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European Ageing Population and Asylum Seekers:  
Can Europe Solve One Problem with Another?

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## Introduction

One of the biggest challenges of our times is the ageing of the population. In the Western world - especially in Europe - low fertility rates and higher life expectancy have shrunk the labor force and created a large pool of older people who have to depend on that decreasing labor force. The economic ramifications of the situation can be severe. When the population is ageing, pension and healthcare costs are raising. Meanwhile, the labor force - the group that contains the people who are paying for those costs - is shrinking. As a result of the reduced labor force, the labor supply decreases. Like falling dominoes, different aspects of the economy underperform, eventually leading to reduced growth.

Migration inflows are very often suggested as a solution to the problem of ageing population in Europe. The type of migration that aims to substitute for the ageing population is called replacement migration. There is a significant amount of literature that has dealt with the replacement migration proposal. Part of that literature agrees with the prospect of replacement immigration (the UN being one of the strongest advocates) and another part raises concerns about it, mainly because of the massive migration movement that it implies.

In the meantime, Europe faces another problem, that of a very high influx of asylum seekers. Refugees mainly come from the war stricken countries of Syria, Afghanistan and Iraq and enter Europe through Greece and Italy. There has been a huge amount of debate and controversy in Europe, both at the national and the European level, on what should happen with these asylum seekers. A few weeks ago, the EU reached a "one-for-one" agreement with Turkey. That agreement says that for every Syrian refugee that Turkey takes back from Greece, another Syrian will be send to Europe. This policy aims at discouraging asylum seekers from illegally crossing the dangerous path from Turkey to the Greek islands; a tactic that cost the lives of almost four thousand people in 2015 (Missing Migrants 2016). On April 4th 2006, the first 200 people were sent back to Turkey from Greece. It is important to highlight that only Syrian refugees

are part of this plan and that the rest of the refugees - who account for 54% of the refugee population - are left out.

Europe seems to be treating the high refugee influx as a problem, however, that does not necessarily have to be the case. Maybe the EU can solve one problem with another. The refugees can act as replacement migrants for Europe and help it fix its ageing problem. But even if the ageing problem cannot be solved by the influx of refugees, the economic benefits of immigration can be great in terms of growth and labor market performance.

