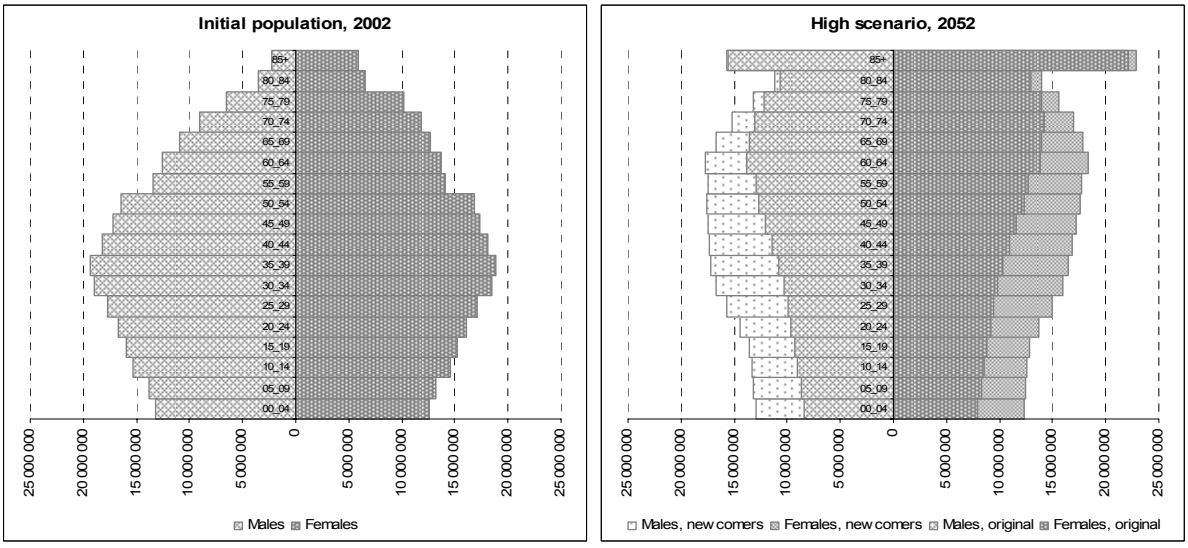
In the High scenario, a good overall socio-economic situation is assumed for all European countries, including swift convergence of the economies and of the living standards. This

would both increase the overall mobility of people within Europe in search for emerging employment possibilities and reduce the push factors to emigrate from the less developed regions, including Central and Eastern Europe. The increase of the East-West population flows following the opening of the Western European labour markets is therefore expected to be a short-term phenomenon, rather moderate in size. The assumed dynamic economic growth and social development in Europe is also expected to result in a need for inflow of foreign labour from the other parts of the world and thus lead to a relative relaxation of immigration policies. Economic growth in the developing regions of the world is furthermore assumed to be a factor contributing to the increased mobility of people on a global scale.

Under such assumptions, the total population size of all 27 countries under study is going increase by 13.3% within the forecast horizon, from 494.1 million in 2002, to 563.0 million in 2052. The post-2002 'external' immigrants, that is those coming from the outside o the 27 studied countries, and their descendants contribute to the increase in population size of the countries under study by 148.2 million people. Hence, in the absence of immigration from outside the 27 countries under study, the total of their populations would be smaller by 35% at the end of the forecast period. By 2052, about 109.0 million people are expected to come as immigrants to the 27 European countries, on average 2.2 million yearly.

The expected shifts in the age structures in European countries in the High scenario are similar to the ones for the Base scenario, yet with proportionally more immigrants and their descendants in all age groups. The impact of increased immigration can be seen here as a more moderate relative decline in the proportion of the younger generations, as well as an increase in the older age groups, including the oldest-old. In the forecast for 2052, the most numerous age group is again expected be the one of 60-64 years. A comparison of the age pyramids for all countries under study between 2002 and 2052 is presented in Figure 3.6 in the same way as in the case of the Base scenario (Section 3.1).

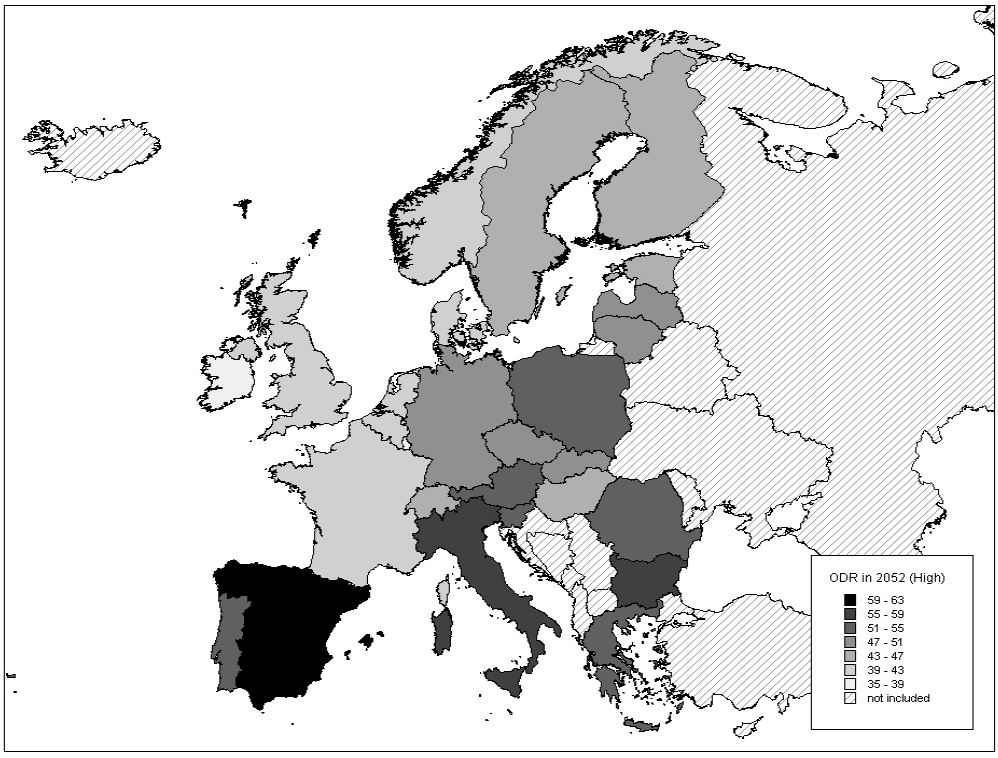
Figure 3.6. Changes in the age structure in 27 countries, 2002-2052: High scenario



Source: Eurostat, NewCronos; own calculations

The ageing process in the High variant of the forecast is obviously slightly less advanced than in the Base one, due to the inflow of more immigrants, relatively younger than the receiving population. The average ODR in 2052 in this scenario is expected to equal 48.7 percent, what corresponds to the PSR of 2.1 persons in the working age (15-64 years) per one person in the age of 65 years or more. The ODR is therefore expected to increase (or PSR to decline) in comparison with 2002 by nearly 104%, thus, slightly more than double. On the country level, the High scenario ODR values foreseen for 2052 range from 38.1 for Luxembourg and 38.2 for Ireland (PSR of 2.6) to 58.8 for Italy and 60.0 for Spain (PSR of 1.7). With respect to the ODR values in the High scenario, the countries under study follow roughly the same order as in the case of the Base one, only slightly modified by the impact of migration within Europe. Hence, countries with the ageing process expected to be least advanced over 50 years, are additionally the Netherlands (ODR of 39.7) and the United Kingdom (40.5), followed by the Scandinavian countries. Countries with the most advanced ageing, in terms of ODR, are again the ones of Southern and South-Eastern Europe, including Bulgaria (ODR of 58.7), Greece (54.7) and Slovenia (54.1). The spatial distribution of the ODR values envisaged for 2052 in the High variant of the forecast is presented on a map in Figure 3.7.

Figure 3.7. Old-age dependency ratio (ODR) in Europe in 2052: High scenario



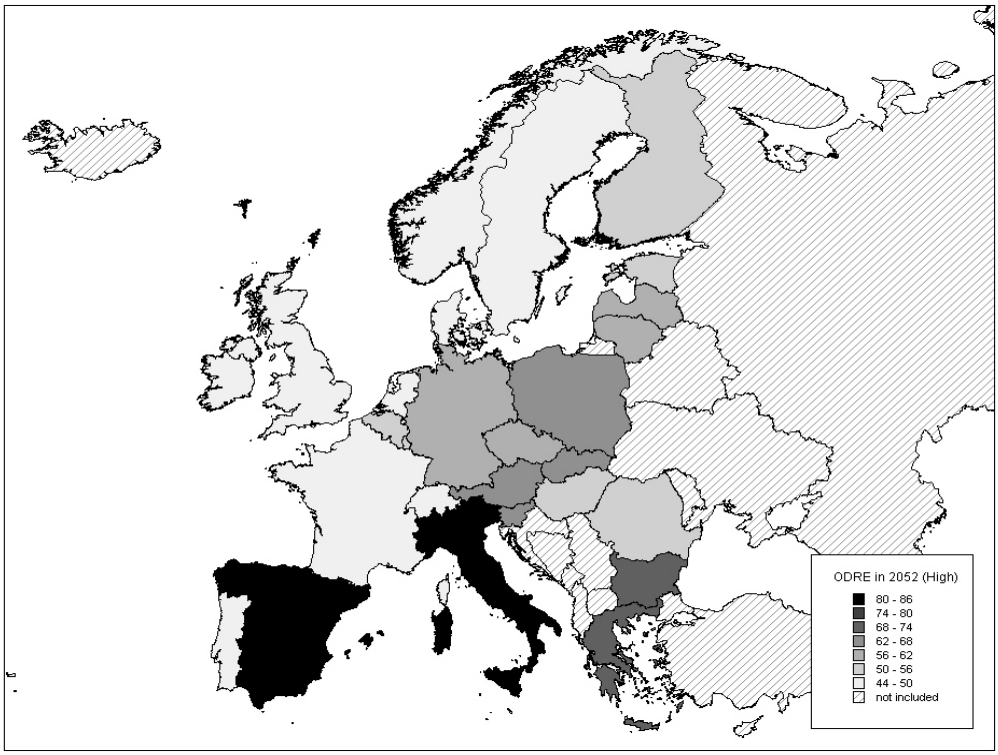
Source: own computations

In the High scenario the total labour force resources of the 27 countries under study are expected to increase by 5.9%, to 246.6 million by 2052. The increase will be slower than in the case of the total population, resulting in a decline of share of labour force in the total population from 47.1% in 2002 to 43.8% in 2052. Slightly better labour force participation

rate for total population is a straightforward result of increased number of immigrants from the other parts of the world. At the end of the forecast period, the post-2002 immigrants and their descendants are going to account for almost one third of the total labour force resources in the 27 European countries.

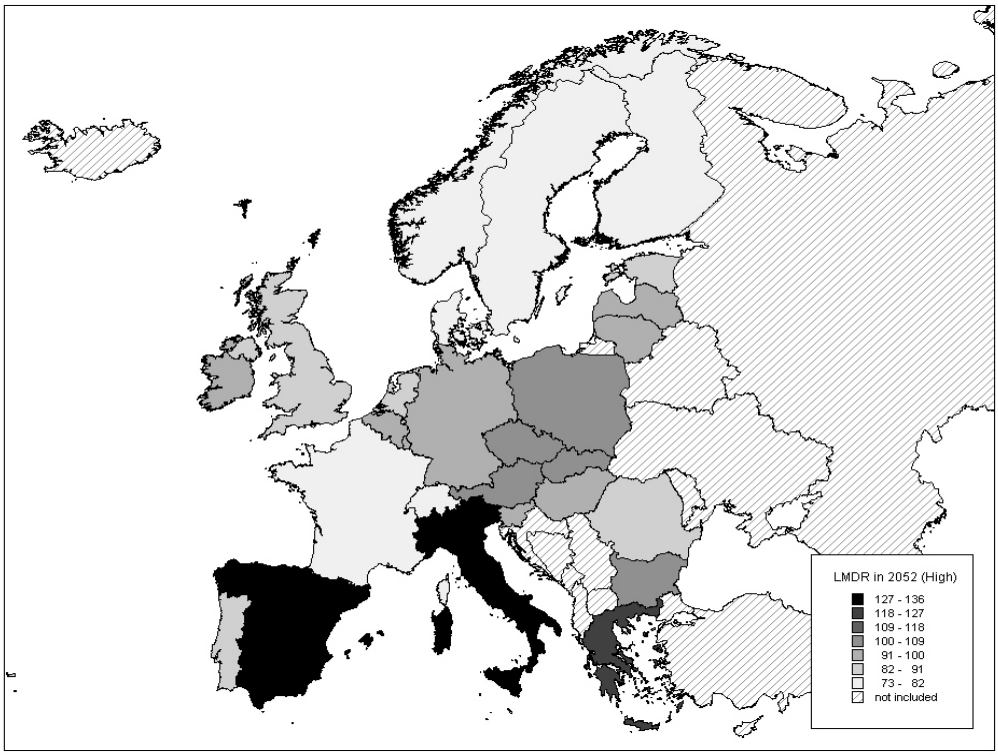
The alternative assumptions concerning international migration do not bring a radical change with respect to the ageing process and its effects, in comparison to the Base scenario. The ageing process is going to evolve, although its economic consequences will be less intense. By 2052, ODRE is going to increase on average to 58.8 (as compared to 66.4 in the Base scenario), while LMDR to reach 97.2 (105.2 in the Base scenario). This means that on average every active person will have to support slightly less than one inactive aged 15 years or more. Not surprisingly, this change is going to favour countries with relatively large migration inflows. The order of countries according to ODRE and LMDR values in 2052 for the High scenario is very similar to the one for the Base scenario. For 2052, the lowest values of both indicators are reached in Norway (ODRE of 46.0, LMDR of 73.1) and the highest ones – in Italy (ODRE of 81.2, LMDR of 134.4). The spatial distributions of the ODRE and LMDR values forecasted for 2052 in the High scenario are presented in figures 3.8 and 3.9.

Figure 3.8. Economic old-age dependency ratio (ODRE) in Europe in 2052: High scenario



Source: own computations

Figure 3.9. Labour market dependency ratio (LMDR) in Europe in 2052: High scenario



Source: own computations

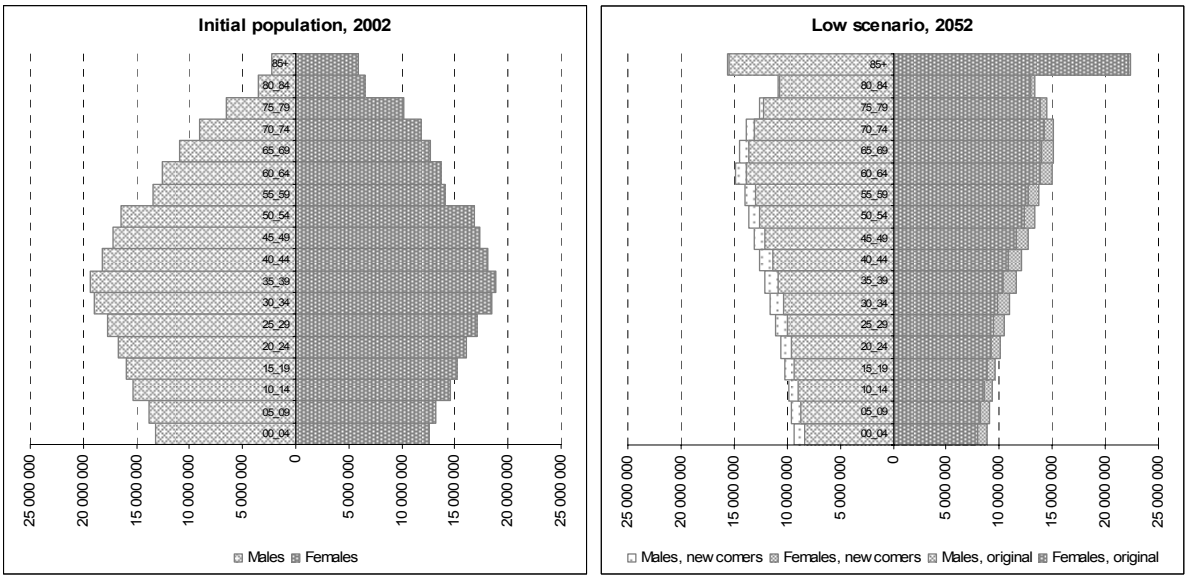
Opposite to the High scenario, the Low variant of the forecast envisages economic stagnation in Europe, higher unemployment levels and structural problems on the labour markets. In the countries of Central and Eastern Europe, short- and mid-term economic disturbances are assumed. This would give reason to the enhanced migration pressure to Western Europe, strengthened by gradual opening of the labour markets within the enlarged European Union. The disparities between the more and less developed parts of Europe are assumed to persist longer in comparison to the Base scenario, due to unfavourable economic conditions. Therefore, the wave of migration in the Low variant is assumed to be higher and longer-lasting. On a global scale in turn, a worldwide economic stagnation is assumed. This would result in strong migration pressure on Europe from the developing countries, countered by very restrictive migration policies, aimed at protecting the European labour markets and reducing the potential social tensions. These factors would eventually contribute to the decline of at least registered immigration to the European countries under study.

