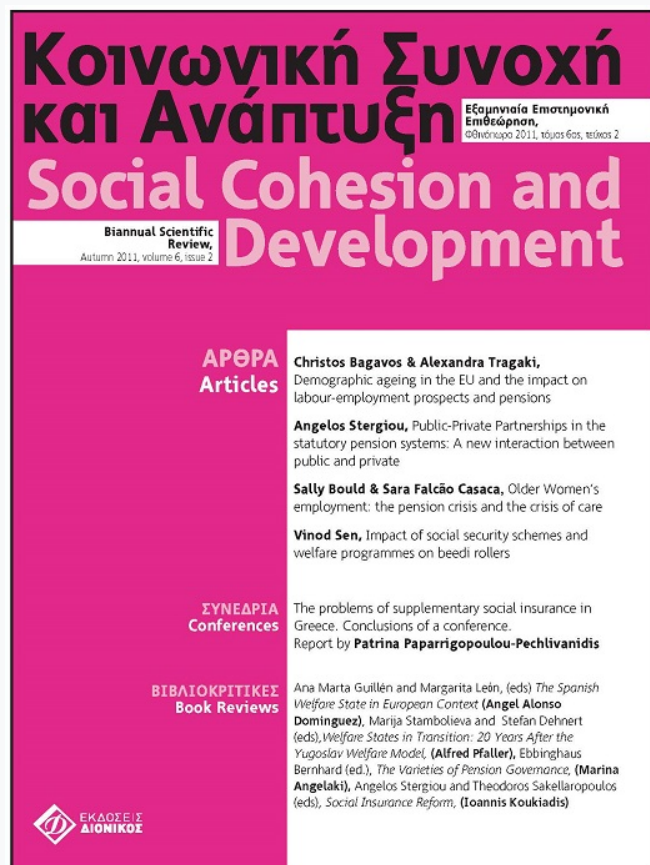


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# Demographic ageing in the EU and the impact on labour-employment prospects and pensions

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## Δημογραφική γήρανση στην Ευρωπαϊκή Ένωση και επιπτώσεις για τον απασχολούμενο πληθυσμό και τη συνταξιοδότηση

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### ABSTRACT

The paper examines the potential volume of employed population, seen from the supply point of view, in selected European countries, in the context of the expected demographic ageing. Our findings indicate that disparities across EU are rather pronounced. Future potential employment varies across countries, because of diverse working-age population trends and various employment rates by age and sex. In a declining working-age population context, an increase in the employment rates could prevent or at least moderate labour force shrinkage. As for pensions, the paper underlines the importance of the employment potential of the non-employed in order to compensate for demographic ageing and therefore for the expected increase in the number of pensioners.

**KEY WORDS:** Demographic ageing, employed population, migration, pensions, European Union

### ΠΕΡΙΛΗΨΗ

Στο άρθρο εξετάζεται η επίδραση που ασκούν οι μεταβολές της κατά ηλικία δομής του πληθυσμού, αλλά και ειδικότερα η δημογραφική γήρανση, στην αγορά εργασίας και τη συνταξιοδότηση, μέσα από τον προβληματισμό που αφορά στο συνολικό απασχολούμενο πληθυσμό των επόμενων δεκαετιών. Μελετάται και εκτιμάται το χρονοδιάγραμμα εμφάνισης μιας κατάστασης αδυναμίας αύξησης της απασχόλησης, από την πλευρά της προσφοράς, στις χώρες της Ευρωπαϊκής Ένωσης το οποίο μπορεί να προκύψει ως συνέπεια της πιθανής συρρίκνωσης του μεγέθους του πληθυσμού των παραγωγικών ηλικιών καθώς και της γήρανσης στην κατά ηλικία δομή του. Σε ότι αφορά τη συνταξιοδότηση, το άρθρο επικεντρώνεται στη σημασία που θα έχει μια πιθανή αδυναμία αύξησης της απασχόλησης για την εξέλιξη του λόγου των συνταξιούχων προς τους εργαζόμενους, ο οποίος αποτελεί μια βασική συνιστώσα για τη βιωσιμότητα των συνταξιοδοτικών συστημάτων.