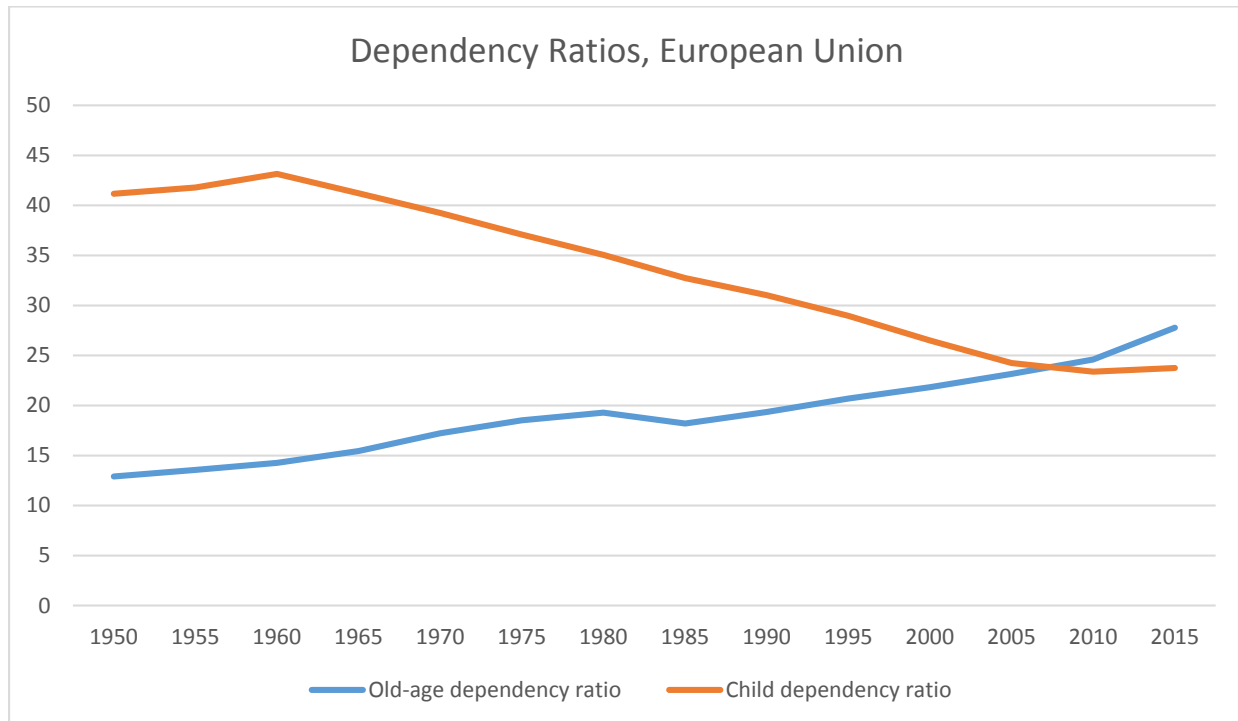
In this paper, I am first going to have a look at the demographic situation in the European Union. I will then review the previous literature on the effects of ageing population and the prospect of replacement immigration as a solution. After that, I will review some aspects of the literature that we should take into account when we talk about migration, such as social capital, trust and public attitudes towards immigration. Next, I will make estimations on the amount of extra immigrants that are needed in order to balance the old-age dependency ratios in four countries: Germany, France, Greece and Sweden. I will then compare those immigration needs with the demographics of the refugee population and make some conclusion about whether the asylum seekers could be considered as a solution to Europe's ageing problem. Finally, I am going to propose an EU-wide