Under the conditions assumed in the Low scenario, the overall population size of 27 European countries is envisaged to decline to 446.9 million in 2052, thus by 9.6%, mainly due to limited immigration from the other parts of the world. In this variant, the contribution of the post-2002 immigrants and their descendants to the overall population size would amount only to 32.2 million people by the end of the forecast period (7% of the total). During the whole forecast period (2002-2052), the total number of 'external' immigrants to the 27 countries

under study in the Low scenario is expected to be only about 22.8 million people, thus on average less than half a million a year.

Also in the Low scenario, the forecasted changes in the age structures in the countries under study resemble the ones obtained for the Base scenario, although with proportionally less immigrants observed in all age groups. The age pyramid here is much slimmer, with more advanced relative decline in the proportion of the younger generations in the population. The most numerous age group in 2052 is expected be the one of 60-64 years for males and the one of 65-69 years for females. The Low scenario changes of the age structures for all 27 countries under study in the forecast period are presented in Figure 3.10.

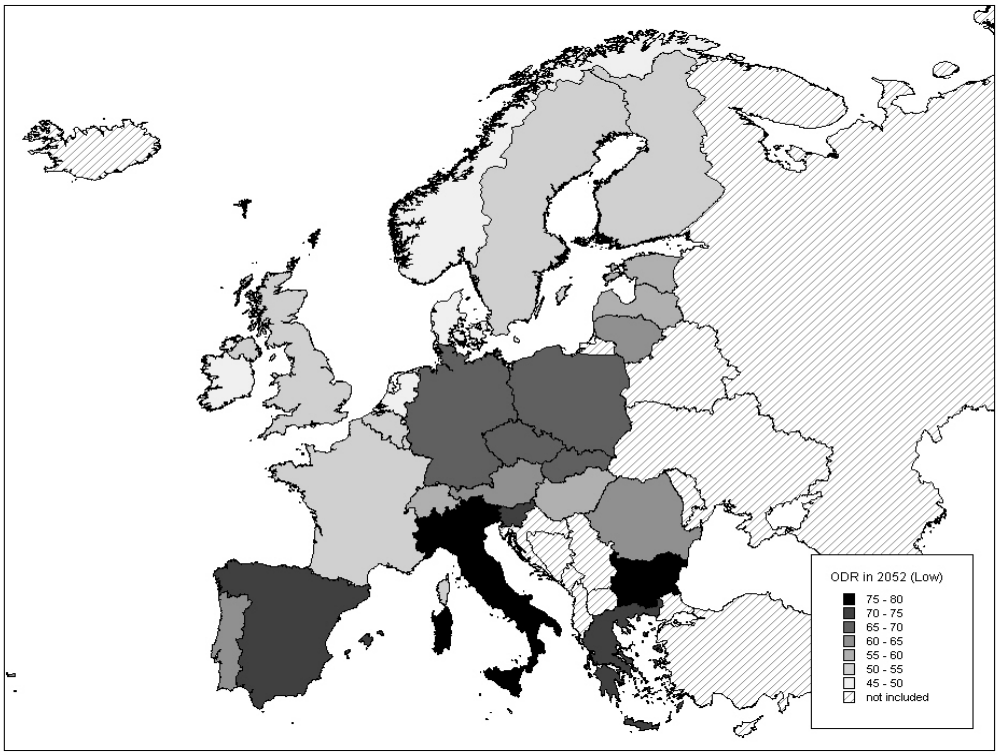
Figure 3.10. Changes in the age structure in 27 countries, 2002-2052: Low scenario



Source: Eurostat, NewCronos; own calculations

In the Low scenario, the reduced immigration streams result in more rapid ageing of the population of the countries under study. The average ODR in this variant is expected to reach 60.8 percent by 2052, which corresponds to 1.6 inhabitants in the working age 'potentially supporting' each person above the age of 65 years. On the country level, the ODR values foreseen for 2052 range in the Low scenario between 46.6 for Ireland (PSR of 2.1) and 77.1 for Bulgaria (PSR of 1.3). Again, the order of the countries under study is roughly the same as in the other scenarios, allowing for slight alterations caused by the impact of intra-European migration. In this scenario, the countries with relatively least advanced ageing process in terms of ODR are expected to be: Denmark (ODR of 48.1), Norway (48.2) and the Netherlands (48.9). On the other hand, these phenomena is again going to be relatively most advanced in Southern and South-Eastern Europe, including Italy (ODR of 75.5), Spain (74.2), Slovenia (71.5) and Greece (70.2). A map with the spatial distribution of the ODR values forecasted for 2052 in the Low scenario is presented in Figure 3.11.

Figure 3.11. Old-age dependency ratio (ODR) in Europe in 2052: Low scenario

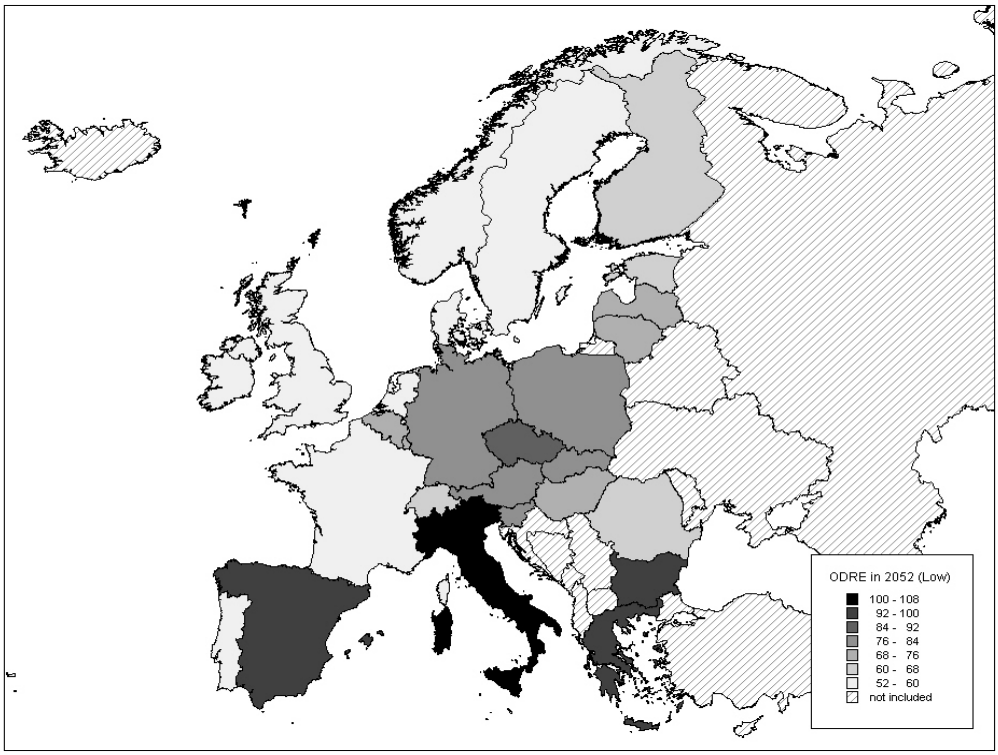


Source: own computations

The smaller number of immigrants in all age groups, especially the younger ones, will also influence the labour force forecasts in this variant. At the end of the forecast period the overall labour force resources in the 27 countries under study are expected to be by 21% (49 million people) smaller than in 2002. In this scenario, the total labour force in 2052 is going to amount to 184 million people (41% of the total population), of whom 8.7% are going to be post-2002 immigrants and their descendants.

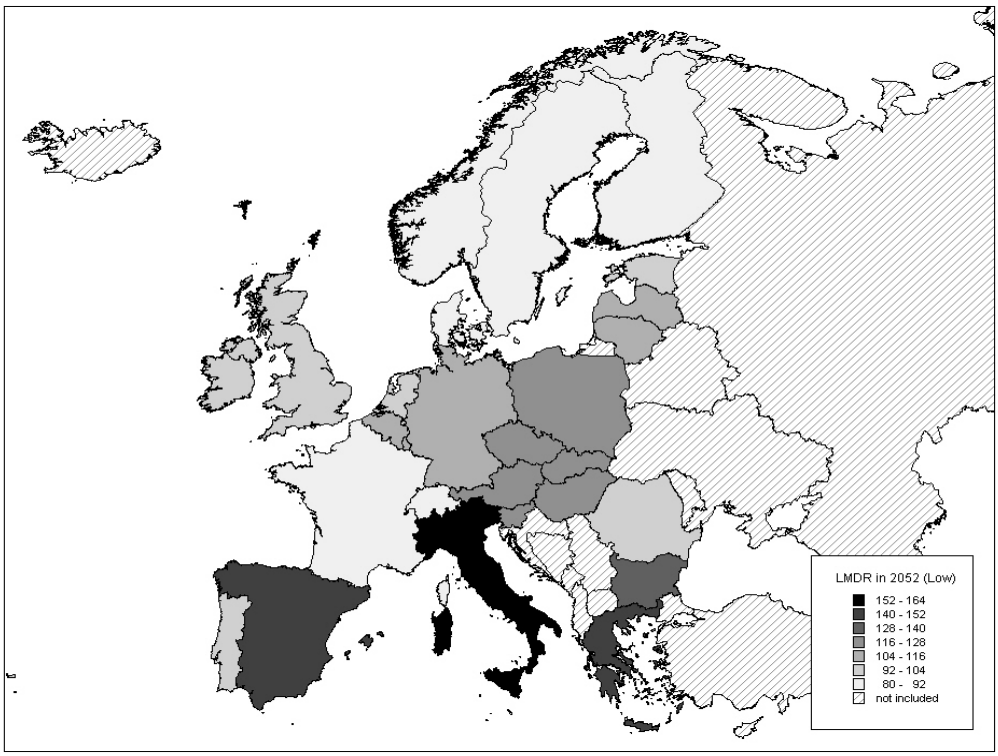
The small net inflow of immigrants is also going to negatively influence the burden of economically inactive persons on the active population. In the Low scenario the average ODRE forecasted for 2052 for all countries under study is going to reach 73.6, while the average LMDR – 112.9. The Scandinavian countries with France and the United Kingdom will demonstrate the relatively smallest burden of the retired inactive population on the labour force. Similarly, the Scandinavian countries and Switzerland are going to be characterised by the smallest overall burden of inactive population (excluding children) on the active one. Again, the smallest values of both indicators forecasted for 2052 are going to be observed for Norway (ODRE of 53.5, LMDR of 80.8), while the highest ones – for Italy (ODRE of 105.0, LMDR of 160.1). The spatial distribution of the ODRE and LMDR values for 2052 is presented in Figures 3.12 and 3.13.

Figure 3.12. Economic old-age dependency ratio (ODRE) in Europe in 2052: Low scenario



Source: own computations

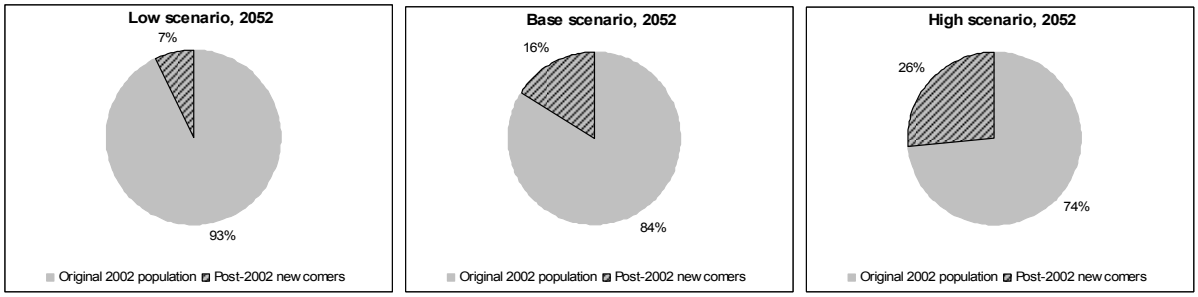
Figure 3.13. Labour market dependency ratio (LMDR) in Europe in 2052: Low scenario



Source: own computations

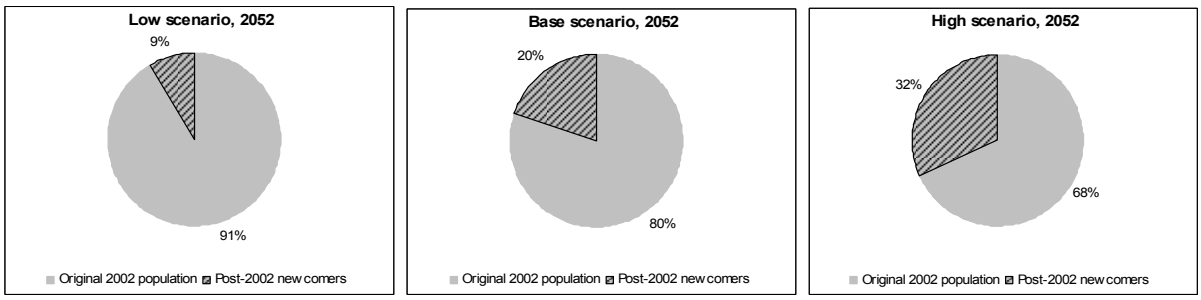
The uncertainty span between the High and Low scenarios regards therefore not only the estimated final population and the labour force size of the 27 countries (differences of 116.1 million and 63 million people respectively), but more importantly, the age structures and thus the advancement of the ageing process with its economic consequences. Moreover, the mentioned differences are almost exclusively due to the impact of immigration of generally younger people from the other countries of the world. The immigrants and their descendants are eventually expected to account for between 7% and 26% of the overall population forecasted for 2052 in the 27 European countries (Figure 3.14). Their respective shares in the labour force are expected to vary from 9% to 32% (Figure 3.15).

Figure 3.14. The share of immigrants arriving after 2002 and their descendants in the total population of 27 countries, 2052 (%)



Source: own computations

Figure 3.15. The share of immigrants arriving after 2002 and their descendants in the total labour force of 27 countries, 2052 (%)



Source: own computations

It is worth re-iterating that even though in the Base scenario for 2052 the 16% of the post-2002 newcomers contribute to maintaining the population size at a relatively stable level, it does not stop the changes in the age structures, visible as further progress of the ageing process. In order to keep the population structure of Europe 'young', much more immigrants would be theoretically needed than it is currently assumed even in the High variant of the forecast, seen as the high bound of the possible future size of immigration. This issue is further corroborated in Sections 4 and 5 of this paper, devoted to the results of various simulations of population development, aimed at sustaining various characteristics of the population and the labour market, be it the overall size, or one of the dependency ratios.

Analogically, the post-2002 immigrants and their descendants, who in the Base scenario are expected to constitute 20% of the labour force resources in 2052, do not significantly mitigate the effects of ageing of the labour force. The High and Low variants of the forecast, setting the bounds of probable migration flows to Europe, suggests that immigration can alleviate, but not offset, the profound effects of population ageing. For the European labour markets these effects are twofold: the labour force decreases and is subject to ageing itself, with increasing shares of older age groups in the total labour force.

The comparison of variants of forecasts reveals a significant difference in labour force structures between 2002 and 2052. The shares of the oldest age groups are expected to almost double over the next 50 years, mostly at the expense of the middle-aged groups (25-54). Table 3.2 presents shares of broad age groups in the total labour force forecasted for 2052 under different migration scenarios.

Table 3.2. Shares of age groups in the total labour force of 27 European countries, %

Age groups	2002	2052		
		Low scenario	Base scenario	High scenario
15-24	12.0	11.6	11.6	11.7
25-54	76.6	67.2	68.3	69.4
55+	11.3	21.2	20.1	18.9

Sources: Eurostat, NewCronos; International Labour Organization (2003); own calculations

It can be noticed, that various migration assumptions can alter the forecasts slightly, but their influence is minor when compared to the overall predicted change. It should be, thus, realised that the older workers will constitute ever greater shares of the labour force. This issue should be considered a serious challenge, in order to use this potential effectively. The inevitably growing proportion of the older workers in the overall labour force should induce the development of institutions facilitating their employment. Additionally, various incentives for the increase of economic activity of older people will be also needed. The latter issues have be discussed at length by Palomba and Kotowska (2003).