**ΛΕΞΕΙΣ-ΚΛΕΙΔΙΑ:** Δημογραφική γήρανση, απασχολούμενος πληθυσμός, μετανάστευση, συνταξιοδότηση, Ευρωπαϊκή Ένωση

## 1. Introduction

The EU-27 population has passed the 500 million mark. Since 1957, when the Treaty of Rome was signed, the population in the European and Economic Community has increased

by more than 320 million. This population growth results from two main factors (Monnier 2004): the “political” and the “demographic” factor. The political factor describes the effect of successive enlargements on total population and is responsible for an increase of around 250 million persons. The “demographic” factor represents the relative small part of increase that comes from the “internal” population growth; it is estimated at almost 23% of the total population increase (70 millions).

In recent decades EU-27 population has increased at a gradually slowing pace. Within the period 1990-2009, the EU-27 population increased at an annual growth rate of about 3.2 per 1000 inhabitants, compared to an average of around 8 per 1000 inhabitants in the 1960s (European Commission 2011). In 2009, the population in eight EU-27 Member States was already declining. Since the early 1990s, the contribution of net migration to total population growth has become more significant than that of natural increase. The age structure of population in the EU is becoming older, due to increasing life expectancy and to persistently low fertility levels. In fact the demographic dynamics of the EU is currently more straightforward: growth is fuelled mainly by immigration, whereas the population is getting older and more diverse (European Commission 2011).

Despite the varying speed of demographic ageing across the EU Member States, there is common concern in respect to its impact. In fact, the ageing of population within the EU will continue in the coming decades and it is likely to be of major significance, mainly as far as the labour market and pensions are concerned (EPC and European Commission 2006; European Commission 2011).

The socio-economic impact of demographic ageing has been profoundly analysed during the recent decades (for an overview see Weill 1997). Demographic shift is seen as a crucial factor for labour market developments, for the viability of pension schemes, and therefore for the well-being of people as well as for the public finance sustainability (Alonso 2009; Börsch-Supan and Ludwig 2011 and 2009; Mantel 2001; Tyers, R. and Shi 2007). Though the demographic ageing process is practically irreversible for the decades to come, its implications may be partly attenuated if participation rates increase within specific age or population groups (i.e. elder workers and women). The activation of labour market reserves is often promoted as a policy aiming to moderate the inevitable deterioration of future support ratios in EU and OECD countries (Burniaux et al. 2004; Muenz 2007).

As for the demographic aspects of labour market and pensions, the impact of a shrinking and ageing working age population is seen in relation to (national or immigrant) labour force trends (Feld 2000). It is also examined through its impact on employment and unemployment rates (Jimeno 2004) and on economic growth (Peschner 2011) as well as in terms of the need to activate the employment potential of the non-employed in the years to come (Bagavos 2002; Bagavos and Fotakis 2001).

The paper aims at examining an aspect which has not yet been sufficiently addressed in previous studies (Bagavos and Tragaki 2008). It deals with the potential volume of employed population, seen from the supply point of view, in selected EU Member States. The starting point lays on the observation that in certain countries, participation rates for specific age groups are lagging behind maximum observed levels. The basic research question is to quantify to which extent upward trends in participation rates (especially among women and specific age-groups) and migratory inflows could in short or medium term, off-set the bearing of demographic ageing on labour and employment prospects. The main objective of this work is to examine the significance

of such an increase in employment rates on pensions sustainability. In particular, the gradual increase of employment rates for various population sub-groups as well as migration from third countries can contribute to sustain employment despite the adverse demographic trends (Bagavos 2003; European Commission 2010).

Given that future trends in the age structure of the population will lead to a more pronounced demographic ageing, the paper examines how feasible it is to obtain employment growth so as to delay the expected decrease in the volume of employed persons in the years to come. It analyses for how long the trends in working age population allow for an increase in the number of employed persons. In particular, we estimate the timing to a “tight” labour market in selected EU Member States, where further employment growth, given from the supply point of view, can not be realised because of the striking and ageing working age population. We also emphasise on disparities across Member States which are related to variations in terms of the speed of demographic ageing, of the current levels of employment rates by age and sex and of the possibilities in creating jobs, this latter factor is not analysed in the paper.

The article is organised as follows: Section 2 provides the methodological approach and describes the nature of data used in the analysis. The following section presents the main findings for the various Member States. Finally, in Section 4, some concluding remarks and policy implications are put forward.