retirement age plan that will attempt to take into account the needs of each member country independently. The goal of this paper is to examine the extent to which the refugee influx can solve the European ageing problem and to investigate other solutions to the ageing population.

### **An Ageing Europe**

According to World Bank, old-age dependency ratio is "the ratio of older dependents to the working-age population". Older dependents are defined as people that are older than 65 years, while

working-age is between 15 and 64 years old. Child dependency (or young-age dependency ratio) is the ratio of children under 14 years of age to the working-age population.

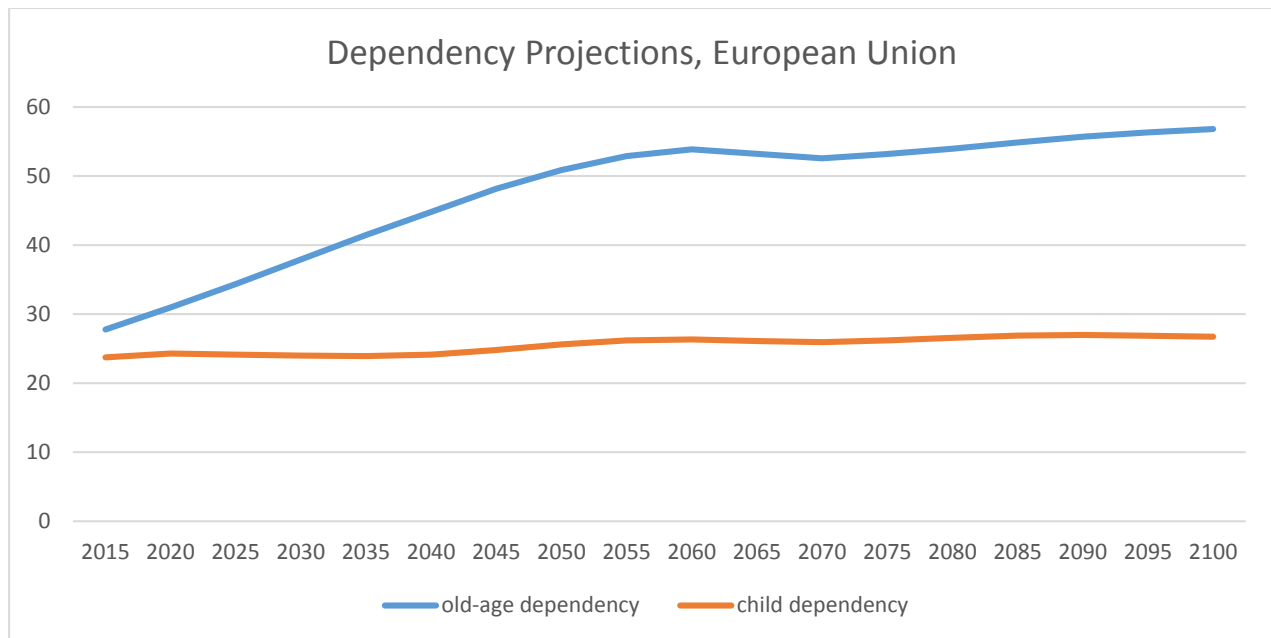
As we can see in **Figure 1**, the working population in Europe used to be more burdened by the child dependency rather than the old-age dependency. Gradually the situation has shifted and old-