It is expected that, the overall labour force resources in Europe are going to decline over the next 50 years. The share of the labour force in the total population is envisaged to decline by 10% by the end of the forecast period. Most of the decline can be attributed to the increasing share of older people in the total population. The developments of the labour force participation rates of the total population of 27 countries under study, as well as of the population aged 15+, in various forecast scenarios are presented in Table 3.3.

Table 3.3. Forecasted developments of the labour force for 27 European countries, %

	2002	2052		
		Low scenario	Base scenario	High scenario
Proportion in the total population	47.1	41.0	42.4	43.8
Proportion in the population 15+	56.6	47.0	48.7	50.7
Relative change in size of labour force (2002 base)	-	–21.1	–9.9	+5.9

Sources: Eurostat, NewCronos; International Labour Organization (2003); own calculations

The methodology of forecasting the economic activity (Saczuk 2004) allows to distinguish between the economic and demographic factors shaping the share of the economically active persons in the total population. Economic factors reflect the decisions of people in particular age groups, whether to participate in the labour force or not. The demographic factors regard the proportions of age groups in the total labour force. The forecast of economic activity envisages increases of labour force participation in all age groups. The greatest raise in economic activity is assumed for the oldest groups, currently having the lowest economic activity rates, expected to more than double by 2052. Nonetheless, in none of the forecast variants this is sufficient to compensate for increasing shares of the elderly in the total population. In order to keep the overall activity rates on constant levels, more radical changes in economic activity of the older age groups would be needed.

The declining shares of the labour force in the total population, as well as in the population 15+ in all variants of the forecast imply a growing burden of the economically inactive on the active. In the Base scenario the per worker cost of supporting the pension system (ODRE) is expected to more than double within the next 50 years. In the same period, the per worker social security cost generated by younger age groups is expected to remain more or less constant, or even slightly decline[2]. It has to be stressed, however, that the aggregate indicators used in this study (ODRE and LMDR) are very simplified measures of the social security system costs. Nevertheless, they are useful in assessing the scale of the expected change.

The influence of international migration on these tendencies is again very limited in scope. Within the bounds set by Low and High forecast scenarios, migration has a slight impact on the results (as demonstrated in Tables 3.2 and 3.3), but in neither forecast variant this effect is sufficient to compensate for the scale of changes. The examples of the countries under study suggest that high economic activity and, indirectly, high fertility, are more effective and more plausible in mitigating the economic effects of ageing than high immigration.

[2] It should be noted here that the economic burden of the younger age groups can be calculated as the difference between LMDR and ODRE. In this particular situation, the increase in the overall LMDR can be almost exclusively attributed to the increase of ODRE, and not to the component related to the population under 65.

4. Results of simulations of population and labour force changes

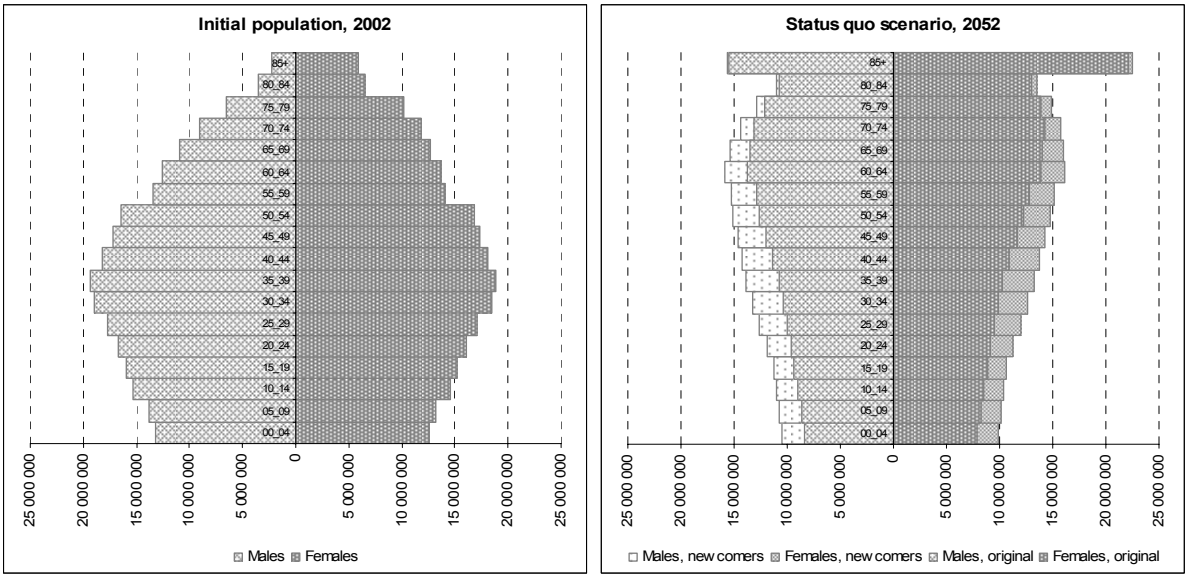
In this section, results of a set of population and labour force simulations, which have been prepared under assumptions of constant migration flows and no migration from the other countries of the world than the studied 27, are discussed. Comparison of the simulation results with forecasts presented in Section 3 and further simulations presented in Section 5 is subsequently made from the point of view of the plausibility of different assumptions and their impact on counteracting the negative economic effects of population ageing. It has to be stressed that the simulations denote theoretical population developments only, rather impossible in reality.

4.1. Simulation under the 'status quo' migration assumption

First simulation of population development assumes preserving constant migration patterns, the same as observed in the beginning of the 21st century, thus, maintaining the current status quo with respect to the external migration exchange of the 27 countries under study. The global results obtained under these assumptions resemble to a large extent the Base scenario forecast. If international migration stayed at its current levels throughout the next 50 years, the overall population of all 27 European countries would slightly decrease from 494.1 million in 2002, to 486.4 million at the end of the projection period. In this hypothetical scenario, the post-2002 immigrants from the other countries and their descendants would contribute to 71.7 million people in the 2052 population, thus to about 15%. Preservation of current annual net inflow of 1.1 million persons to the countries under study would result in a total number of 53.0 million immigrants over fifty years. Assumption on constant migration flows results in the target age structure of the 2052 population for all 27 countries very similar to the one obtained for the Base forecast, as illustrated in Figure 4.1.

In terms of the aggregate measures, under the status quo migration assumptions the overall ODR for all countries under study would increase from 23.9 to 56.0 percent, the PSR declining from 4.2 to 1.8 'potential supporters' of the population aged 65 years or more. The ranking of particular countries with respect to their simulated ODR values for 2052 is slightly different from the one forecasted in the Base scenario. The indicators range from 39.0 for Ireland (PSR of 2.6) to 73.3 for Greece (PSR of 1.4), at the lower end being countries like Norway (ODR of 42.5), the Netherlands (42.9) and Denmark (45.0), while at the upper end – Italy (69.0), Slovenia (68.0), Bulgaria (67.5) and Poland (67.3).

Figure 4.1. Changes in the age structure in 27 countries, 2002-2052: Status quo scenario

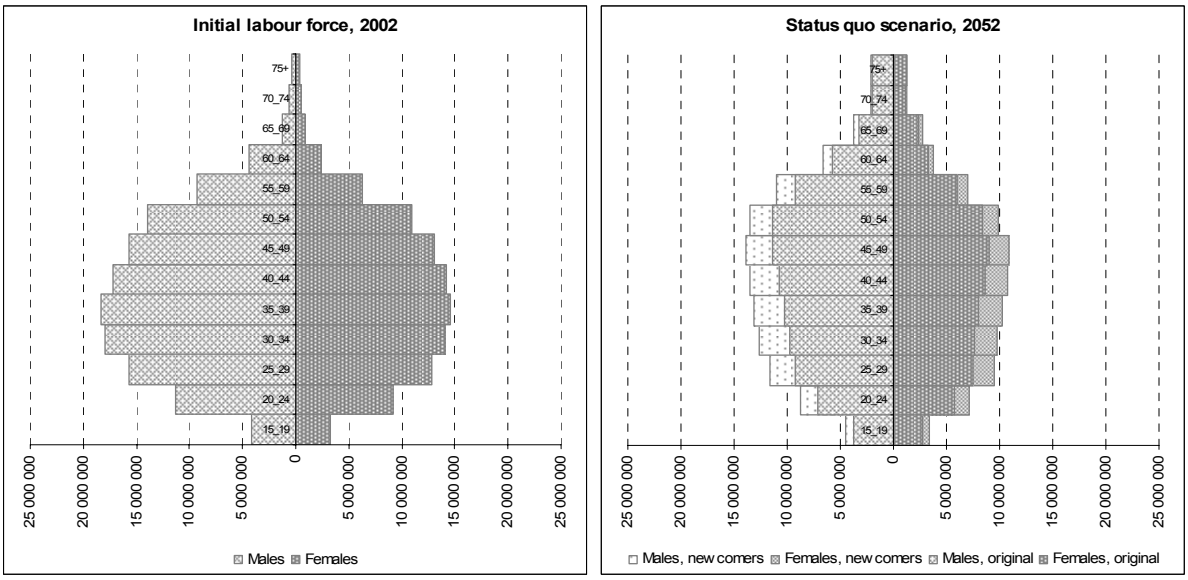


Source: Eurostat, NewCronos; own calculations

Results of the simulation for the labour force of 27 countries are also similar to the ones obtained in the Base forecast scenario. With constant migration, the labour force resources would decline by 12% (28 million people) by 2052. At the end of the forecast period, the post-2002 immigrants and their descendants would account for 18.1% of the total labour force of 27 countries. Also the proportion of labour force in the total population, as well as the age structure of labour force resemble the ones from the Base scenario. In the period 2002-2052, the share of labour force is expected to decline by 5%, while the proportion of the older age groups (55+) in the labour force is projected to almost double, mostly at the expense of the middle age groups (25-54). The initial and target age structures of the labour force, the latter resulting from constant migration assumption, are presented in Figure 4.2.

The aggregate measures of economic effects of ageing (ODRE and LMDR) for 27 countries together are also very similar to the ones for the Base scenario, with some country-level exceptions. In the most notable case of Spain, the unprecedented high immigration observed recently when kept constant for the next half a century lowers the projected burden of inactive persons on the active in comparison to Base scenario. The cases of Poland, the Czech and Slovak Republics are the opposite: assumed constant net outflow of migrants from these countries increase this burden. The ranges of indicators simulated for 2052 remain practically unchanged in comparison to the Base scenario: ODRE is expected to reach levels ranging from 47.3 (Norway) to 95.8 (Italy), while LMDR from 74.5 to 150.1 (the same countries).

Figure 4.2. Changes in the age structure of the labour force in 27 countries, 2002-2052: Status quo scenario



Sources: Eurostat, NewCronos; International Labour Organization (2003); own calculations

4.2. Simulation under no external migration assumption

Second simulation of population and labour force changes assumes no migration exchange of the 27 European countries under study with the rest of the world. As migration seems to be contemporarily an immanent feature of a globalised world (Koryś, Okólski 2004), this scenario has to be seen as purely theoretical. It has been designed to illustrate the impact of international migration on population change in the other forecast and simulation scenarios, rather than to constitute a plausible trajectory of population developments itself. This scenario is used throughout this paper to distinguish the 'original' population from the post-2002 'newcomers' and their descendants in the target population and labour force structures expected for 2052.

Should there be no international migration exchange between the 27 countries under study and the other regions of the world, population decline and advancement of the ageing processes would be, not surprisingly, most dramatic. Over the years 2002-2052, the overall population of all 27 European countries would decrease from 494.1 million to 414.7 million, thus, by about 16%. The target population structure is also very much advanced in the ageing process, with the average ODR of 64.1 and the corresponding PSR of 1.6 working-age persons 'potentially supporting' the elderly over 65 years. The age pyramids for this scenario can be found in the figures illustrating all other forecast and simulation variants, as the ones depicting the 'original' population, thus marked with a darker shading.

In terms of the country-specific variation of the aggregate measures of ageing, ODR varies from 48.5 for Ireland (PSR of 2.1) to 81.8 for Italy (PSR of 1.2). A ranking of the European

countries with respect to the ODR values is very similar to the one for the Base forecast scenario. At the higher end of the values of this simple ageing indicator there are also Spain (ODR of 80.4), Greece, Slovenia and Bulgaria, three latter with ratios between 74 and 75 percent. Again, the ageing processes would be least advanced also in Norway (ODR of 50.2), Denmark (50.3), Luxembourg (51.3) and in the Netherlands (51.4).

In this simulation, the even greater changes are expected for the labour force. By 2052 the overall labour force resources would decrease by 65 million people - 28% of the initial stock. Should there be no migration exchange with the other parts of the world, in 2052 the economically active persons would account for 40.1% of the total population of the 27 countries under study. On the contrary to changes in scale, changes of structure of the labour force would not significantly differ from the Base scenario forecasts. Again, the share of older age groups in the labour force is expected to almost double by 2052, mostly at the expense of the middle age groups.

Under such hypothetical scenario, the economic indicators of ageing would show further advancement of this process, the average ODRE reaching 77.6 and LMDR 117.0 by 2052. The numbers are high, but only slightly higher than the ones in the Low forecast scenario, what gives an additional hint that immigration does not sufficiently influence the tempo of population ageing. The comparison of ODRE and LMDR does not reveal any new patterns: the simulated values of both indicators go up for all countries. The order of the countries by their 2052 ODRE and LMDR values is almost the same as in the Base scenario, with the lowest ones in the countries with high economic activity and high fertility. It is noticeable that the economic consequences of ageing would progress most rapidly in the countries where they are already most profound, i.e. in Italy, Spain, Greece, as well as in the Central and Eastern European countries.

In addition to the scenario assuming no migration exchange of the countries under study with the rest of the world, another simulation has also been made, with no migratory movements whatsoever, either outside or inside Europe. As the results obtained in the latter variant proved not to differ substantially from the previous scenario, they will not be discussed in details in this paper. Nevertheless, the main population and labour force indicators for the hypothetical ‘Europe without migration’ can be found in the Annex.

5. The simulation of replacement migration needed to maintain certain population and labour force parameters

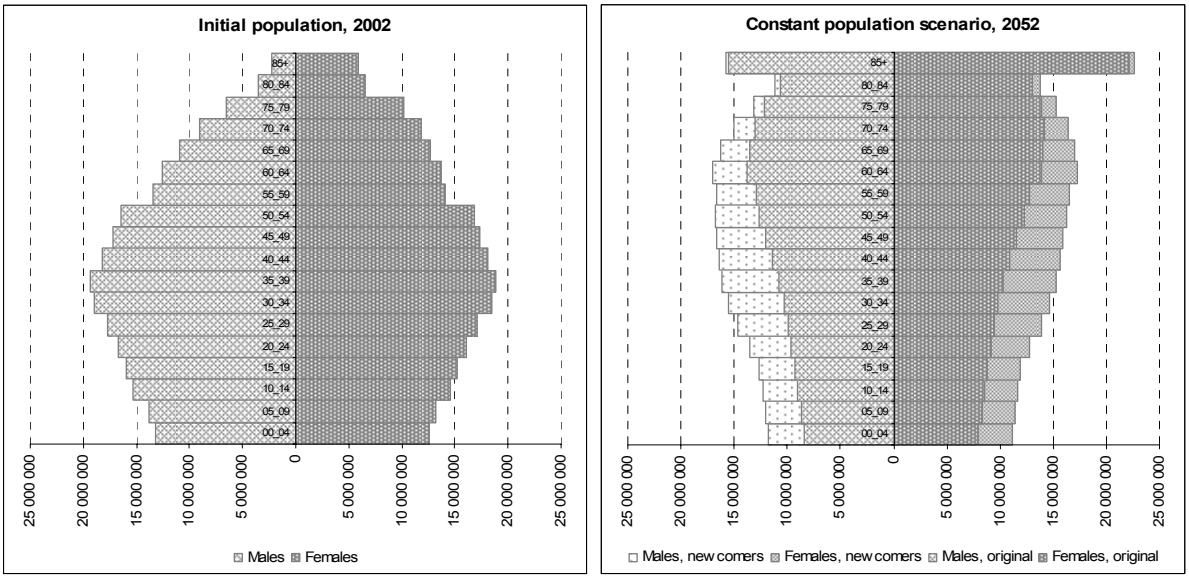
In this section we look at the hypothetical consequences of the inflow, from the outside of the 27 studied countries, sufficient number of migrants to keep the population size constant on the level observed in 2002 and needed to keep various dependency ratios (old-age, economic, and labour market) not increasing. It should be stressed forcefully that we neither advocate the influx of migrants of such scale as presented in some simulations, nor see it feasible. The whole exercise should be interpreted above all from the point of view of the analysis of demographic deficit expected due to low fertility and mortality.