## 2. Data and Methods

**T**he aim of this paper is to investigate the potential volume of employed population and estimate the time-space towards maximum employment, for selected EU countries. Analysis relies on official data about labor force participation, provided by Eurostat. No distinctions are made across different types of employment (i.e. part-time). The employment potential of the non-employed is subject to four discrete factors: (i) the overall employment level, (ii) the age and sex composition of the working-age population, (iii) the employment rates by age and sex and (iv) the rate of job creation.

This work proposes a demographic approach of labour and focuses on issues affecting the supply side. The later of the four previously mentioned factors that refers to labour demand is, therefore, not analysed in this paper. Emphasis is, also, placed on the impact of international migration both on the size but also on the age structure of the working population and the over time variations of employment reserves.

The starting point of this analysis relies on the evaluation of the size and the variations of a theoretical “maximum” employment, for each of the selected countries. The estimation of maximum employment results from (a) a maximum employment rates profile, common to all countries, and (b) the age and sex structure of the working-age population of each country. The maximum employment is thus calculated by applying an empirical upper limit of the employment rate (by age and sex) on the working-age population projections. In other words, for every future working age population of a given age and sex structure there is only one maximum employment level.

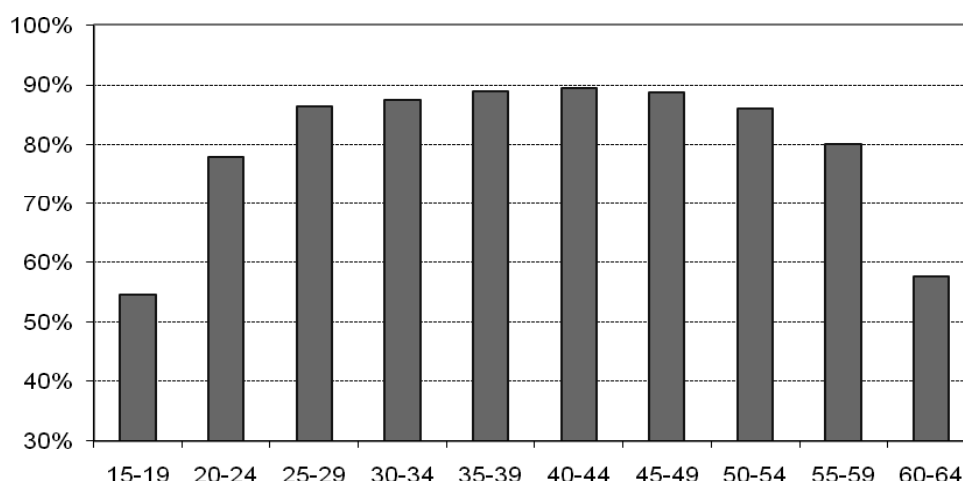
At a second stage, assumptions are to be made about future annual employment growth (i.e. 0.5%, 1%, 1.5% and 2%). Those employment growth rates, applied on the most recent employment level observed in each country, provide estimations of alternative scenarios concerning

future employment levels. The idea is to evaluate, for each of the studied countries, the critical year or period beyond which labour-employment reserves will not allow any further increase in employment level. This condition represents what we call “a tight labour market condition” where employment level –calculated from specific employment growth objectives- exceeds maximum employment level.<sup>1</sup> Obviously, the timing of such a condition is conditioned by country-specific assumptions relative to the employment growth rates and the future migratory flows.

Estimations about future working population derive from the 2010 Eurostat population projections. They are mainly based on two different scenarios, the “convergence” and the “convergence-zero migration” scenario. It is, hence, possible to isolate the role of international migration on the working population size and structure and therefore on the labour supply.

An additional valuable data source is provided by the Labour Force Statistics (LFS). Based on data about maximum employment levels observed in eighteen selected EU countries (namely, EU-15 countries plus Czech, Hungary and Poland) during the years 1985-2010, an age-specific maximum employment rate profile for men and women have been estimated. This serves as an empirical upper limit of employment rate by age and sex (Figure 1). For both sexes aged between 25 and 54 years, the employment rates are steadily higher than 85%; the peak (89.5%) is reached by the middle-age workers of 40-44 years. Younger (20-24) and elder workers (55-59) show slightly lower employment rates, around 80%. Those levels are explained by the transition processes: from education to employment for the younger, and from activity to retirement for the elder. Age groups situated at the extremes of working years, 15-19 and 60-64 years of age, register particularly low employment rates, below 55% and 58% respectively. Longer schooling years and early retirement are responsible for low participation rates among the very young and older workers. It is worth noting that the overall participation rate that derives from the specific employment rate profile is somewhat higher than 76% of total population in the ages 15-64.