**Figure 1** - Source: UN Population Division, World Population Prospects, 2015 Revision

-age dependency is now higher than child dependency. There are two factors driving this trend: low fertility rates and higher life expectancy. The first is mainly attributed to cultural factors and seems to follow the same trend across the Western world. The second is a result of higher quality of life and medical advancements. Normally we do not perceive increased life expectancy as a negative thing, however, there are some economic costs coming with it, mainly in the form of higher healthcare and retirement expenditures. The two ratios switched places very quickly and we can observe how steep that change has been in the graph. Just two decades ago child dependency was higher than old-age dependency by 8.2% (28.96% to 20.69%). Until 2005, child dependency was still slightly higher than old-age dependency (24.25% to 23.15%), although after 2005 old-age dependency passed child dependency and it seems that

it will stay there for years to come. In **Figure 2** we see UN's projections on EU's dependency ratios (World Populations Prospects, 2015). Looking at the projections, it becomes clear that EU is not getting any younger. The problem actually seems to be getting worse and worse across Europe; starting in 2035, countries like Germany and Italy are going to have old-age dependency ratios of over 50%.

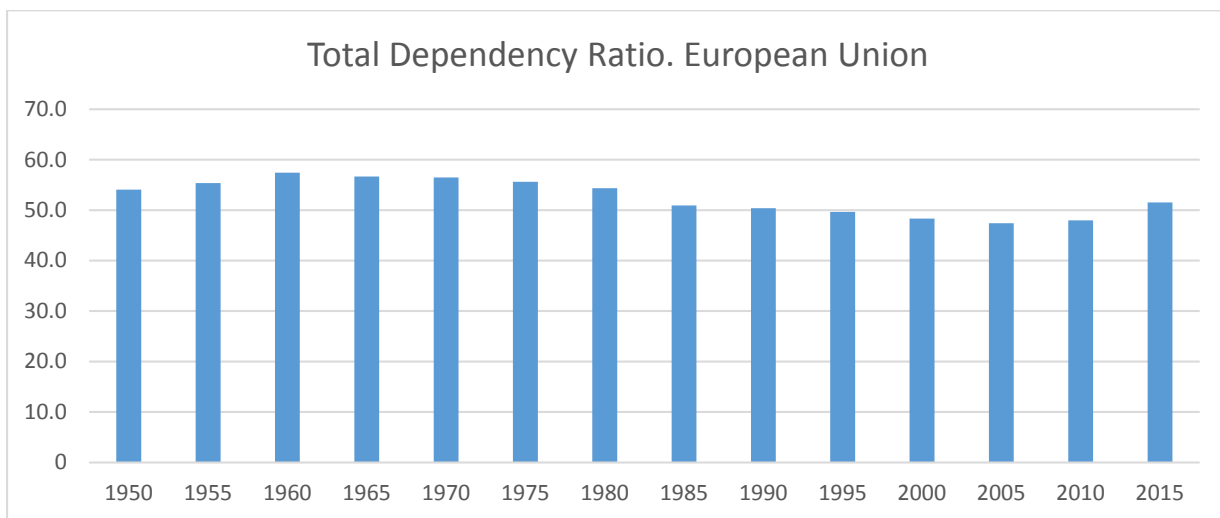


**Figure 2** - Source: UN Population Division, World Population Prospects, 2015 Revision

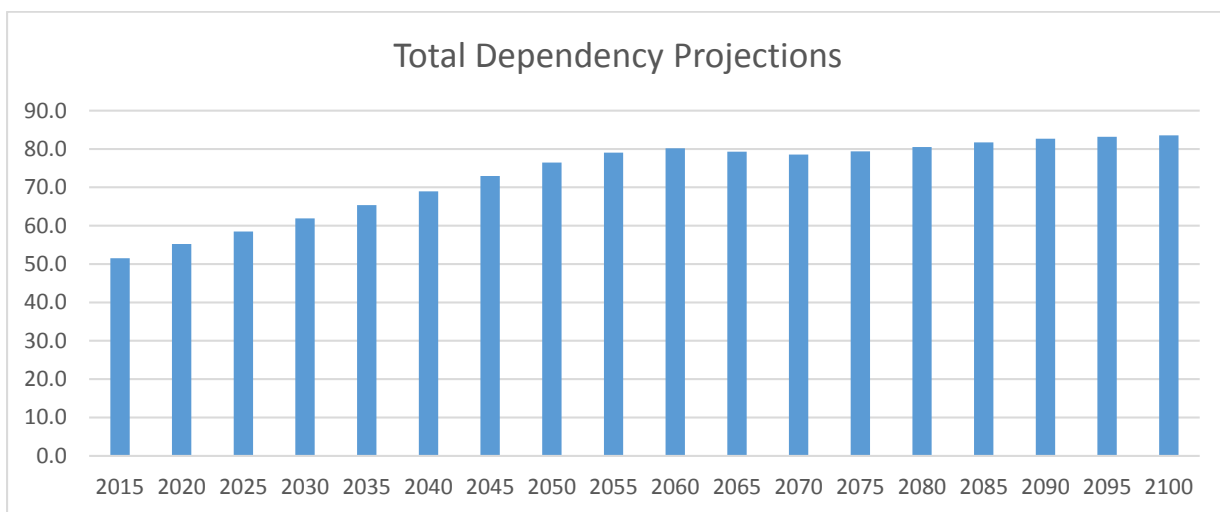
The ageing population has caused the total dependency ratio to increase as well (total dependency ratio is the sum of the child and old-age dependency ratios). As we can see in **Figure 3**, the European Union was experiencing a slight decline in its total dependency ratio since the 1960s. From 1960 to 2005 -the last year child dependency exceeded old-age dependency- total dependency decreased by 10% (57.4% to 47.4%). In **Figure 4** we see the projections of the total dependency ratio. The ratio seems to be increasing until 2060 and then it begins to stabilize around 80%; which means that by 2060, in a group of 9 adults, only 5 of them will be eligible to be part of the labor force in the European Union. Even if all of the potential labor force is employed, for every four dependents there will only be five other

people supporting them. This is a scary potential since it practically means that everyone will have to be productive enough for almost two people, themselves and a nonworking-age individual.