5.1. Simulation under constant population assumption

Among the simulations of future population development prepared in the current study, one has been devoted to answering the question, how many immigrants would be needed to sustain the overall population size of particular countries. Precisely, having adopted the Base scenario of international migration between the 27 countries, the number of immigrants from the other countries of the world has been calculated, in addition to the one forecasted in the Base scenario (see Section 3.2). From the methodological point of view, it is worth adding that if the Base scenario developments did not project population decline for a particular country and period, the 'replacement' immigration has been set to zero by default. Hence, in the projection period (2002-2052), the simulated population size can only grow, or at least stay at the same level as in 2002, but cannot decline.

Following these assumptions, the total population of 27 European countries under study would increase to 532.6 million in 2052, due to the inflow of 32.8 million immigrants more than in the Base forecast scenario. At the end of the projection period, the group of post-2002 immigrants and their descendants would comprise 117.9 million people, thus about 22% of the total. In 2052, ODR in this scenario would equal 51.1, what corresponds to PSR of 2.0 working-age 'potential supporters' per elderly person. These figures clearly demonstrate that maintaining the population size alone does not reverse, or even significantly slow down the ageing processes, what is additionally illustrated in Figure 5.1.

Figure 5.1. Changes in the age structure in 27 countries, 2002-2052: constant population



Source: Eurostat, NewCronos; own calculations

With respect to the country distribution of the additional 'replacement immigrants', the highest numbers were obtained in the simulation for Romania (8.8 million), Poland (6.6 million), Germany (4.7 million), Bulgaria (3.5 million) and Italy (3.2 million). It is worth noting that in the case of Bulgaria the size of 'replacement immigration' would amount to almost a half (45%) of the 2002 population, while in the case of Romania – to over 40 percent. On the other hand, in ten countries maintaining the population size would not require the inflow of additional migrants from outside Europe, apart from the ones scheduled in the Base scenario. These countries are: Belgium, Denmark, France, Ireland, Luxembourg, the Netherlands, Norway, Sweden, Switzerland and the United Kingdom. Meeting the same goal in Finland would require letting in only 1.7 thousand additional immigrants in the period 2037-2042. It is worth noting that these are all the countries, for which the target Total Fertility Rates of 1.8 or 1.9 were assumed for 2052 (Bijak 2004).

The additional inflows of 'replacement migrants' is reflected in the ODRE and LMDR levels simulated for 2052. For the countries that would receive the highest numbers of such immigrants relative to their total population, the values of both indicators go down considerably (e.g., for Bulgaria). Therefore, under these assumptions the order of countries by the ODRE and LMDR values in 2052 would alter, however with hardly any change in the overall scale of aging and its economic consequences. The average ODRE for all 27 countries together in 2052 is going to equal 61.6, while the average LMDR – 99.8, which is only slightly less than in the Base scenario.

Under the assumptions adopted, the labour force resources would hardly change over the whole period 2002-2052, declining only by 0.6% (1.4 million people) to account for 43.4% of the total population by the end of the projection period. The post-2002 immigrants and their descendants would comprise 27.5% of the total labour force (63.3 million people). Hence, the

aggregate results for 27 countries fall between the Base and High forecast scenarios. The age structure of the labour force in 2052 would be almost the same as in the High scenario: 11.6% of the total would comprise the young workers (aged 15-24 years), 69.1% – middle-aged workers (between 25 and 54 years), and 19.3% – the older workers (aged 55+).

It has to be stressed that this simulation scenario has been prepared exclusively for the sake of comparison of the results with the United Nations (2000) report. Contemporarily, preventing the population size from a decline can hardly be considered as a rational policy goal by itself. Some authors even suggest that the opposite could hold: population decline can to some extent be desirable for the society and environment (Burke 1997). Some issues of the latter proposition can be still disputed, for example by taking into account the division and specialization of labour, beneficial for productivity, which is easier in large populations (Espenshade 2001). Anyway, regardless of the outcome of the debate on relations between population and economic growth, it has to be noted that population decline should not be considered as a policy 'problem' and evaluated in a normative way. Instead, these processes can rather be seen as characteristic for yet another phase of human history, especially concerning the developed countries of the world (Bouvier 2001).

Despite the lack of direct policy implications, the 'replacement migration' scenario designed for keeping population size constant generally fits into the feasible range of possible future international migration developments for most of the countries. On average, the total population inflow is placed somewhere between the Base and High forecast scenarios, with the most important exceptions of the countries of Central and Eastern Europe, in particular of Bulgaria and Romania. In the latter countries, the forecasted very low fertility and low net immigration levels combined lead to greater numbers of 'replacement migrants' theoretically required to maintain the population size, than would be both likely and feasible, i.e. would fit into the span between the Low and High migration scenarios.

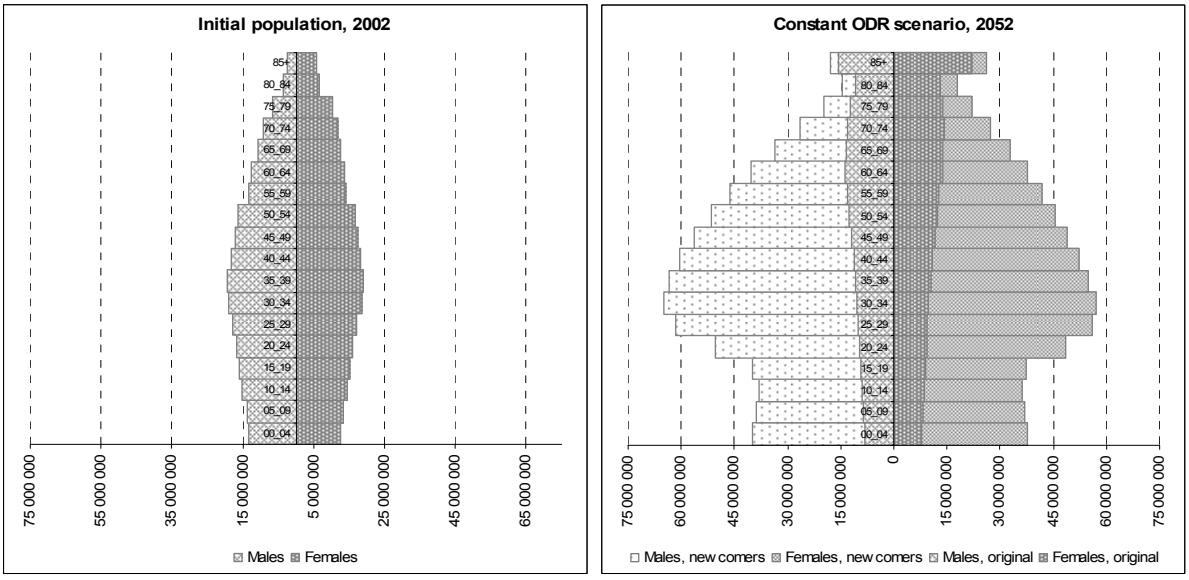
5.2. Simulation under constant dependency ratios: old-age, economic and labour market

Similarly to the simulations presented in the previous section, further projections have been made, in order to calculate the number of 'replacement migrants' required to maintain constant (at least not increasing) dependency ratios: ODR, ODRE and LMDR. The first simulation is comparable with the one prepared in the United Nations (2000) report, while two latter ones try to take into the account a part of the criticism the UN report was subject to. The assumptions of constancy of particular dependency ratios (or more precisely, not allowing for their increase) reflect the aim to preserve the current status quo, rather than to achieve 'optimal' levels of particular measures. For this reason, no subjective maximum threshold values of ODR, ODRE or LMDR have been set. We are perfectly aware that the assumption of constancy of the indicators is also purely judgemental. Nevertheless, we have

deliberately chosen this option, showing the problems with maintaining the current aggregate parameters depicting population and labour force structures.

In this group of simulations, the most extreme results have been obtained for the one assuming constant ODR (and thus PSR) values, with simulated 'replacement migration' levels roughly consistent with the outcome of the United Nations (2000) study. In this scenario, in order not to let the ODR in particular countries increase above the levels from 2002, the 27 European countries would have to accommodate 827.8 million immigrants by 2052, in addition to the ones that are forecasted to come under the regular conditions (Base scenario). Hence, the whole population under study would have to triple between 2002 and 2052, eventually achieving the size of 1,480.6 million. By the end of the projection period, the post-2002 newcomers and their descendants would amount to 1,065.9 million people, thus to 72% of the total. From the point of view of the 'replacement migration' concept, that would be the price of reaching the ODR value of 23.5 percent, and the corresponding PSR equalling 4.3, by the end of the projection period. The age structure of the population of all 27 countries under study projected for 2052 follows to a large extent the structure of the immigrant population, with the exception of the oldest age groups (Figure 5.2).

Figure 5.2. Changes in the age structure in 27 countries, 2002-2052: Constant ODR/PSR



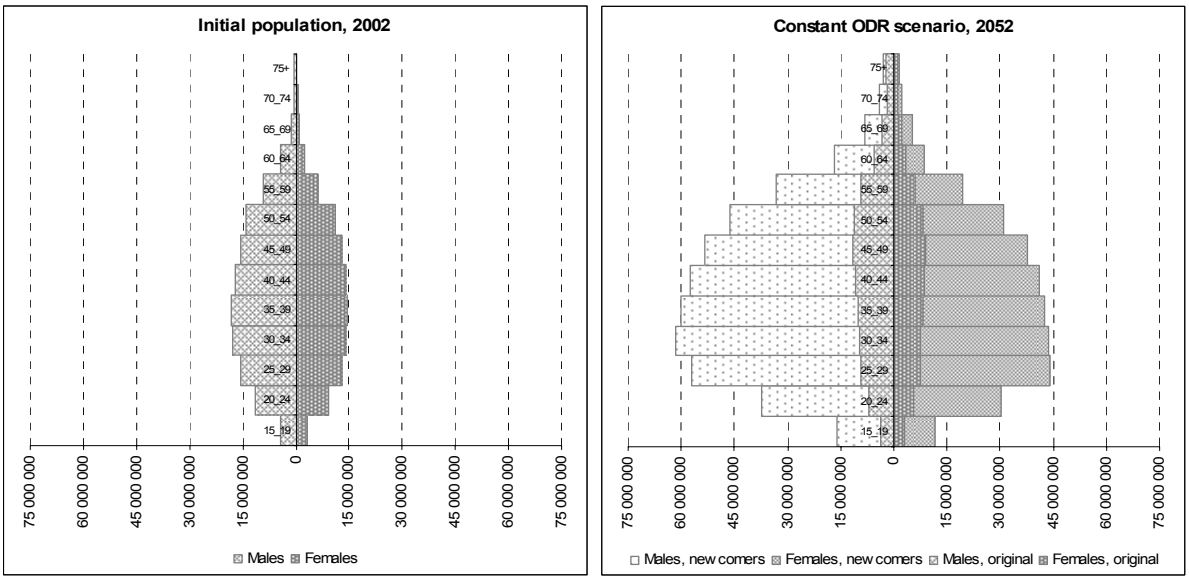
Source: Eurostat, NewCronos; own calculations

This age structure is however very far from the smooth and even one of the stationary population (Lotka 1907), that would guarantee long-term population stability. In the case of the simulated 2052 population, the base of the age pyramid is very thin (there are relatively few children). This directly implies that in the more distant future, the inflow of 'replacement migrants' would have to be continuously increasing in order to meet the goal of not allowing for the ODR increase. This conclusion is supported by the results of the empirical research carried out for Australia by McDonald and Kippen (1999). They proved that there are declining returns from immigration in terms of its impact on slowing down the population

ageing processed (decreasing effects of scale). In the other words, each subsequent immigrant contributes to slowing down the ageing processes to a smaller extent than the previous one. For these reasons, both the magnitude of the projected required immigration inflow and the structural features of the hypothetical 2052 population simulated under these assumptions render the 'constant ODR' scenario nothing more but a theoretical exercise.

Under such assumptions, the hypothetical labour force would be greater than the one forecasted in the Base scenario by 563.1 million people. Hence, the total labour force would more than triple reaching 772.8 million people in 2052. By the end of the projection period, the post-2002 immigrants and their descendants would account for 78.3% of the labour force resources in 27 European countries (Figure 5.3).

Figure 5.3. Changes in the age structure of the labour force in 27 countries, 2002-2052: Constant ODR/PSR



Source: Eurostat, NewCronos; International Labour Organization (2003); own calculations

Very high migration inflow needed to prevent ODR from increasing would also considerably slow down the process of ageing of the labour force. By the end of the simulation period, the proportion of the older workers in the total labour force would grow by only 2 percentage points, and would be accompanied by the slight increase of proportion of the young workers (from 12% to 12.4%). Due to the young age structure of the immigrants, the economic consequences of the ageing process would not only be mitigated but also slightly reduced. The 2052 values of ODRE and LMDR for 27 countries together would amount to 27.8 and 62.2, respectively, which is less than the values was observed in 2002.

In order to address a part of the critique the United Nations (2000) report has been subject to (Espenshade 2001; Coleman 2002; for overview see Saczuk 2003), some economic aspects of ageing have been incorporated into the simulation. Most notably, corroborating the idea of Feld (2000), alongside the overall population size and structure, the labour force resources

have been subject to the analysis, on the basis of the forecasts of future labour force participation developments (Saczuk 2004). This has been made in two scenarios assuming constancy of aggregate measures taking into the account the labour market structure: ODRE and LMDR. It has to be noted that all scenarios implicitly assume that the labour force activity patterns for the 'original' population, as well as those for the immigrants are identical. This assumption is by necessity simplistic, as going deeper into this issue would require a separate research, given the complexity of the problem.

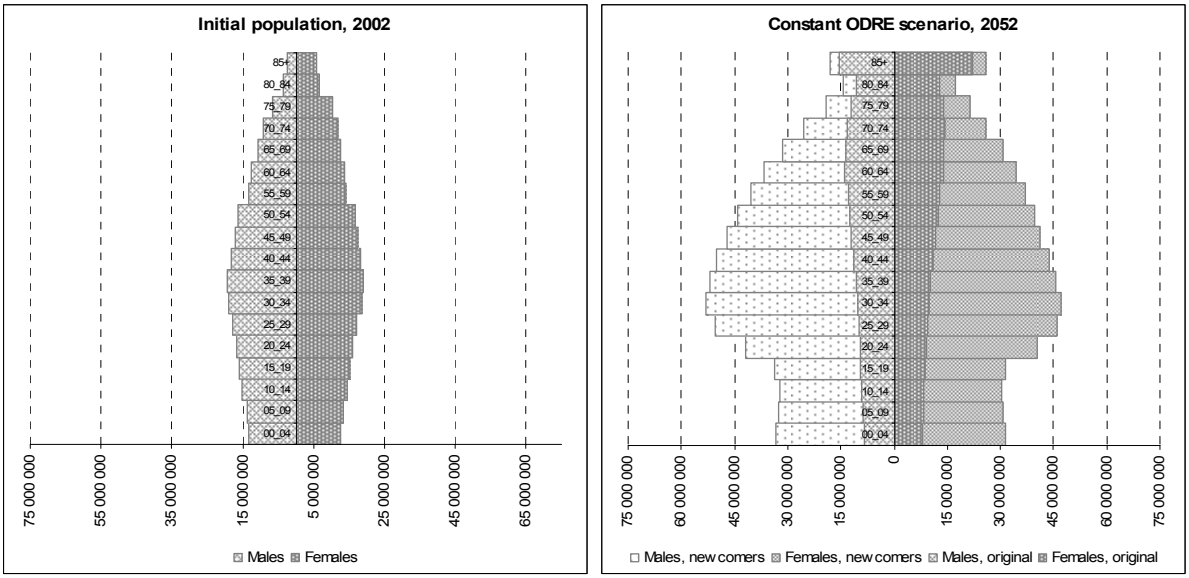
The scenario assuming constant or not increasing ODRE values resulted in a similar, yet slightly less drastic outcome, in comparison with the previous one, focusing on maintaining the ODR. This is a natural consequence of assuming the improvements in the age-specific labour force participation.

In order not to let the country-specific ODRE grow above the initial levels, in total 653.0 million people would have to immigrate into all countries under study during the whole projection period, additionally to the 'most likely' number of immigrants, forecasted in the Base scenario. The 2052 population in this case would amount to 1,275.9 million people, thus it would be over 2.5 times bigger than the initial one of 2002. Some 861.1 million people (67%) would be the post-2002 newcomers and their descendants, and this magnitude of inflow would suffice to achieve ODRE of 31.7 in 2052.