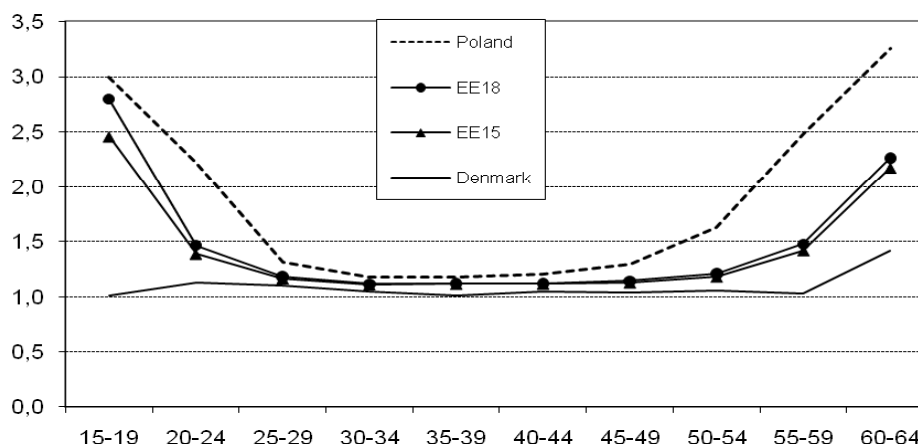
**Figure 1: Maximum employment rates by age-group  
(based on EU-18 LFS data)**



Source: Eurostat, Labour Force Survey, 1985-2010, Own Calculations.

Those age-specific maximum employment rates applied on working population prospects provide the theoretical maximum employment levels over the coming years. At a second stage, alternative rates concerning future annual employment growth (namely, 0.5%, 1%, 1.5% and 2%) are applied upon the latest employment level available per country so as to provide a range of different future employment levels. The comparison between the maximum employment and that based on fixed growth rates is a key-issue in our analysis. A critical year, beyond which no further increase in employment level due to labour-employment reserves is possible, is therefore estimated for every country. This condition reflects a “tight” labour market where employment level exceeds maximum employment level. Obviously, the greater the gap between current and maximum employment level is, the longer the time-period to the critical year will be. For instance, Denmark, due to its high employment rates, will reach the critical year well before Poland, where employment rates lag behind maximum levels (Figure 2).

**Figure 2. Maximum to current employment rates by age group in Denmark, Poland, EU-15 and EU-18**



Source: Eurostat, Labour Force Survey, 1985-2010, Own Calculations.

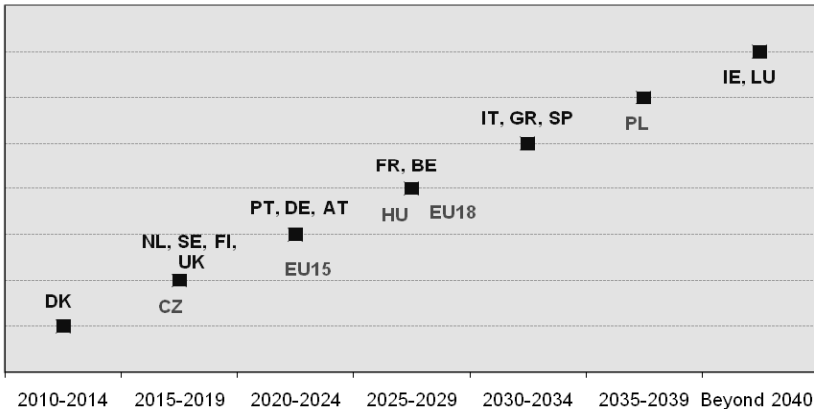
Moreover, as employment rates converge towards the maximum level, any increase in employment becomes more and more dependent on the variations of the volume of each age group of the working-age population. Slowing population growth rates and the shrinking working age population resulting from the demographic ageing, may in the near future deplete all labour-supply employment reserves.