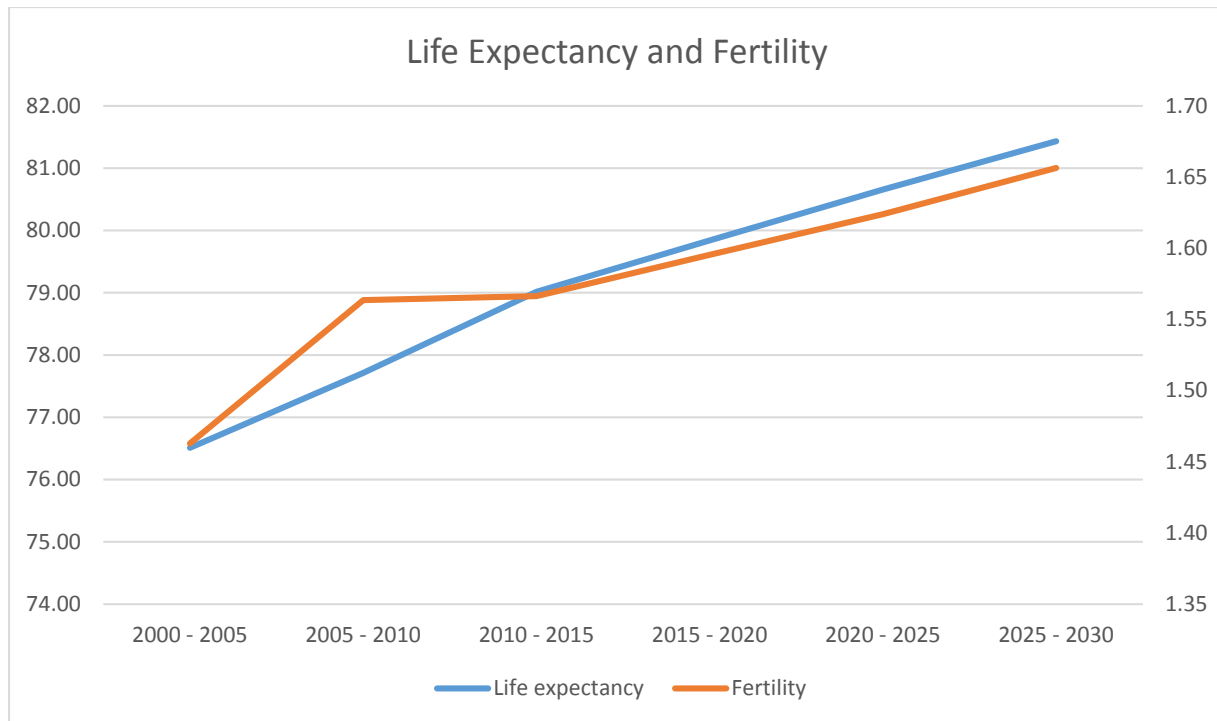
Finally, although the combination of low fertility and increased life expectancy did cause the ageing population problem, one side of the problem, fertility, is projected to increase in the future. That does not mean that fertility will fix the problem it caused, but it means that now the problem is not that fertility decreases, but that it does not increase enough to balance the longer life expectancy. In **Figure 5**, we see that both life expectancy and fertility are projected to increase.



**Figure 3** - Source: UN Population Division, World Population Prospects, 2015 Revision



**Figure 4** - Source: UN Population Division, World Population Prospects, 2015 Revision



**Figure 5** - Source: UN Population Division, World Population Prospects, 2015 Revision

## Literature Review

### *Population Ageing Implications*

The Western world seems to be facing the problem of “ageing population”. Ageing population is the “process by which older individuals become a proportionally larger share of the total population” (UN 2002). A big part of the literature has focused on the negative effects of population ageing, especially in European countries. Most research agrees that population ageing can be very detrimental to the economy and that it is a problem that has to be dealt with as soon as possible. There are different ways to look at the solution to this problem. Part of the literature suggest that immigration can help balance the demographics of the ageing countries and another part argues that it is too late to fix the demography itself, therefore we should focus on systematic restructuring, such as pension reforms.



### *Ageing and Growth*

According to Weil (1997), consumption decrease is inevitable when the population is ageing. Nevertheless, he supports that the effect is not as alarming if we take into account that there was a period in time that the reduced child dependency (0-14 years old) and the subsequent reduced costs that came with it benefited growth. Now, the old age dependency ratios take those benefits back. Pichelmann and Roeger (2004) highlight the need for structural reform in areas such as pensions and healthcare because of the projected low growth in European countries. According to the authors, ageing will be a huge burden in combination to low growth. Godet (2006) also points at the negative relationship between ageing population and economic growth, while he calls for larger migrant inflows accompanied by a focus on integration of newcomers.