The scenario of constant LMDR generates even more moderate results, yet still very far from being within the range of feasible future trajectories of international migration developments. In this case, not letting the country-specific LMDR values to increase above their levels from 2002 would require accommodating in total 470.7 million people by 2052, in addition to the immigrants that would come under the regular conditions (Base scenario). At the end of the simulation period, the population of all 27 countries under study would amount to 1,066.4 million people, thus it would be nearly 2.2 times bigger than the one from 2002. Out of this figure, the contribution of the post-2002 newcomers and their descendants would be in the height of 651.7 million (61%), what would enable to reach the final LMDR value of 73.6 at the end of the simulation period.

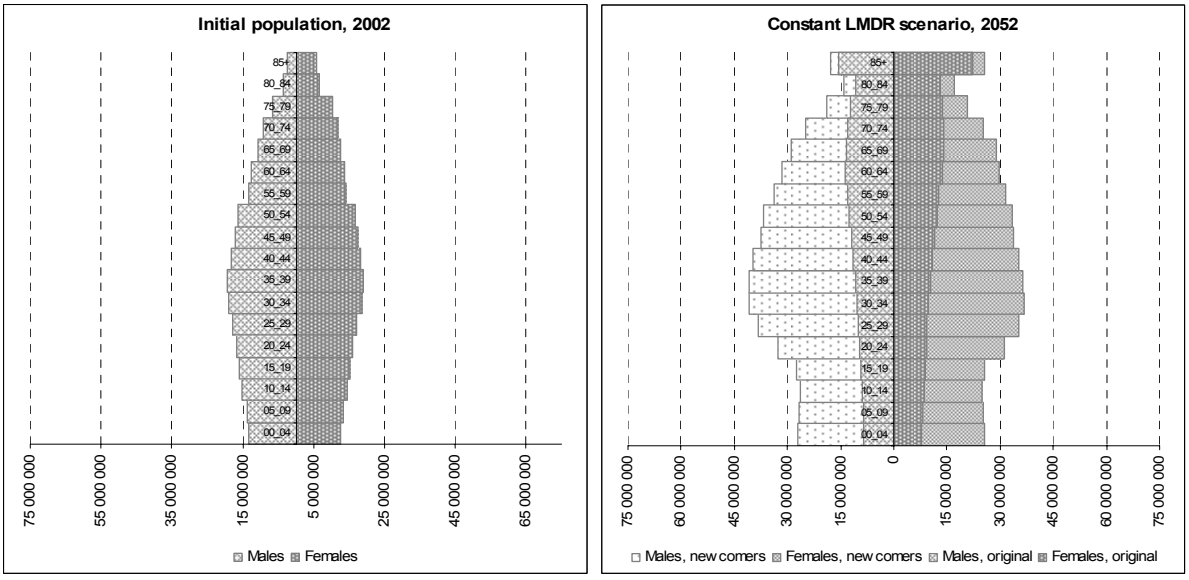
The population age structures of all 27 European countries projected for 2052 in two replacement scenarios taking into the account the expected labour market developments, are presented in Figures 5.4 (maintained ODRE value) and 5.5 (constant LMDR).

Figure 5.4. Changes in the age structure in 27 countries, 2002-2052: Constant ODRE



Source: Eurostat, NewCronos; International Labour Organization (2003); own calculations

Figure 5.5. Changes in the age structure in 27 countries, 2002-2052: Constant LMDR



Source: Eurostat, NewCronos; International Labour Organization (2003); own calculations

From Figures 5.4 and 5.5 it can be seen that the overall age structures of the population of 27 countries under study in both scenarios are also quite far from the stationary one, although not as far as the one under the 'constant ODR' assumptions. Including the forecasted changes on the labour market participation the simulation resulted in decrease in the number of required 'replacement migrants', and also smoothened the age structures of the projected population. However, the impact of the still massive immigration was in neither case enough to guarantee achieving the optimal age structure of the population. From this point of view, as well as for the reasons mentioned in the discussion of the previous scenario, concentration exclusively on the aggregate measures either ODRE or LMDR does not help achieve the optimal population structures. Adversely, such approach would again generate the demand for increasingly more

immigrants, in order to prevent these aggregate measures from declining, what would eventually lead to artificial age structures, in reality not suiting the goals of counteracting the ageing processes. The same conclusions apply also to the labour force resources.

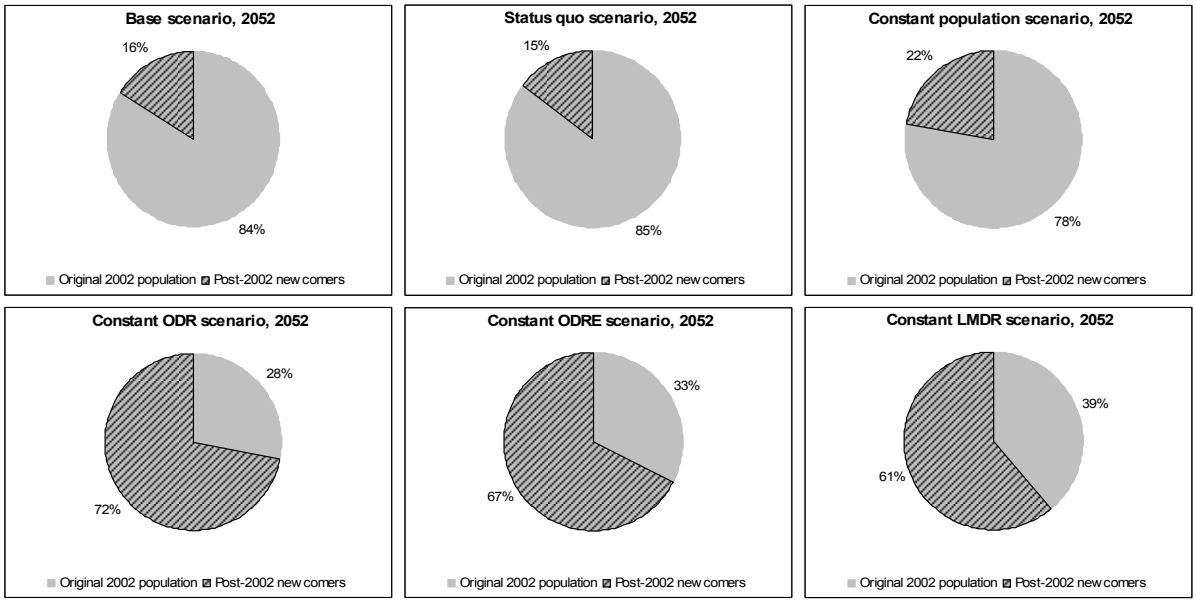
On the country level, the magnitude of 'replacement' inflows depend heavily on the initial values of the respective dependency ratios. As the results prove the complete unfeasibility of immigration 'solutions' in keeping ODR, ODRE and LMDR not higher than their levels from 2002, an overview of country-specific results is not presented in details in the current study. Only the results of the last simulation, assuming constant LMDR, are presented in the Annex on the country basis, as among the three scenarios presented, this one is closest to being feasible, although still not close enough to become a rational policy goal.

5.3. Comparison of the results of forecasts and simulations

In a first attempt to evaluate the feasibility of the scenarios presented in the previous subsections, their outcome can be compared with the reference framework, set out by the Low, Base and High variants of the migration forecast, discussed in Section 3. Judging solely by the aggregate numbers for 27 countries under study, it is obvious that only the 'status quo' migration scenario, as well as the replacement one aimed at preserving the current population size of particular countries fit within the reasonable range of international migration developments. In the latter case, there may be several local exceptions of low-fertility-low-immigration countries, like Bulgaria, Romania, as well as some other ones from Central and Eastern Europe, where the immigration required to achieve this goal would already be unreasonably high. Three remaining replacement scenarios (constant ODR, ODRE and LMDR), do not fit in the feasible range of future population inflows from the other countries of the world, which range has been set by the Low and High variants of migration forecast.

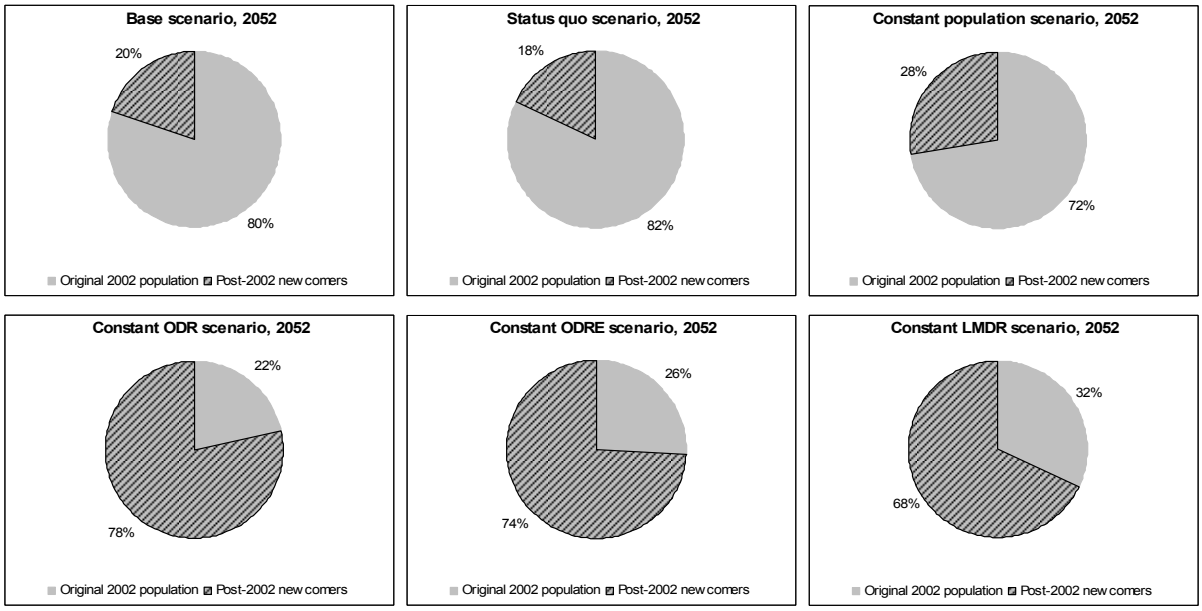
Moreover, three replacement scenarios aimed at sustaining the aggregate parameters depicting the population and labour force structures lead to the significant dominance of the post-2002 newcomers and their descendants in the overall population, with their shares about 4 times higher than in the Base scenario (Figures 5.6 and 5.7). This may lead to social and political turbulences, especially in the short term, before the eventual ethnic and cultural 'melting' of the society can possibly take place, as it has been suggested by Espenshade (2001). A thorough inquiry into the latter issue remains, however, beyond the scope of the current study.

Figure 5.6. Post-2002 immigrants and their descendants in 27 countries, 2052 (%)



Source: own computations

Figure 5.7. Post-2002 immigrants and their descendants in the labour force of 27 countries, 2052 (%)



Source: own computations

Similar conclusions can be drawn with respect to the labour force resources, only that in all forecast and simulation variants, the shares of post-2002 newcomers and their descendants in the labour force, projected for 2052, are even higher than the respective ones for the total population (Figures 5.6 and 5.7). This is even despite the forecasted improvements of age-specific labour force participation rates, which did not contribute much to a reduction of the economic burden on the active population. From the point of view of labour force, this is the

ageing process of the overall population that is a key factor shaping the future size and structure of labour supply.

As it has been noted earlier, target age structures of both population and labour force resources in the Base forecast and in the 'status quo' scenario are quite similar; the same applies to the High forecast and the 'constant population' replacement scenario. Three remaining replacement simulations (constant ODR, ODRE and LMDR), eventually lead to the structures that are distorted by the massive inflow of immigrants, in favour of the most mobile groups, i.e. those in the younger productive age. Generating the artificial age structures, significantly influenced by the ones of external immigrants, is a serious shortcoming of all scenarios aimed at maintaining specific aggregate parameters of population and labour force. Such structures are very far from the optimal equilibrium stationary one of Lotka (1907), guaranteeing the population stability and a zero growth. Although such a stationary structure may be achieved in the long run, under the assumptions of constant below-replacement fertility and steady immigration (Espenshade et al. 1982), it is definitely not yet the case in the fifty-year period under study.

From the strictly demographic point of view, there is another argument against the 'replacement migration' concept with respect to counteracting the ageing processes. It has been proven that among all processes that contribute to the demographic change, fertility has the most significant impact on the future age structures of the populations (Coale 1957, Carrier 1962, after: Grundy 2002: 818).

Given the enormous numbers of immigrants required to sustain the ODR, ODRE or LMDR values, as well as the artificial age structures obtained eventually in all three replacement scenarios, it seems obvious that the policy solutions for the problems related to ageing need to be sought elsewhere. This issue will be further corroborated in Section 7, after a comparison of the results of the current analysis with the ones obtained in similar studies concerning Europe, presented in Section 6.

6. Comparison of the results with the other studies

This section is devoted to the comparison of selected forecast and simulation results with other similar studies, most notably the United Nations (2000) report. Both results and methodological aspects of the study are confronted with the criticism the UN research was subject to. This is done in order to evaluate the current approach, focusing on changes in labour force and on social security burden of the economically inactive population.

6.1. 'Replacement Migration' report of the United Nations

The outcome of the current study can be directly compared with the United Nations (2000) report in the case of four large Western European countries (France, Germany, Italy and the United Kingdom), as well as of the whole 'old' European Union (15 members prior to 2004). The UN study contains also aggregate information for whole Europe (47 countries), which, although not comparable with the one for 27 countries analysed in the current paper, also can provide valuable information on the ageing process and its implications for the whole continent. The empirical comparison of the United Nations (2000) report and the current study in the Base forecast scenario, as well as in the constant population and constant ODR/PSR scenarios for the mentioned countries and areas is presented in Tables 6.1-6.3.

Table 6.1. Comparison of the current study with the UN (2000) report: Base scenario

Country	Study	Total population (thousand)			Yearly net migration (thousand)			Potential Support Ratio (PSR)		
		2002	2025	2050	2000-05	2020-25	2045-50	2002	2025	2050
France	UN 2000	59 418	61 662	59 883	40	0	0	4.07	2.81	2.26
	Current	59 486	66 015	70 177	66	123	120	4.00	2.77	2.17
Germany	UN 2000	82 278	80 238	73 303	240	200	200	3.95	2.71	2.05
	Current	82 488	82 728	77 589	213	206	186	3.91	2.59	1.75
Italy	UN 2000	57 091	51 270	41 197	34	0	0	3.58	2.39	1.52
	Current	57 157	57 693	54 458	177	209	211	3.55	2.43	1.49
UK	UN 2000	58 955	59 961	56 667	40	40	0	4.05	2.92	2.37
	Current	59 232	63 257	65 426	69	110	108	4.19	3.16	2.22
EU-15	UN 2000	375 757	367 342	331 307	470	250	210	3.98	2.73	1.96
	Current	379 350	402 646	403 403	1 222	1 121	1 063	4.00	2.79	1.86
Europe 27	Current	494 178	509 297	496 934	1 060	1 177	1 190	4.19	2.84	1.86
Europe 47	UN 2000	728 305	702 335	627 691	757	305	265	4.48	3.06	2.11

Notes. Values for 2002 for the UN (2000) study are obtained from the linear interpolation of forecasts for 2000 and 2005. Similarly, values for 2025 and 2050 for the current study are interpolated from the forecasts for 2022 and 2027, respectively for 2047 and 2052. Yearly net migration for 2000-05 for the current study shows the data for 2002.

Source: United Nations (2000); Eurostat, NewCronos; own computations

Table 6.2. Comparison of the current study with the UN (2000) report: Constant population

Country	Study	Total population (thousand)			Yearly net migration (thousand)			Potential Support Ratio (PSR)		
		2002	2025	2050	2000-05	2020-25	2045-50	2002	2025	2050
France	UN 2000	59 156	61 121	61 121	0	0	91	4.07	2.81	2.33
	Current	59 486	66 018	70 221	66	124	123	4.00	2.77	2.17
Germany	UN 2000	81 661	81 661	81 661	215	325	431	3.92	2.74	2.26
	Current	82 488	83 357	83 357	213	284	416	3.91	2.61	1.91
Italy	UN 2000	57 338	57 338	57 338	127	256	318	3.62	2.69	2.03
	Current	57 157	58 100	58 100	177	258	373	3.55	2.45	1.62
UK	UN 2000	58 638	58 833	58 833	0	12	116	4.07	2.94	2.49
	Current	59 232	63 263	65 497	69	110	112	4.19	3.16	2.22
EU-15	UN 2000	372 440	372 440	372 440	263	869	1 418	3.96	2.78	2.21
	Current	379 350	404 008	415 177	1 122	1 272	1 573	4.00	2.80	1.92
Europe 27	Current	494 178	520 408	532 209	1 060	1 723	2 174	4.19	2.90	1.99
Europe 47	UN 2000	727 912	727 912	727 912	1 063	1 879	2 803	4.56	3.20	2.38

Notes. Values for 2002 for the UN (2000) study are obtained from the linear interpolation of projections for 2000 and 2005. Similarly, values for 2025 and 2050 for the current study are interpolated from the projections for 2022 and 2027, respectively for 2047 and 2052. Yearly net migration for 2000-05 for the current study shows the data for 2002.