### 3. Results

#### 3.1 Employment reserves in the EU and disparities across countries

In the EU-15, the employment reserves (a term that describes the volume of non-employed persons in working age) are adequate to fuel a steady increase in employment for at least a decade (Table 1 and Figure 3). Rather similar results are obtained for the EU-18.

**Figure3. Critical period to “tight labour market” conditions for 18 EU countries (annual employment growth=1%)**



Source: Eurostat, Labour Force Survey, 1985-2010, Population Projections 2010 (convergence scenario), Own Calculations.

As assumptions upon employment rates go higher, the critical period becomes shorter. In fact, the higher the objectives for a future employment growth, the lower the perspectives for a long term increase in employment, since the rise in the working age population comes to a halt and the employment rates join the maximum levels. Let's take the EU-15 case. As annual employment growth rates go from 0.5% to 1% and 1.5%, the critical period gets closer: from 2030-2034 to 2020-2024 and 2015-2019, respectively. Annual growth rates of 2% can only be applied up to the late 2010's. Sooner or later, the demographic shifts, as dictated by the ageing process, impose a weak employment growth.

Differences across countries seem pronounced. Scandinavian countries face limited perspectives of employment growth (from the supply point of view), due to high participation rates for both sexes. Especially for Denmark, the employment potential of the non-employed allows for an annual employment growth not higher than 0.5% up to the early 2010s. Other countries with already high employment rates, such as the Netherlands, Sweden, Finland, the United Kingdom, and the Czech Republic have to cope with a relatively short time period left till tight market conditions are reached.

A second group of countries comprises Portugal, Germany and Austria. In those countries, the margin of employment rates' increase is wider but the time allowance is shorter: for an annual increase rate of 1%, the critical year is situated in early 2020's.

**Table 1 Critical period to “tight labour market” conditions for 18 EU countries, calculated for different annual employment growth rates**

	Annual Employment Growth Rate			
	0,5%	1,0%	1,5%	2,0%
Denmark (DK)	2010-2014	2010-2014	2010-2014	2010-2014
Netherlands (NL)	2020-2024	2015-2019	2010-2014	2010-2014
Sweden (SE)	2025-2029	2015-2019	2010-2014	2010-2014

Finland (FI)	2020-2024	2015-2019	2010-2014	2010-2014
United Kingdom (UK)	2025-2029	2015-2019	2010-2014	2010-2014
Czech Republic (CZ)	2025-2029	2015-2019	2015-2019	2010-2014
Portugal (PT)	2025-2029	2020-2024	2015-2019	2010-2014
Germany (DE)	2025-2029	2020-2024	2015-2019	2015-2019
Austria (AT)	2030-2034	2020-2024	2015-2019	2015-2019
EU15	2030-2034	2020-2024	2015-2019	2015-2019
France (FR)	Beyond 2040	2025-2029	2020-2024	2015-2019
Belgium (BE)	Beyond 2040	2025-2029	2025-2029	2020-2024
Hungary (HU)	2035-2039	2025-2029	2020-2024	2015-2019
EU18	2030-2034	2025-2029	2020-2024	2015-2019
Italy (IT)	2035-2039	2025-2029	2025-2029	2020-2024
Greece (GR)	2035-2039	2030-2034	2020-2024	2020-2024
Spain (SP)	2035-2039	2030-2034	2025-2029	2020-2024
Poland (PL)	Beyond 2040	2035-2039	2025-2029	2025-2029
Ireland (IE)	Beyond 2040	Beyond 2040	2030-2034	2025-2029
Luxembourg (LU)	Beyond 2040	Beyond 2040	2030-2034	2025-2029

*Source:* Eurostat, Labour Force Survey, 1985-2010 and Population Projections 2010 (convergence scenario), Own Calculations.

The currently low employment rates observed in Hungary, France, Belgium, Italy, Greece and Spain offer a wider manoeuvre margin. For those countries, different assumptions about employment growth rates are feasible and the critical period becomes longer. Nevertheless, disparities across those countries are nothing but negligible. Higher fertility rates in France may have a positive demographic impact on the employment reserves, under low growth rate assumptions. Yet, as the baby-boom generation approaches retirement, the working-age population will gradually shrink.

The southern European countries provide an interesting case-study, primarily due to their low participation rates, especially among women, and secondly due to the reverse of migratory flows. Actually, the “demographic deficit” created by persistently low fertility rates since 1980s, is offset by the low participation rates and migratory inflows.