As expected, ageing population is a problem in many places of the world. Using data from the Republic of Korea, Choi and Shin (2015) show that population ageing will cause decrease in GDP growth from 3.3% in 2011 to 0.5% in 2100. Aside from the direct effects of ageing population, there are also indirect effects, one example is teacher ageing. Berk and Weil (2015) point out that older teachers pass on information that was current at a much older time and that this phenomenon can harm "technological up-to-dateness". Other authors, such as Futagami and Nakajima (2001), support that the ageing population does not necessarily impede growth. Although, they do find that increasing the retirement age can result in decreased growth.

### *Pensions*

Boongarts (2004) highlights the unsustainability of the current pension systems. Most pensions systems are currently using a "pay-as-you-go" format, which makes them unsustainable because of the constantly ageing populations that keep on increasing the number of pensioners and decreasing the labor force. According to Boongarts (2004), European countries are in the worst place among the ageing world

due to a combination of young retirement ages, low labor force participation and the fact that most of these countries run a public pension system. The author also implies that benefits in Europe are too high and that they might be aggravating some of the previously mentioned problems; shifting to a more privatized pension system seems beneficial, but it would bring about huge transitional costs that European countries prefer to avoid.

### *Fertility programs*

A common belief about fertility-targeting programs is that they do very little to increase fertility. Nevertheless, Caldwell (2002) supports that if we take a closer look at programs that have been implemented in the past, we will realize that fertility-targeting programs might be more beneficial than what we usually consider them to be. Reviewing past assessments of fertility-targeting programs, Caldwell points out a few success stories. European countries such as France in the 1980s and Sweden in the 1940s seemed to have benefited from such programs, but the strongest examples come from Eastern Europe. Russia, East Germany and Romania are examples of countries that benefited from implementing drastic fertility-targeting measures in the 1970s and 1980s. For instance, with a controversial program, Romania outlawed abortions and significantly increased its fertility rates. Moreover, programs that aim to increase fertility can also indirectly increase the female labor participation. That positive effect is the result of fertility-targeting transfer payments. Those transfers can help households afford childcare centers and other related services, allowing the female to participate in the labor force. The goal of higher fertility is to increase the labor force in the future, therefore a measure that increases fertility and at the same time adds workers to the labor force in the present is worth considering.

*Replacement Migration and Population Stability*

Replacement migration became a mainstream term in economic research when in 2000 the United Nations Population Division published a report titled: *Replacement migration: Is it a solution to declining and ageing population?*. In the report it was argued that the ageing and declining population of France, Germany, Italy, Japan, Republic of Korea, Russian Federation, United Kingdom and United States could be stabilized through massive migration inflows. The report not only called for policies that help with the incorporation of the new migrants, but it also highlighted the need for adjustments in labor force participation, retirement age and healthcare. The report caused a lot of controversy mainly because of the high levels of immigration it projected and it has been debated in part of the literature ever since. Later in the paper, I will follow a similar approach to the one the UN used to calculate the extra migration inflows that are needed in order to stabilize the old-age dependency ratios in some EU countries.

Espenshade et al. (1982) created a stable population model that included migration and argued that with complementing fertility, mortality and migration rates a population can be stabilized. The authors did not use projections of fertility and mortality, instead they used fixed rates for both. Moreover, the authors were not aware of the later massive drop in fertility and increase in life expectancy which have caused the immigration needs to significantly increase. Nevertheless, Espenshade et al. (1982) did create one of the first models of replacement migration.

Dalla Zuanna (2006) discussed the combination of low fertility and high migration in twentieth century Italy. In contrast with many other authors, Dalla Zuanna (2006) does not find the low Italian fertility rates problematic. He actually supports that the combination of the two in Italy has increased human capital, upward social mobility and income; while it has also helped balance the labor market and limited the ageing of the population. Because of the usually younger median age of immigrants, the ageing of population in Italy slowed down. According to Dalla Zuanna (2006), Italy needs ten more years (at the time that his paper was written (2006) he was talking about 20 more years) of sustained migration in order