Source: United Nations (2000); Eurostat, NewCronos; own computations

Table 6.3. Comparison of the current study with the UN (2000) report: Constant ODR/PSR

Country	Study	Total population (thousand)			Yearly net migration (thousand)			Potential Support Ratio (PSR)		
		2002	2025	2050	2000-05	2020-25	2045-50	2002	2025	2050
France	UN 2000	64 458	105 188	187 193	333	1 937	3 196	4.36	4.36	4.36
	Current	59 486	93 215	157 638	66	1 614	2 978	4.00	4.00	4.00
Germany	UN 2000	94 737	148 307	299 272	3 251	3 347	4 096	4.41	4.41	4.41
	Current	82 488	123 568	221 813	213	2 483	4 938	3.91	3.91	3.91
Italy	UN 2000	66 281	96 664	193 518	1 402	1 886	2 094	4.08	4.08	4.08
	Current	57 157	82 735	152 778	177	1 470	2 978	3.55	3.55	3.55
UK	UN 2000	58 824	86 856	136 138	62	1 421	2 239	4.09	4.09	4.09
	Current	59 232	82 816	144 134	69	1 296	2 364	4.19	4.19	4.19
EU-15	UN 2000	413 279	641 056	1 228 341	6 171	12 947	18 153	4.31	4.31	4.31
	Current	379 350	572 783	1 059 706	1 122	10 882	22 135	4.00	4.02	4.03
Europe 27	Current	494 178	747 775	1 398 088	1 060	14 830	32 753	4.19	4.22	4.25
Europe 47	UN 2000	778 064	1 212 912	2 346 459	12 410	29 817	50 841	4.81	4.81	4.81

Notes. Values for 2002 for the UN (2000) study are obtained from the linear interpolation of projections for 2000 and 2005. Similarly, values for 2025 and 2050 for the current study are interpolated from the projections for 2022 and 2027, respectively for 2047 and 2052. Yearly net migration for 2000-05 for the current study shows the data for 2002.

Source: United Nations (2000); Eurostat, NewCronos; own computations

When interpreting the results of the Base forecast scenario and its equivalent from the United Nations (2000) study, the Medium variant (Table 6.1), it should be noted that in all cases the target Total Fertility Rates assumed for 2050 in the UN report are higher than the ones in the current study. On the other hand, current study assumes much (up to five times) higher net migration levels than the UN report. As with respect to the advancement of ageing both factors (high fertility and high net migration) work in the direction of delaying the process, it is not surprising that the PSR values forecasted for 2050 are quite similar in both studies, the current ones being only slightly lower. In most of the cases, higher net migration levels assumed in the current study constitute therefore a substitution for lower expected fertility levels. The only exception is Germany, where the PSR forecasted in the current analysis for 2050 (1.75) is substantially less than the one of the UN study (2.05). The reason can be found in persisting low fertility levels assumed in the current analysis, together with hardly any difference in the long-term net migration levels between both studies.

In the UN study, as a direct consequence of the assumed paths of demographic development, the population size is expected to decline in all countries listed in Table 6.1, with the exception of France, where high fertility is envisaged to contribute to a slight population increase by 2050. The population size of all 47 countries of Europe is expected to decline on average by 14%, while the population of the 15 'old' EU member countries – by 12%. The highest population losses, forecasted for Italy (population decline by 28% over 50 years), are a result of combining assumptions on low fertility and hardly any migration in the future. From the perspective of the current research, the latter assumption seems however hardly realistic. The migration factor, to which in the current study much more importance is given, substantially influences the population size. Therefore, although the low-fertility countries (Germany, Italy) are in the current research still expected to observe population losses over the next 50 years, the population decline is not so drastic as in the UN study. Moreover, the population of all 27 countries analysed in the current study is expected to reach similar size by the end of the forecast period, to the one observed for 2002. This is due to a combination of the forecasted population increase of the EU-15 on average by 6%, compensated by negative population growth in Central and Eastern Europe throughout the forecast period.

The results of the second compared projection scenario, assuming preventing the total population size from decline (Table 6.2), are not very different from the outcome of the Base forecast variant. Moreover, the yearly net migration levels required to satisfy this assumption on population size in the current study, as well as in the UN report are expected to converge to similar values by 2050, despite the visible initial differences. It has to be noted that the UN study underestimated the net migration values for most of the European countries (but Germany) already for the beginning of the 21st century, what could be ex-post verified by the data for 2002, being the departure point for the current study. Due to differences in fertility and net migration trajectories, the PSR values forecasted for 2050 significantly differ between both studies. Again, in all cases the PSR values obtained in the current study are smaller than

the ones from the UN report, for the reasons mentioned before. In this projection scenario, the ultimate 2050 PSR values are higher than the respective ones in the Base forecast variant.

With respect to the population size, an additional thing has to be mentioned, having an impact on the differences between the outcome of the current study and of the UN report. While the UN study practically keeps the population size constant in this scenario, the population of 27 European countries studied in the current research in 2050 is expected to be by 8% higher than in it was in 2002. The difference is due to a slightly different methodology applied in the current study in comparison with the UN report. International migration flows from the Base scenario are assumed to occur anyway, and only on the top of them, the additional 'replacement migration' flows are added in order to prevent the population size from declining, should a need arise. Therefore, in the current study some non-zero migration is assumed independently from the development of the overall population size, what is the source of the mentioned difference.

The most significant differences between the current study and the UN report consider the scenario with replacement migration preventing the PSR from declining (Table 6.3). Although the yearly net migration levels required to satisfy this assumption are expected to converge to similar values by 2050 in both studies, both the projected PSR values and overall population size differ for the presented countries. Due to the visible problem of different jump-off years of the simulations, the population size projected in the UN study for 2002 already is much higher than the values actually observed, applied as the starting point in the current study. The only exception is the United Kingdom, where the PSR values initially higher in the current study (4.19) than in the UN report (4.09), correspond with the respectively higher population size predicted for 2050, what is an exceptional situation among the countries, for which the comparisons are made.

In terms of simulated population size required to maintain the recent ODR/PSR levels by the means of the 'replacement migration' inflow, both the current study and the UN report visibly differ in the case of the countries listed in Table 6.3. In all cases but the United Kingdom, the population size projected for 2050 in the UN study is higher than its equivalent in the current research. The specificity of the UK this is due to the mentioned issue of higher initial PSR in the current study, although eventually the population size projected for 2050 is quite similar in both studies. According to the UN report, in order to maintain the recent ODR/PSR levels, the population size of all 47 countries of Europe would have to increase over three times within 50 years, only slightly less increase is required for the 15 countries of the 'old' EU. In that respect, the outcomes of the current study are only a little less extreme than the ones of the UN: the required population growth in all 27 countries analysed would have to amount to 283%, while for the EU-15 countries – to 279%. This is clearly the result of the convergence of the numbers of 'replacement migrants' to the values common for both studies.

It has to be stressed, as it has been stated in the United Nations (2000) study, that the latter scenario is merely an illustration of the scale of problems related to the advancement of population ageing, while it is considered to be completely implausible from the demographic point of view. In no possible way can and should the policy measures, aimed at dealing with the undesired consequences of ageing, be sought in massive immigration flows resulting in triplication of the original population size within half a century. This issue has been misunderstood in a part of the criticism the UN report was subject to (see Saczuk 2003). Therefore, it has to be reiterated that the 'replacement migration' concept has been developed to illustrate the magnitude the problems related to ageing of and not to provide their feasible solution through international immigration.

Moreover, as it has been noted by Espenshade (2001: 388), "the current potential support ratio in [the European] countries is substantially higher than the potential support ratio one would observe in a long-run stationary population endangered by below-replacement fertility and constant immigration. […] The only way to maintain a permanently younger population than the population implied by constant immigration stream is to let the annual migration stream increase into the indefinite future." This conclusion additionally renders the replacement scenarios aimed at maintaining the constant PSR values for fifty years implausible from the demographic point of view.

From this evaluation it can be concluded that in terms of the crude demographic outcome, the current study is roughly comparable to the *Replacement Migration* report of the United Nations (2000), taking into account different jump-off years of forecasts and projections. The key difference between the studies is the enhancement of the current one by the labour market aspects. Focus on the size and structure of the labour force is more appropriate in the analysis of the potential economic problems posed by the population ageing. Therefore, even an analysis of aggregate measures of social security burdens, like ODRE and LMDR, is a step forward in comparison to the study of crude ODR/PSR, that has been proposed by the United Nations (2000). While the latter indicators are purely demographic, the former take into account the assumed future developments of labour force participation and thus incorporate the economic factors of ageing in the analysis, for lack of which the UN report was heavily criticised.

Due to the expected improvements in age-specific patterns of economic activity, the ageing-related changes measured by ODRE and LMDR are not so rapid, as in the case of analysing the PSR alone. This can be seen in the overall change of the indicator values forecasted in the Base scenario for all 27 countries under study: while the average ODR is expected to increase by 130% between 2002 and 2052, the average ODRE in the same period is going to grow by 105% and the average LMDR only by 37%. This also explains, why the simulations not permitting the decline of the ODRE and LMDR values, are less extreme in terms of numbers of the 'replacement migrants' than the similar scenario focused on ODR/PSR. Although all replacement scenarios are demographically implausible, it is the last one ('constant LMDR')

that should be focused on, while discussing the results of the study, as it takes into account the fairly complete picture of future changes in the labour force resources in the countries under study. For this reason, detailed results for this simulation scenario are presented in the Annex for all countries under study, together with the Base forecast.

With respect to other socio-economic factors, it has to be noted that the UN report already showed the impact of moving up the retirement age, an important remedy against the PSR decline, which was not analysed in the current study. In the UN report, the average PSR value of 2.11 forecasted for 2050 for all 47 European countries in the Medium variant, assuming retirement at the age of 65, would increase to 3.13 with five additional years in employment, and further to 4.88 assuming retirement at 75. The results for the EU-15 are similar, as the forecasted PSR of 1.96 (retirement at 65) would more than double due to moving the retirement age up by ten years, to the level of 4.12 (United Nations 2000: 147, 151).

From the non-demographic point of view, the combination of both factors (increasing labour force participation and moving up the retirement age) is likely to bring the most profound results in the attempts to offset the negative effects of population ageing. On the other hand, certain population policies should also be considered, aimed at least at preventing fertility from the further decline, most importantly by helping women to reconcile work, career and self-fulfilment with childbearing. These issues are further corroborated in Section 7.

6.2. Other studies on the impact of migration on population ageing

More than a decade before the controversial United Nations (2000) report, several other attempts have been made to simulate the number of 'replacement migrants' required to fill the population shortages caused by the ageing process in various countries. The simulations of Lesthaeghe et al. (1988) made for the 12 countries of the then European Community showed that in order to balance the below-replacement fertility with population inflow by 2050, "record" numbers of immigrants would have to be admitted into Europe, at least a million persons a year. It is worth noting that in the light of the later migratory experience of Europe, these figures are not unrealistic any more, moreover, they are very close to the Base variant of the current study.

The scenarios prepared by Wattelar and Roumans (1991) for Austria, Belgium, Canada and Spain proved that keeping the PSR at a constant level of 3.0 would require at least doubling of the initial population through immigration. Moreover, the size of these population inflows would have to increase constantly, as the immigrants would also be subject to the ageing process. Further simulations by Gesano (1994) showed that the maintenance of population size of Italy at its level from early 1990s would require between 300 and 500 thousand immigrants yearly, depending on the variant. The immigration peak would be expected about

the middle of the 21st century, followed by a slight decrease to the levels ultimately ensuring the stable population structure.

Almost at the same time as the United Nations study, an article has been published by Feld (2000), focusing on twelve European countries: Austria, Belgium, France, Germany, Greece, Italy, the Netherlands, Norway, Portugal, Spain, Sweden and the United Kingdom. Similarly to the current research, Feld projected the future population and economic activity developments in different variants. Two of them have been found as the reasonable limits of possible changes in the labour force, combining either high fertility and immigration with low activity rates, or, adversely, low fertility and immigration with high participation in the labour force. The former one is associated with the average of 900 thousand immigrants a year for the period 1990-2020, while the latter one – with 300 thousand.

Interestingly, in the study of Feld (2000) the variant with lower immigration and higher labour force participation ultimately leads to the higher increase in the active population of the countries under study (by 3.8 million people over 30 years), in comparison with the opposite boundary variant (increase by 1.4 million). This increase is, however, most likely attributed to the timeframe of the analysis. By 2020, the effects of ageing are not going to be as profound as they are expected to be in the longer run. Until 2010-2015 in most of the countries under study the high population momentum caused by the 'echo' of the baby boom from the 1950s is going to prevent the overall population size (and thus also labour force) from declining. This finding is consistent with the results of the current study, which, however, projects the population and labour force resources until 2050, for a period long enough to observe the long-term consequences of assumed below-replacement fertility.

Also about the same time as the UN report, a study of McDonald and Kippen (2000) was published, containing future labour force development scenarios for various countries, including eight European ones. The remedies to maintain the absolute size of the labour force in the short run have been found in increasing either labour force participation (France, the United Kingdom), fertility (Germany, Sweden), or both factors together (Greece, Italy, the Netherlands, Spain). In the case of the latter group of countries an alternative policy measure instead of promoting fertility can be allowing for high immigration, at the level of 0.5% of the current population size a year. Although in such a case the absolute numbers of immigrants have been found by the authors as extremely high, in the light of the most recent migration developments this conclusion need not hold any more. The latter scenario produces the numbers of immigrants that fall between the Base and High scenarios of the current study and thus can be seen as reasonable, following the argumentation presented earlier in this paper.

As response to the UN report, Coleman (2002) presented alternative simulations prepared for the United Kingdom by the Government Actuary's Department (GAD). The study has been prepared using more detailed assumptions, taking into account the specificity of the country. A comparison of the results with the contents of the UN report, as well as with the current

study, shows many similarities in immigration levels needed to preserve the currently observed potential support ratios at the levels of 4.1-4.2. Only the projected population size implied by the constant PSR remains visibly lower in the UK study (118.9 million) than both in the UN research (136.1 million) and in the current one (144.1 million). The difference between the current study and the research of GAD can likely be attributed to less optimism with respect to mortality decline in the latter research, assuming life expectancy shorter by 5 years in the case of males and by 4 years in the case of females. An experiment performed using the life expectancy quoted in Coleman (2000) proved that the ultimate population size implied by the constant PSR of about 4.2 projected for 2050 would equal ca. 120.9 million. Therefore, allowing for different mortality assumptions, the outcomes of the current research and the study of GAD are essentially comparable.

With respect to the place of current research in discussion concerning impact of migration on various population parameters, it can be noted that in comparison with the other similar studies, it focuses more on the structural issues concerning the labour markets. To a lesser extent is the current study dealing with the topics that have been already covered elsewhere, like the absolute size of the labour force (Feld 2000; McDonald, Kippen, 2000), entirely leaving out macroeconomic problems concerning public pensions, health expenditures, fiscal balance or national savings (Roseveare et al. 1996). The issue of later retirement age has also been deliberately omitted, as it has already been addressed in the research of Roseveare et al. (1996), as well as in the United Nations (2000) report and in the study of Coleman (2002).

The authors of the mentioned studies were very careful in formulating the possible recommendations for the population policies on the basis of the obtained results. Lesthaeghe et al. (1988) concluded their simulations for the 12 EC countries with a statement that immigration is not a feasible solution to population ageing problems. Instead, demographic policy means should be sought elsewhere, especially in the direction of increasing the fertility rates. The latter idea has been later re-iterated by Gesano (1994). Direct migration policy implications, in turn, although based on mathematical models and not on projection-based demographic simulations, have been worked out by Blanchet (1988) for France. As the size of projected ‘replacement migration’ shows visible cycles, he analysed a theoretical possibility of successive waves of immigration and emigration. Such a policy would, however, also imply increasingly high migration flows required to keep the population structure constant, and cannot therefore be seen as practically feasible.