Perspectives about employment increase are particularly high for Poland, Ireland and Luxembourg. The critical period to tight labour market conditions is longer than elsewhere. The reasons behind this differentiation are mainly demographic (high fertility rates and slow ageing process) for Ireland and Luxembourg, while in the case of Poland the most important explanation lies in low participation rates.

### ***3.2 The impact of migration***

The future population size and age-structure are particularly sensitive to unpredictable demographic trends. To explore uncertainty in future outcomes, population projections adopt alternative scenarios concerning future trends in migration. The convergence scenario presupposes



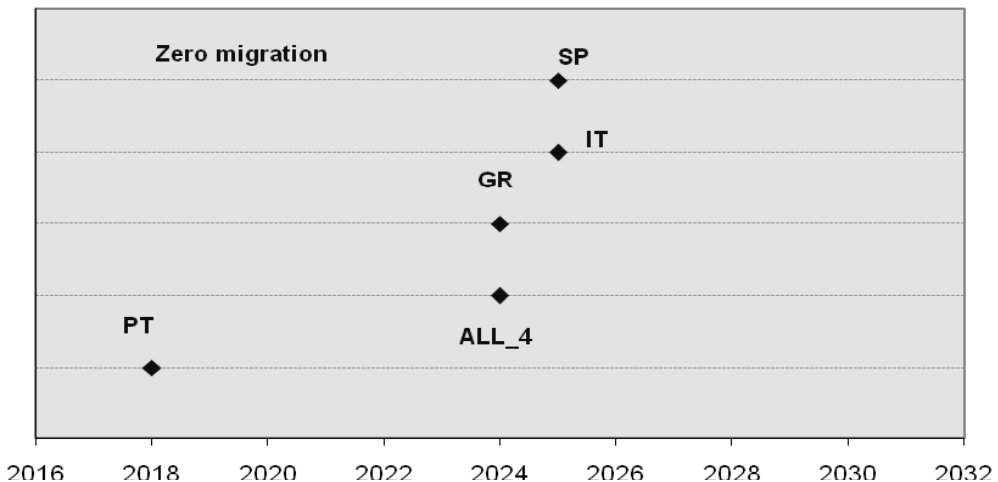
a convergency towards common demographic trends in terms of fertility, mortality and migration for the various EU member states. The adoption of alternative scenarios, firstly, provides a range within which future population is highly probable to be found, and secondly measures the possible impact of a demographic parameter on future population volume and structure. The comparison of a relevant scenario with the baseline one gives signs about the specific role of each variable.

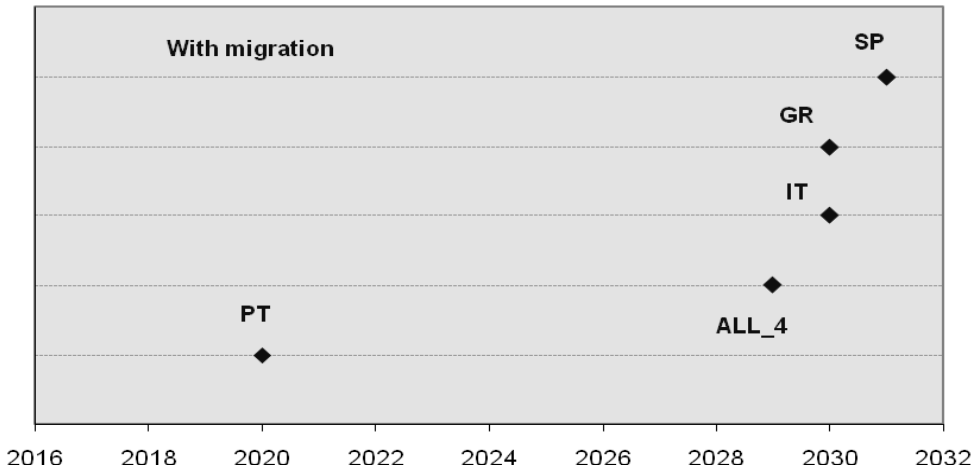
In this paper we applied the zero-migration scenario in the case of Southern European countries. The comparison of the outcomes with those of the baseline scenario let some interesting indications about the effects of migration to come up.