to maintain the proportion of working-age individuals, despite the simultaneous exit of the baby-boomers from its labor market. Dalla Zuanna (2006) also justifies the way that the combination of low fertility and high immigration has benefited Italy's human capital. When children grow in families with fewer siblings (thanks to the lower fertility), it is more possible that they will be educated, which increases their human capital. When their human capital increases, they do not have to work at occupations that pay less and provide a lower social status anymore. That is when new immigrants come into play. The new members of the workforce are willing to take those jobs with the prospect that they will provide a better future for them and for their children. After the old group of immigrants adopt the low fertility strategies of the Italians, the new immigrants will substitute for the lower paying jobs and that creates a continuing cyclical situation. This cyclical situation also facilitates social mobility. Finally, Dalla Zuanna (2006) points out that there is not definite empirical support that unskilled immigration has impeded development, especially in Western Europe and that for the last two decades of the 20th century the strongest economies in the EU were the ones with the highest immigration balances.

Duwicquet et al. (2014) analyzed different scenarios in international migration by the year 2030. They used the Cambridge Alphametrics Model to run simulations of the different scenarios. One of the migration scenarios they simulated was the 'replacement migration' scenario. In the 'replacement migration' scenario, the migration inflows for the countries with increasing dependency ratios is enough to stabilize that ratio by 2030. The authors found a positive effect of replacement migration on economic activity in the hosting countries. More specifically, they found a 25% increase in Western European employment by 2030.

Except for the positive effects in terms of replacing the ageing population, immigration by itself seems to be beneficial for the hosting countries. Røed and Schøne (2012) examined the effects of economic immigrants and refugees on the flexibility of Norway's labor market between the years 1995 and 2004. The authors found that immigrants (and refugees alike) "grease the wheels" of the Norwegian

labor market. Immigrants seem to be very good at moving to areas with higher economic opportunities, especially when it comes to employment. They also found that immigrants bring labor market flexibility in three ways. First, when immigrants arrive in the country, they choose to live and work in areas with higher employment opportunities and wages. Second, immigrants are willing and do move from county to county based on the economic opportunities. At the same time, the native population does not seem to be responsive at all when it comes to regional economic differences and shocks. Third, they are more likely to emigrate out of the country if the economic situation is not positive. In that respect, immigrants can be seen as a gift to a country's labor market. They move around when the market needs to be stabilized and then leave it when it needs to breathe.

Refugees and labor immigrants are sometimes considered two completely different groups of people for the hosting countries. Labor immigrants are viewed as new members of the working force, while refugees are very often seen as people who move to those countries in order to take advantage of social structures such as the welfare system. Cortes (2004) investigated the relationship between refugees and economic immigrants who entered the US between the years 1975 and 1980. According to Cortes' findings, refugees did not start as strongly as economic immigrants, even though they had approximately the same level of English skills. In 1980, refugees were making 6% less than economic immigrants and worked 14% fewer hours. Nevertheless, by 1990 the tables had turned and now the refugees made 20% more money, worked 4% more hours, while their English skills improved by 11% more than the economic immigrants. Finally, it is important to point out that the refugees and immigrants came from many different parts of the world and that the difference in economic performance cannot be attributed to cultural factors.

*Reactions to replacement migration*

In response to the UN Population Division report on replacement migration, Coleman (2001) argues that the problem is not caused by low immigration, but by the increasing life expectancy and decreasing fertility. Coleman explains that immigration cannot substitute for the decrease in the labor force because that would mean drastic change in the demographics of the receiving countries and an immense increase in net migration rates. He supports that there is nothing we can do to bring back the old demographic structure in European countries and that even if immigration is the answer to the problem, issues such as discrimination and economic marginalization in the receiving countries have to be dealt with before a higher number of immigrants start moving in. In a later paper (2008), he supports that the most effective ways to solve the ageing population problem in the medium-term is higher fertility rates and to increase the retirement age to reflect better the longer life expectancy.