The infeasibility of migration policies based exclusively on keeping the potential support ratios constant, or similar criteria regarding population structures, has been also repeated by the other authors (Wattelar, Roumans 1991; Coleman 1992, 2002; Gesano 1994). Coleman (1992) additionally concluded that the increased influx of immigrants into Western Europe in order to fill the labour force shortages would not be required within the period of 10-20 years. This statement, however, has been made in the early 1990s and need not necessarily hold for the future, for similar reasons to the ones discussed with respect to the study by Feld (2000).

The demographic and labour force policy implications have been also discussed by McDonald and Kippen (2000), and their results with respect to the combination of policies related to fertility, migration and labour force participation have been presented before. Lesthaeghe (2000) pointed out that replacement migration may be only a partial and temporary solution, limited to the countries with the lowest fertility. Recently, Coleman (2002) stressed that the policy responses to population ageing should rather be non-demographic, but focus on economic issues instead. As the most profound and feasible, yet still partial solutions, the increase in both labour force participation and retirement age are proposed.

From the literature overview, one can see that the Western countries have already been covered by numerous studies concerning the 'replacement migration' scenarios. The current research is, however, the first one explicitly dealing with this issue for ten countries of Central and Eastern Europe, most notably for the new EU member states that joined the European Union in 2004[3]. The selection of countries for the purpose of this study was aimed at treating the enlarging European Union and the developed countries like Norway and Switzerland as one migratory system. In such a system, migration flows between the countries are taken for granted, as following the increasing freedom of movement of labour, it is going to be hardly possible to influence them with policy means. In this approach these are only the inflows from the other parts of the world that may to some extent constitute the decision parameters of the policy process. The possible policy implications of the outcome of this study are discussed in the subsequent section of this paper. The discussion on policy issues presented in the literature summarised above, can constitute a good point of departure for making the recommendations for the purpose of the current study.

[3] The only Central European country that has been subject to a similar study up to date is Hungary (Hablicsek, Tóth 2002).

7. Recommendations for European social and population policies

In this section an attempt is made to translate the results of the analysis presented before into recommendations for European policy measures for the future. An overview of the contemporary social and population policy objectives of the EU is presented and various policy directions are discussed in their context. The proposed measures are subsequently evaluated from the point of view of their long-term plausibility, what enables the final recommendations of particular policy means for Europe in the context of population ageing.

7.1. Main objectives of social and population policies in the EU

Contemporarily, the most important social policy path of the European Union is defined in the Lisbon Strategy. During the Lisbon European Council summit held on 23-24 March 2000, the European Union set itself a strategic goal "to become the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion", to be achieved by 2010 (European Commission 2000a). In particular, the realization of this goal would require co-existence of three elements:

- Development of the R&D sector and the information society in order to build a knowledge-based economy, enhance competitiveness and innovation;
- Modernisation of the European social model;
- Achieving a sustainable economic growth by appropriate macro-economic policies.

Moreover, the Lisbon Strategy explicitly links the possibility of achieving the sustainable economic growth with the preconditions of full employment and taking into account the individual career choices of the individuals. Two policy areas are especially important here in the context of population ageing. Firstly, it is stressed that priority should be given to lifelong learning, flexible management of working time and job rotation. Secondly, career opportunities should be equalled for men and women, in order to facilitate the reconciliation of working life and family life, focusing on creation of new standards in the area of childcare. In the Lisbon Strategy it is clearly stated that "The European Council considers that the overall aim of these measures should be, on the basis of the available statistics, to raise the employment [i.e. labour force participation] rate from an average of 61% today [in 2000] to as close as possible to 70% by 2010 and to increase the number of women in employment from an average of 51% today to more than 60% by 2010. […] This, by enlarging the labour force, will reinforce the sustainability of social protection systems" (European Commission 2000a).

Further analysis of the current problems with the European labour force, especially in the context of population ageing, reveals that not only is unemployment in Europe relatively high and overall labour participation lower than it could be, but there are also visible structural

incompatibilities. Firstly, labour activity is especially too low among certain social groups, like women, the elderly and the disabled people. In the *Social Policy Agenda* of the European Commission (2000b) two labour market gaps are mentioned in this context: a gender gap, with 50% of the employed women in the European Union, compared to two-thirds in the United Stated, and an age gap, with too low employment rate in the age group 55-65 years. Furthermore, human resources in Europe remain underdeveloped, in comparison to the United States. Further improvements of the human capital seem crucial in order to create a knowledge-based economy in Europe, with focus on upgrading skills and extending life-long learning. The ultimate objective is to create more and better jobs in Europe by implementing this strategy (European Commission 2000b).

Specifically in response to the current demographic trends concerning Europe, a Green Paper "Confronting demographic change: a new solidarity between the generations" has been recently published by the European Commission (2005). The document summarises the past achievements of the Community policies designed to anticipate the demographic change, as well as lists the main future policy priorities aimed at accommodating the demographic change. With respect to the former, three policy areas already present in the EU strategic areas are especially worth mentioning (European Commission 2005):

- The European Employment Strategy, including the promotion of "active ageing" and the gradual raising of the average retirement age[4];
- Reforms of social security systems, ensuring the preservation of the inter-generational solidarity and maintenance of a balance between the retired and working populations. Additionally, the long-term health care and elderly care policies should be developed in order to facilitate such reforms;
- Ensuring gender equality using policy measures aimed at achieving a better balance of career and family life, like development of child care structures, division of parental leave and part-time working, what be crucial in raising labour force participation.

With respect to all these issues, they have to be seen as very difficult and the Commission openly admitted that the EU is presently still very far from achieving the objectives set. Consequently, the three priority policy areas required to confront the demographic change in contemporary Europe are:

- "Return to demographic growth. We must ask two simple questions: What value do we attach to children? Do we want to give families, whatever their structure, their due place in European society? Thanks to the determined implementation of the Lisbon agenda (modernisation of social protection systems, increasing the rate of female employment and the employment of older workers), innovative measures to support

[4] Cf. Guideline 5, Council Decision of 22 July 2003, Official Journal OJ L 197, 5.8.2003: 13.

the birth rate and judicious use of immigration, Europe can create new opportunities for investment, consumption and the creation of wealth.

- Ensure a balance between the generations, in the sharing of time throughout life, in the distribution of the benefits of growth, and in that of funding needs stemming from pensions and health-related expenditure.
- Find new bridges between the stages of life. Young people still find it difficult to get into employment. An increasing number of 'young retirees' want to participate in social and economic life. Study time is getting longer and young working people want to spend time with their children. These changes alter the frontiers and the bridges between activity and inactivity" (European Commission 2005: 10-11).

This set of objectives requires a wide range of various policy measures, not limited to the demographic ones, but including a variety of economic and social instruments, like increasing the labour force participation and the retirement age, or reforming the pension systems. In the context of the ageing process, the issues of fertility and childbearing are clearly given priority among the possible population policy measures. This is not surprising in the light of the results of the current analysis, presented in Sections 3, 4 and 5, as well as of the other studies, discussed in Section 6 of this paper.

With respect to the migration policy, the European Commission already a year before issuing the Green Paper noted that "[…] while using immigration to fully compensate for the impact of demographic ageing on the labour market is not a realistic option, increased immigration flows are not only likely but necessary. The existing literature confirms that migration can contribute to mitigating the ageing process significantly if migration rates remain at their historical levels or increase further, without being a solution to ageing populations" (European Commission 2004). This does not leave doubts about the negative stance of the Commission with respect to the 'replacement migration' as a possible remedy for the problems related to population ageing. The implausibility of such a 'solution' is therefore already recognised among the European policy-makers and the need for alternative policy measures aimed at dealing with social and economic issues related to population ageing is explicitly expressed.

In response to the foreseen problems of labour force shortages due to ageing, Fotakis (2000) stressed the necessity for a combination of migration and economic policy measures, aimed at an increase in labour force participation and productivity, as well as at combating unemployment. In line with the Lisbon Strategy, the employment of the unused labour potential has been suggested as one of the partial solutions to the mentioned problems. It has been noted that labour productivity, although recently increasing very slowly all over Europe, may grow significantly in the future due to technological changes. Massive 'replacement migration' would then be no longer needed to sustain the most important parameters of the economies in the longer run. Nevertheless, in the short term, additional inflows of immigrants into Europe may be helpful in offsetting the labour market mismatches caused by the ageing populations. Specifically with respect to migration policies in this context, the it has been

noted that "the political momentum tends to be in favour of a managed increase in legal immigration. […] In addition, the EU intends to promote effective integration measures for the new immigrants ensuring them decent living and working conditions and the development of anti-discrimination policies which could in turn reinforce their socio-economic contribution to their host society" (Fotakis 2000: 10). An additional conclusion was that the assessment of the real needs for immigration in the European Union is a very complex issue and that the results may differ between particular countries.

7.2. Overview of research on policy issues related to of population ageing

Given the interest of the policy-makers in the issues related to population ageing, it is not surprising that the policy implications of the demographic processes have been addressed by many researchers, both in Europe and worldwide. A recent study of Grant et al. (2004) provides a detailed overview of the possible policy measures aimed at dealing with the consequences of ageing. The specific policy measures are divided into three main groups (Grant et al. 2004: 3-4):

- Indirect preventive policies (economics, gender issues and education), aimed at creating long-term conditions for higher fertility in the post-modern society through affecting the macro-level socio-economic variables;
- Direct preventive policies (migration, family support, reproductive health, child benefits and family-friendly employment), aimed at the attempts to interfere with the micro-level demographic decisions of the individuals and families with respect to fertility and migration;
- Ameliorative policies (social security, labour force, health care and support for the elderly), aimed at reducing the impact of ageing on the society and economy.

The main conclusions reached by Grant et al. (2004) are that the 'replacement migration' is not a remedy against population ageing and its socio-economic consequences, and durable solutions have to be sought among the policies aimed at the increase in fertility. Ideally, long-term conditions should be made for fertility increase using both indirect and direct preventive policy measures, influencing the underlying reasons of the recent fertility decline. Nevertheless, there is no single policy that should be recommended in that context, and the effectiveness of various policy measures remains in many cases unknown. Therefore, there is a need for future research in that respect, in order to establish links between the policies, main fertility determinants and the fertility itself. In any case, the changes in fertility are expected to be very slow, also due to the nature of policy-making aimed at changing the attitudes and behaviour of the people. There is an important role of the ameliorative policies, which are necessary and can ease the socio-economic burden on the future generations, caused by the ageing process. Grant et al. (2004) concluded that the ageing of Europe's population cannot be stopped, but it can be slowed down, and its negative consequences can be reduced to a

certain extent by appropriate policy measures. However, as it has been also noted by Lesthaeghe (2000), although the demographic policies aimed at increasing fertility are not the only remedies for the negative consequences of ageing, in the long run they have to be ultimately introduced in order to avoid the otherwise inevitable problems in the more distant future. Economic measures are simply a way of "buying time", before "the laws of formal demography – just like those of gravity – will continue to operate" (Lesthaeghe 2000: 22).

The efficiency in meeting the objectives set by the European Commission in the context of population ageing can be nevertheless enhanced by the ameliorative policy measures regarding other areas of socio-economic life. A comprehensive study of Australia prepared by the Productivity Commission (1998) includes a very broad analysis of potential problems and areas for policy actions with respect to ageing. A broad list of the aspects of life that need to be addressed by policy means in this context include: economy and labour markets, national savings, retirement income, social expenditure, child and elderly care, health and family services, as well as education, housing and transport. The study presents and overview of the impact of ageing on the mentioned areas, as well as suggestions for the further research, particularly in the fields of labour force participation, labour productivity, life-long education and training, retirement age, superannuation (pension systems), individual savings, sources of health and elderly care funding, as well as the welfare situation of the older people. From this list it can be clearly seen, how complex is the problem and how wide should be the variety of policy measures responding to the challenges of population ageing. Seen from this point of view, demographic policies constitute only a fragment of the relevant policy framework.

Recently, an interesting standpoint has been presented by Lutz et al. (2004), who developed a concept of 'population balance' as a possible population policy goal, not limited to the issue of population growth alone. Such a policy would be aimed at finding such proportions of age, education and other groups within a population that would maximise the welfare of the individuals and the intergenerational equity. Social welfare has been defined here as a function of three factors: consumption, survival rates and environmental quality. Focusing on the issues of investment in human capital, the authors of this model found that fertility and education levels are in an interplay with respect to welfare maximisation and that higher education can compensate here for reduced fertility. An experiment with a stable population showed that given high percentage of educated people (>85%), welfare is maximised by TFR levels less than 1.5 (Lutz et al. 2004: 329).

The proposal of Lutz et al. (2004) is as a courageous step in the direction of detaching population policies from the bare issues of population ageing and growth. The authors argue that the "population growth and ageing are not separated phenomena, but are really two aspects of unbalanced age distributions" (Lutz et al. 2004: 331). Therefore, the policy aim should not be limited to achieving a zero population growth, nor hindering the ageing process, but to maximise the human welfare, given the magnitude of the demographic change. It is

very likely that taking into consideration the additional issues as welfare and human capital will gain more attraction from the population policy makers in the future.

The importance of investments in the human capital in offsetting the negative socio-economic consequences of population ageing has been also underlined by other authors. For example, two studies carried out recently under the auspices of the Council of Europe (Avramov, Mašková 2004; Schoenmaeckers 2004), stress the necessity for an 'active ageing' of the elderly and provides an interesting overview of opportunities and limitations in that regard.

It has to be noted that also the future demographic processes in Europe will undoubtedly have impact on the further policy developments. In that context, special attention needs to be paid to migration policies, the inertia of which is relatively smallest among the proposed variety of measures aimed at influencing population size and structure. Unlike the attempts to increase fertility or to raise the human capital, the effects of implementing either liberal or restrictive migration policies can be visible without longer delay. Therefore, the migration policies will likely fluctuate in response to the changing pressure of the economic needs, public opinion, or other factors.

For the reasons discussed above it is very difficult to predict the long-term migration policy development path. One can only speculate that there may exist an 'equilibrium' level of immigrants, around which the actual numbers, influenced by the policies, would fluctuate. In such a simplified model, if immigration would be too small to satisfy the economic needs in particular countries, there would be a pressure on the policy-makers to liberalise the inflow of foreigners. Adversely, should immigrant flows be too high and cause social tensions (not determining, whether justified, or not), there would certainly be pressure on introducing the more restrictive policy measures. The adjusted policies would then have a direct and almost immediate impact on the real population inflows into particular countries and into the EU as a whole. The problem is that the discussed policies would work well with flows of migrants, but not with the stocks of foreigners already present in the host countries. From the latter point of view, the efficiency of such policies could be negligible, at least in the short run. The more detailed analysis of such an equilibrium path of immigration and its impact on the stocks of foreign population in the host countries would be, however, very complex and therefore it remains far beyond the scope of the current study.

7.3. Long-term plausibility of the proposed policy solutions

As it has already been mentioned in Section 6, the long-term infeasibility of the 'replacement migration' policy from the demographic point of view has been re-iterated by many authors dealing with the issue (e.g., Lesthaeghe et al. 1988; Blanchet 1988; Wattelar, Roumans 1991; Coleman 1992; Gesano 1994; McDonald, Kippen 2000; Feld 2000; Espenshade 2001). The solutions proposed instead contain a variety of measures, including both demographic policies

aimed at the fertility increase (e.g., Lesthaeghe 2000), as well as necessary economic adjustments (e.g., Coleman 2002). The issue of long-term plausibility of such policy measures is, however, much more subtle than in the case of the 'replacement migration', where the bizarre magnitudes of the 'replacement' speak for itself.

The interrelations between ageing, 'replacement migration' and other related demographic issues have been very clearly summarised by van Imhoff and van Nimwegen (2000: 10, own translation) in their comment to the UN report. They concluded that the "absurd numbers [of 'replacement migrants'] make it clear that migration does not help against the population ageing. The ageing has namely its origin in two processes that have nothing to do with migration: firstly, with fertility changes (previously high, currently low), secondly, mortality changes (ever higher life expectancy). Moreover, it is a misunderstanding to think that the population over 30 years of age is 'extremely old'. Much more so, the populations were 'extremely young' in the past, and at this moment they still are. We should simply accept that the young [population] structure will never come back due to the modern mortality and childbearing patterns. Before these processes cause problems in the society, we should adjust the organisation of our social life to them, and not talk about immigration in panic".

With respect to the management of immigration, the policy context set by the European Commission (2004) can be seen as realistic. It is important that the policy-makers do not perceive immigration as a direct remedy against population ageing, but only as a partial measure to reduce its consequences in the short term. In this context, increased immigration aimed exclusively at preserving certain parameters of the age structures is not considered as a realistic policy mean at the level of the EU. From this point of view, this is clearly an important outcome of the vivid discussion that took place among demographers and policy-makers following the controversies marked by the United Nations (2000) report on 'replacement migration'.