Despite their fast ageing populations, the context is not that discouraging for the countries of Southern Europe, where participation and employment rates in all age groups are still lagging behind the EU average. An activation of labour and employment reserves, especially among women and elder workers, coupled with the recent remarkable changes in migratory balances appear as major potential, which can be tapped to increase labour and employment prospects during the next decades.

If migratory inflows towards Southern European countries ceased, a 1% annual employment growth could be feasible only for a shorter period. Therefore, under the zero-migration assumption the critical year for Portugal would be 2018 (against 2020 under the baseline scenario); Greece and Italy would face tight labour market conditions about five years earlier, in 2024 and 2025 (against 2029 and 2030) respectively; for Spain the critical year would move from 2031 (under the baseline scenario) to 2025 (under the zero-migration scenario).

**Figure 4. Critical Period to “tight labour market” conditions in Southern European countries according to baseline and zero-migration scenario (annual employment growth rate=1%)**





Source: Eurostat, Labour Force Survey, 1985-2010, Population Projections 2010 (convergence scenario with migration and zero-migration scenario), Own Calculations.

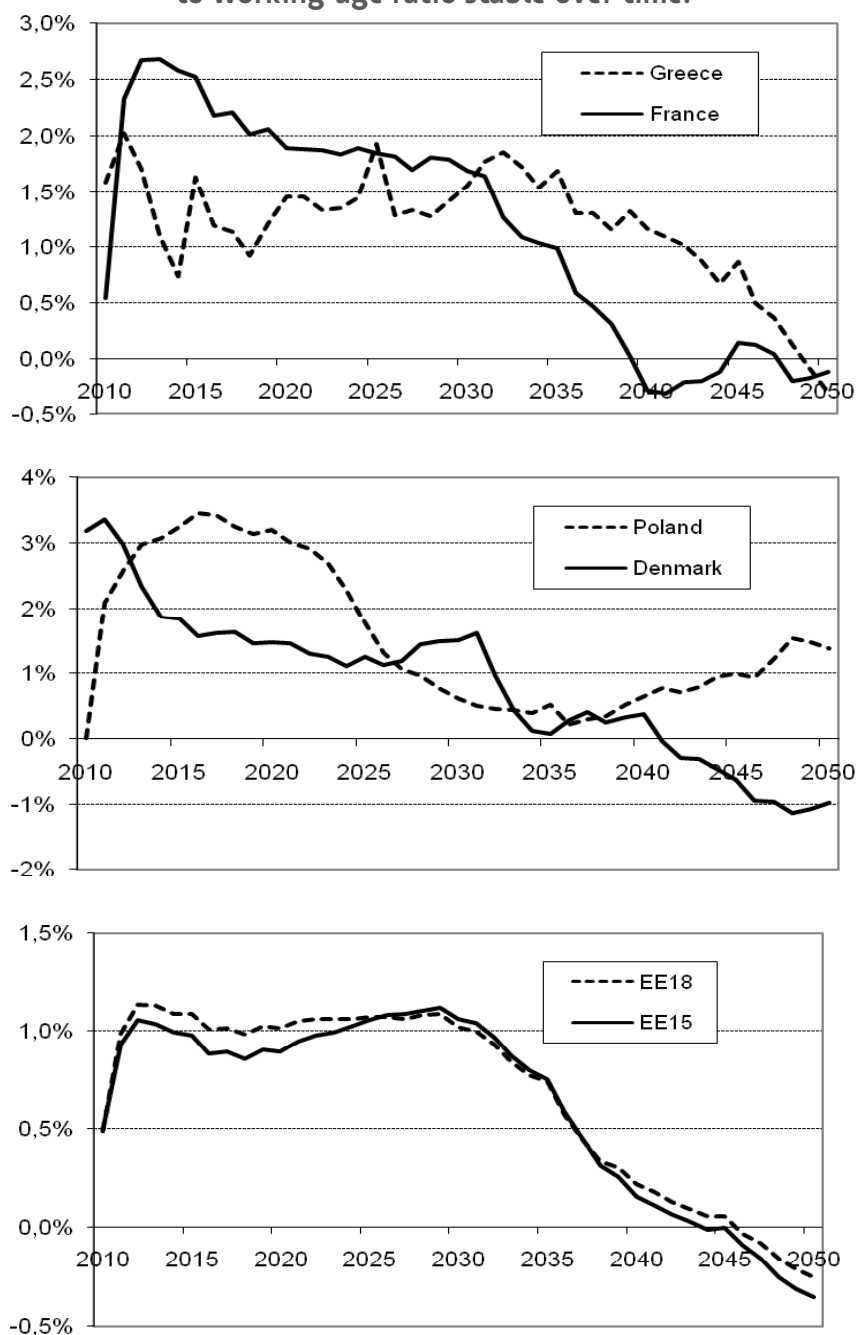
The above figures show that despite its non negligible effects, migration can only offer a brief time space before the “tight labour market” conditions are met. Should the desired employment growth is fixed at 1% annually, migration dynamics are not that important to offset the demographic momentum.