In this context this is not surprising that the European Commission (2004) admitted that "even somewhat higher net immigration would not dispense policy makers from implementing the EU's internal structural reform agenda to cope with the impact of ageing populations. In particular, in all Member States timely preparations to tackle the budgetary implications of ageing will have to rely on the three-pronged strategy of raising employment rates, reducing public debt, and reforming pension systems". It can be hoped that the fact that the European Commission acknowledged the seriousness of this issue and of necessity of applying diverse policy means in order to tackle with it will be followed by concrete actions, both on the level of the EU and of the Member States. The Member States themselves should also recognize the importance of the challenges posed by population ageing, and concentrate their efforts in order to design as efficient policy measures, as possible.

In the evaluation of long-term plausibility of the demographic policies aimed at fertility increase, a cost-efficiency analysis of particular policy means would be beneficial. The issue

is important especially in the framework of the second demographic transition theory of D. J. van de Kaa and R. Lesthaeghe (Lesthaeghe, van de Kaa 1986; van de Kaa 1987), given the advancement of social modernisation processes in the Western societies (Okólski 2004). The differentiation between indirect and direct preventive policy measures presented by Grant et al. (2004) can lead to the speculation that these are the former ones, focusing on long-term sustainable economic development, gender issues and investments in the human capital (education), that are more likely to give durable results in terms of fertility increase. The efficiency of the remaining ones, including family support, child benefits and family-friendly employment, should be perceived rather in the short and middle term. As it has been noted by van de Kaa (2003), the real and sustainable transition to higher fertility can occur exclusively through the changes in the normative systems of the societies. Perceiving the children and family life as a way of self-realisation of the parents is the only possibility to achieve this goal in the individualised post-modern world. Nevertheless, the question, whether and to what extent can the societal values and norms be influenced by the policy means, remains unanswered. Another open issue is, whether the return to the replacement levels of fertility is possible in the light of the current knowledge of social processes.

The policies aimed at increasing fertility may be seen as a way to slow down the ageing process in a longer term, bearing in mind the reservations discussed above. Additionally, it has to be noted that, as pointed out by Lutz et al. (2003), the process of ageing in Europe is already so advanced that it causes a negative population momentum. In the other words, even if total fertility rates would instantly return to the replacement level, negative population growth would still be observed over a period of time, due to the ever smaller generations of the newborn from the last decades. Similarly, an increase in fertility would decelerate the ageing process also with a time delay. This has to be considered when thinking about plausible demographic policy measures aimed at counteracting population ageing, as the effects of such policy means would be observed years after these policies are implemented.

Regarding the goals set in the Green Paper of the European Commission (2005), the proposed policy objectives based on the idea of a return to demographic growth are somewhat controversial. As it as been pointed out by Lutz et al. (2004), demographic growth alone should not be perceived as an ultimate policy goal, as opposed to the maximisation of social welfare through investments in human capital. Clearly, this is the most efficient and robust way to achieve the other European policy objectives, concerning the inter-generational equity and solidarity. To some extent such policies may be strengthened by the ones aimed at the increase of fertility, but the latter should be rather perceived as an auxiliary measure and not as the key long-term policy objective that would automatically guarantee realisation of the objectives set. This conclusion is especially important, as in the light of the earlier discussion, the important factors in play with respect to fertility changes in post-modern societies may not be directly influenced by policies of any kind. This applies in particular to social values and norms that are underlying the current below-replacement fertility patterns (van de Kaa 2003).

With respect to the ameliorative policies (using the terminology of Grant et al., 2004, presented in the previous subsection), including direct reforms in the areas of social security, labour force, health and elderly care, there is no doubt a desperate need for them, regardless of their ultimate long-term capability to overcome the negative consequences of population ageing. In fact, as it has been noted by Lesthaeghe (2000), this capability is by nature temporary, as economic policies are not a replacement for population policies, which are the only ones that could reverse or slow down the current demographic trends in the longer run. This issue seems to be already understood among the policy-makers, at least at the EU level. Notably, Fotakis (2000: 9) admitted that given the magnitude of demographic changes, "the policy makers are faced with different options. Containing public spending on pensions by rendering pension schemes less sensitive to demographic changes is one of the option. The option is often complemented by suggesting important reforms in the PAYG systems or a shift to a funded system. The latter in fact may ultimately imply, among other, investing on countries with higher potential in human resources and higher economic growth". It can only be added that the latter also cannot be done without end, as it could eventually turn out to be something similar to the pyramid scheme. Therefore, the true option is to make the pension systems more independent from the demographic parameters of the populations. However, this issue requires further a very thorough interdisciplinary research, which remains beyond the scope of the current study.

The necessity for such a multidisciplinary research on the issues related to population ageing, its outcomes and the ways to confront them, has been suggested in the important publication of the National Research Council (2001). The detailed recommendations included focusing on the data issues, multidisciplinary approach and cross-country co-operation, in order to achieve a comprehensive picture of the phenomena under study. The following areas have been identified as the priority ones in that context: work retirement and pensions, private wealth and income security, transfer systems, as well as health and well-being in the ageing population. Only putting a really significant effort into broad research on the complex issues related to population ageing can contribute to the development of durable policy measures that would ultimately meet the challenges brought by the demographic change.

The impact of suggested ameliorative policy means on realisation of the goals set up in the Lisbon Strategy can hardly be expected to even partially alleviate problems emerging from the population ageing by 2010. Given the short timeframe set for achieving these objectives and the fact that the progress in most of the relevant priority policy areas is far from satisfactory already halfway this time horizon (European Commission 2005), one cannot expect rapid changes in that regard. In the light of the argumentation presented by Saczuk (2004), the aims of the Lisbon Strategy with regard to the labour force participation (i.e. increase to 70%) are equally not realistic neither in short, nor in the long run, primarily due to the changes in the age structure of the population. Nevertheless, it is very important that continuous attempts are made all over Europe, in order to realise these strategic aims.

7.4. Recommendations for the policy-makers

From the presented overview it can be seen that no migration policy can constitute a sustainable long-term 'remedy' for problems related to the population ageing and their consequences. There may be some exceptions, where migration policies can mitigate the effects of ageing in the short term, to mention the example of selective recruitment of foreign personnel in such sectors as health and elderly care. In the long run, however, the idea of replacing the ageing generations with ever bigger waves of immigrants would be neither plausible, nor efficient. These issues have been summarised in the paper by Korcelli (2003), who re-iterated that 'replacement migration' is a purely theoretical concept and it cannot be seen as an instrument to balance demographic losses. The migration policy should nevertheless be an active one, aimed at balancing the labour demand and supply through the means of selective immigration. Therefore, its aims should be focused on economic and labour market areas rather than on demographic ones.

For the above-mentioned reasons the population policy measures cannot be expected to stop or reverse the population ageing, at least in the short and middle term. Increased fertility and immigration can slow down the process, but only to a limited extent. The efficiency of such measures is additionally affected by the fact that the outcomes of the former would be observed with a time delay, and the effects of the latter would be only temporary by nature. In this context, even more important are the ameliorative policies concerning the other areas of socio-economic life, especially the labour market participation, retirement age, sustainability of the pension systems, etc.

In the light of the results of the current study, as well as of the discussion presented above, the following social and population policy directions can be recommended with respect to dealing with the issues related to population ageing in Europe:

- The idea that immigration can in the long run offset the outcome of the population ageing should be abandoned. Instead of thinking in these categories, the European policy-makers should focus on developing migration policy measures aiming at balancing the current shortages on the labour markets through the means of selective immigration. These selective policies should be rather cautious and must not be seen as measures of offsetting the decreasing fertility.
- Attempts should be made to increase fertility levels in the long run. In order to do so, long-term solutions should be sought to create a supportive environment for the individual decisions concerning childbearing. The policy measures should include at least the promotion of gender equality and education, as well as family support and family-friendly employment. It has to be borne in mind that the outcome of such measures would be observed years after their implementation and that the return to the replacement levels of fertility may be not feasible in the post-modern societies, given the changes in the systems of social values and norms.

- Our research demonstrated that attempts should be made to increase the labour force participation, especially among women and the elderly, in order to partially compensate the labour force decline resulting from ageing. It has to be noted that this can be only an auxiliary measure, as the economic activity rates cannot increase without end. In the case of women, special attention needs to be paid on creating an institutional framework for the reconciliation between work and childbearing. Experience of the Scandinavian countries provides a good example in that respect.
- The inevitable demographic inequilibrium brings about a deep and urgent need for the reform of the pay-as-you-go pension systems that should be replaced with solutions that would not be directly dependent on the demographic dynamics of the population. Such systems should be based on individual savings throughout the working life rather than on repartition between generations.
- There are also some other areas of socio-economic life, not directly related to the outcome of this study, but nevertheless worth mentioning. For example, in order to ameliorate the impact of ageing on the society, certain policy measures should be introduced also in areas of health care and support for the elderly. Promotion of education and investments in the human capital is also an important policy goal itself, both from the point of view of the individuals (lifelong learning), as well as of the societies (increase in productivity and maximisation of the social welfare).
- Finally, more attention should be paid to interdisciplinary policy-oriented research on causes and consequences of population ageing, as well as on the implications of the process on various areas of socio-economic life. Such research should also address issues of possible interactions between various policy measures, for example, aimed at the increase of fertility and at the increase of female economic activity.

Given the pace of population changes, Europe is currently facing one of the last moments available for a peaceful discussion and relatively painless implementation of the appropriate policy measures that would eventually give their results in the coming decades. Failing of doing so may result in accumulation of the negative side-effects of ageing over time that would eventually require significant changes anyway, only that at that moment they will be likely more drastic and associated with higher social costs than they would be in the coming years. It has to be also stressed that the outcome of the applied policy measures, like increasing the labour force participation and moving up the retirement age combined with additional features for the lifelong learning of the elderly, will be only a partial solution for the ageing-related problems.

Needless to say, with respect to the population policies concerning fertility and migration it is crucial that adherence to the emotional (not to say populist) viewpoints should be particularly avoided in the policy-making process. Unfortunately, the risk of emergence of such positions is especially high in the case of these components of demographic change, as they both are related to strong public emotions in most of Europe. The problem is that efficient, plausible and durable policy solutions can be exclusively built on the basis of cumulated knowledge of

the demographic processes, and not on momentary sentiments. Otherwise, public money will be spent on actions designed primarily with short-term electoral goals in view, which will prove inefficient in the long run.

8. Summary and conclusions

This study had the following objectives:

(1) to forecast European populations and labour force resources for the coming 50 years;
(2) to simulate future "benchmark populations" under the status quo and no international migration assumptions;
(3) to simulate the demographic consequences of the additional inflow of population needed to maintain the size of population or constant values of old-age, economic and labour market dependency ratios;
(4) to assess the impact of international migration on population dynamics and labour force in Europe;
(5) to evaluate and recommend the plausible social and population policies based on these simulations, paying special attention to migration issues.

In order to assess the importance of observed international migration for the population dynamics we run a simulation of population dynamics in which international migration was set to zero. Under this assumption, a decrease of combined 27 national populations by over 79 million can be expected, that is 19% of total original population. Despite the fact that the decrease spans half a century, almost two generations, one must not underestimate its significance. It is combined with structural changes visible in the old-age dependency ratio (ODR, defined as the ratio of population aged 65 and more to population in the age group 15-64 year) increase by over 60%. The international migration observed now contributes substantially to the vitality of European populations.

There is a plentiful of studies, including this one, showing that in Europe ageing and, in some countries, declining populations either are or will become important, if not overwhelming, phenomena. The Base scenario of our population and labour force forecast, defined in Bijak (2004), Bijak et al. (2004) and Saczuk (2004) shows that there will be a moderate (0.2% over 50 years) increase in the total population of the 27 studied countries, combined with the reduction of labour force by $1/10^{th}$ and an increase of ODR by 31%. Two other indicators, pertaining to the changes on labour markets, namely the economic old-age dependency ratio (ODRE, defined as the ratio of the economically inactive population in the retirement age, i.e. persons of 65 years or more to the whole active population aged 15 years or more) and the labour market dependency ratio (LMDR, defined as the ratio of the whole economically inactive population to the whole active population) are expected to increase respectively by 31% and 34% on average. The differences between countries are far going: the forecasts show that over the half century ODRE will increase by a factor of between 3.16 for Romania and 1.43 for France, and in most countries it will more than double. Due to rather optimistic assumptions on the future labour force participation rates the values of LMDR will vary from remaining on the level observed in 2002, as in the case of Hungary, to increasing by a factor

of 1.73 in the case of Switzerland. Clearly we will face far going structural changes which will require modification of the financing of social security systems, provision of services and reshaping of many aspects of functioning of societies.

The forecasted demographic changes bring about a lot of concerns. Roseveare et al. (1996) showed that by 2030 in 20 studied OECD countries expenditures on social security and health services will exceed the income. In consequence in many countries pension payments in the pay-as-you-go system will exceed the contributions. This is quite understandable: When Bismarck introduced his Law on Health Insurance for Workers (*Gesetz betreffend die Kranken-versicherung der Arbeiter*) in 1883 and the Law on Invalidity and Old Age Insurance for Workers (*Gesetz über Invaliditäts- und Alterssicherung für Arbeiter, Gehilfen und Lehrlinge*) in 1889, setting up the foundation of modern European social security framework, the demographic scene was entirely different: every worker paid into the system, but relatively few survived to draw the benefits. Over the years the situation changed: most of those who pay, survive until their retirement and use the retirement funds. The demographic change results therefore in a declining number of workers and an increasing number of retired. The system of repartition of payments from workers to retirees is very sensitive to the size of both groups.

This study deals to some extent with the demographic and labour force aspects of the forecasted imbalances. There are three theoretical possibilities to reduce these imbalances, two of demographic nature and the third through the changes on the labour market. The former two are the increased fertility and increased immigration. They would result at the increase of population in the younger age groups due to fertility and, due to immigration, predominantly in the age groups between 20 and 34 years. The third one focuses on the increase of the labour force participation, reducing the imbalance between the number of those who work and the number of those who use the public funds as a source of making their living, without changing the size of population. Obviously neither of these possibilities is exclusive. One may expect that only a combination of all of them may bring any significant changes.

We focused, first of all, on the issue of the use of inflow of migrants, not that much as a remedy for aging – as we knew from earlier studies that the numbers of migrants needed to stop it would be extremely large – but as a measure allowing for the assessment of the magnitude of demographic deficit generated over long time by the persistent below replacement fertility. Therefore it would be misleading to see the migration as the sole or main issue of this research. The underlying problem is the measurement of the deficit in the population size and distortion of age structure.

Let us have a look what magnitude of migration flows would be needed to maintain the unchanged ODR fifty years from now. In 2052 alone the inflow of migrants from the outside of the 27 countries would have to exceed 36 million, well above any reasonable absorption

capacity of Europe. By 2052 the total population would nearly treble, with a vast shares of immigrant population in total populations. If we look at the replacement migration as a measure of the demographic deficit, it is clear that the combined increased life expectancy and long term low fertility result in a need for remarkably high number of persons needed to keep certain parameters of population constant.

We asked ourselves a question, to what extent the changes on the labour market, namely an increase in labour force participation rates could improve the labour supply side of labour-retirement relationship. Saczuk (2004) assumed a universal increase in labour force participation rates, especially in the youngest and the oldest age groups. We estimated the number of migrants needed to maintain the values of ODRE and LMDR and arrived at the potential inflow of respectively 27 and 16 million of persons per year in 2052. However large and infeasible these values are, it should be noted that they are lower respectively by 25% and 66% than the number of immigrants required to keep the value of ODR. This would suggest that the policies aiming at the changes on the labour markets and at the increase in labour force participation rates may be effective in curbing the consequences of demographic imbalances.

At the end, however, only a long term increase in fertility patterns might bring in the demographic change indispensable to reduce the ageing process. This is unlikely to happen, because, as argued by van de Kaa and Lesthaeghe in the second demographic transition theory, the fertility change has occurred due to the changes in values, aims and preferences of women and families. Therefore the sustainability of social security systems may be achieved only through their transformation, from the pay-as-you-go redistribution to systems based on individual savings. This, however, is outside of this study, which is demographic in nature.

Simulations we conducted show clearly that the long term consequences of demographic change should be treated by social policy makers and politicians, whose temporal perspective exceeds the nearest election, with due attention. The changes in social policies, aiming at increase in fertility, increase in labour force participation and reforms of pension systems, are at the core of strategies of adaptation of social and economic systems to the new and unavoidable demographic patterns. Demographic change is ruthless in that sense, that it cannot be overcome with marginal or partial reforms. On the contrary, the reforms needed to compensate the population decline - cum - ageing will be painful, will affect entire populations and will reshape the social making of the next generation.

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