### 3.3 Employment increase, old-age dependency ratio and pensions

Undergoing population ageing ensures that the old age dependency ratio, which measures the number of elderly people as a share of those of working age, will rise sharply over the next years. Old age dependency ratio is pivotal for the financial sustainability of pension systems in all EU countries. Given that the demographic developments are irreversible at least for the next two decades, the only way to intervene on the balance between working and retired population is through employment rates. To keep the share of elder to working age persons at current levels demands an annual increase of employment by 1% for the next 20 years (Figure 5). Demographically speaking, this is feasible since employment reserves allow for an increase of population at this growth rate till mid-2020s (Table 1).

Perspectives vary considerably across countries. Let’s for instance take the case of Greece and France, two countries with rather low participation rates and therefore quite long critical periods (as shown on Figure 3 and Table 1). The population ageing of baby-boomers will demand faster increasing employment rates if the old-age dependency ratio is to be kept at current levels. Yet the demanded increase is not demographically sustainable as it exceeds the employment reserves (Figure 5 and Table 1). For Greece things seem more optimistic. The necessary employment increase does not exceed 1.5% annually. This growth rate can be achieved up to 2025.

**Figure 5. Necessary employment growth to maintain the retired to working-age ratio stable over time.**



Source: Eurostat, Labour Force Survey, 1985-2010 and Population Projections (convergence scenario), Own Calculations.

The comparison between Denmark and Poland, two countries found at the two extremes of current participation rates, offers some interesting information. In Denmark there are limited margins for employment increase due to the already high levels; but so are the demands for employment increase to offset population ageing. In contrast, in Poland the necessary increase in working population to counterbalance the demographic ageing exceeds the employment reserves of the country. No matter how low the current participation rates may be, the demanded increases cannot be achieved. If future employment rates are related to specific labour market objectives (i.e. maintaining the dependency ratio at current levels) the critical period may be considerably shorter. Within the next 15-20 years, practically all EU countries will face an unprecedented situation where no employment increase will be possible. Contrary to previous experience, responsible for that situation will be the shrinking labour supply and not the demand side.

## 4. Conclusions

**I**n an ageing context, future employment growth will depend mostly on increases in age and sex specific participation rates and on migration trends, rather than on demographic developments. During the last decades, the rising working age population coupled with the socio-economic organisation affecting life course patterns have led to an over-representation of the intermediate age group (30-49 years) in labour market and employment. In the coming decades, demographic shifts will claim for a further increase in the participation of women, young and elder persons (50-64 years) in the labour market, so as to respond to an eventual increase in the rate of jobs creation. Future activation of labour and employment reserves will claim for policy adjustments regarding the link between education and labour market, the reconciliation between work and family and the further implementation of active ageing. It also claims for most appropriate migration policies aiming to promote the social and economic integration of migrants in the host countries.

As observed employment rates move towards maximum rates and the working age population slows down or even shrinks, further increases in employment are expected to halt. Migration may delay but will definitely not postpone the developments: tight labour-market conditions will sooner or later be met. In this context, sustainable economic development will require higher productivity yields and better employment performance by emphasising regional development and internal mobility within EU member states. However, even in a context of growing labour productivity, the future demographic burden will call for transfer of rising share of income towards retired persons.

## Notes

1. An initial assumption could rely on the estimation the minimum employment growth rate that could guarantee that the pensioners to working population ratio remains overtime steady to current levels. In such a case, the comparison between the maximum employment level (from the supply side) and the necessary employment level could provide useful information about the chances of the realisation of this objective.

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