Suczuk (2003) has also criticized replacement migration as a solution to ageing population, discarding it because of its impracticality. According to Suczuk, there is no evidence that European countries are going to increase their migration inflows, or that there is even a consideration to do so. Bermingham (2001) supports that "immigration is not remotely possible as a solution to this problem (population ageing)" due to the very large migrant inflow that replacement migration requires. He also points at the cultural disruptions of replacement migration and says that fertility increases will not fix the problem in the short-run and that ageing countries must learn to live with their ageing population. Bijak et al. (2008) also point at the very high numbers of new immigrants needed and propose selective migration based on labor market needs, increased fertility and female labor participation as more effective solutions. Bijak et al. (2008) run a simulation that assumed maximum labor force participation and found that if that scenario is fulfilled, the effects of ageing population will be postponed for 50 years.

## Social Cohesion

### *Social Capital and Trust*

Other than natural and human capital, there is also social capital, so it is important to examine the effects of migration on that kind of capital as well. The concept of social capital became popular among mainstream economics thanks to Robert Putnam who, in his 2000 book, *Bowling alone: The Collapse and Revival of American Community*, defined social capital as the *“features of social life, networks, norms, trust that enable participants to act together more effectively to pursue shared objectives”*. Putnam’s concept of social capital has become widely accepted and is even used by the United Nations as a measure of social cohesion. There has been a lot of literature and debate on social capital, many of them caused by Putnam’s claim that *“immigration and ethnic diversity tend to reduce social solidarity and social capital”* (Putnam 2007). In his paper, Putnam supports that people in diverse neighborhoods display less altruism and community cooperation, while their friend groups are smaller. Moreover, trust levels decrease across - and within - racial groups. Putnam came to these conclusions after examining evidence from the United States, and therefore many of his findings might only apply to the US case, which is something that both his critics and he have pointed out. Putnam also supports that diversity might be detrimental in the short-run, but that the problem is not observed in the long-run.

Most research that supported that diversity reduces trust and social capital and therefore economic efficiency - such as Putnam (2007) and Alesina and Ferrara (2002) - is based on the US, so there are authors who decided to test this hypothesis in Europe. For instance, Gesthuizen et al. (2008) used data from Eurobarometer 62.2 in order to figure out whether ethnic diversity actually affects the social capital of European citizens. They found that while in the US ethnic diversity seems to be decreasing social capital, in Europe it does not have a significant effect. What they found was that social capital variations across European countries were best explained by economic inequality and by how long each country has had a continuous democratic regime. Hooghe et al. (2011), have also failed to find a strong relationship between

diversity and generalized trust, however, the authors recognize that although it was weak and inconsistent, they observed a tendency for a negative relationship between diversity and generalized trust in their findings.

In general, Europe does not seem to be in danger of a significant social capital decrease caused by high immigration and diversity levels. That should make the decision to receive more asylum seekers easier.

### **Attitudes towards immigration**

Other than the social capital and trust components of immigration, we need to take into account the public opinion and attitudes towards immigration. Not only do we need to know whether immigration is welcomed, we also need to know whether immigration is welcomed specifically as a solution to the ageing population problem. Unfortunately, the two most recent surveys that actually posed that question across the EU-27 were in 2006 and 2009 (Eurobarometer 63.3 and 77, Croatia is not included). According to the survey, Europeans are not very open to the idea of replacement immigration. The only three countries that the majority of their population approves of replacement migration are Spain, Sweden and Finland and except for Spain (62% approval) the other two are marginally above the 50% level (55% and 53% respectively). The attitudes vary a great deal across the EU, from the positive attitudes in Spain (62%) to the very low approval in Malta (10%) there is a whole spectrum of approval ratios, most of them lower than their respective disapproval ratios. At this point, I would like to call attention to the fact that although the people of a country approve or disapprove of immigration at specific rates, in practice their attitudes might change. An example of that is Albanese and de Blasio (2014) who found evidence that implied that in Southern Europe minorities feel less discriminated than in the rest of Europe, despite the fact that public attitudes there are mainly against immigration (except for Spain and Portugal). In **Figure 6** we can see responses of the EU-27 countries to the question of replacement immigration (Eurobarometer 77).



On a more optimistic note, the difference between the 2006 and the 2009 surveys is positive. The "tend to agree" response increased from 32% in 2006 to 35% in 2009, while the "tend to disagree" response decreased from 48% to 45%. That is a net change of 6%. If the change in attitudes

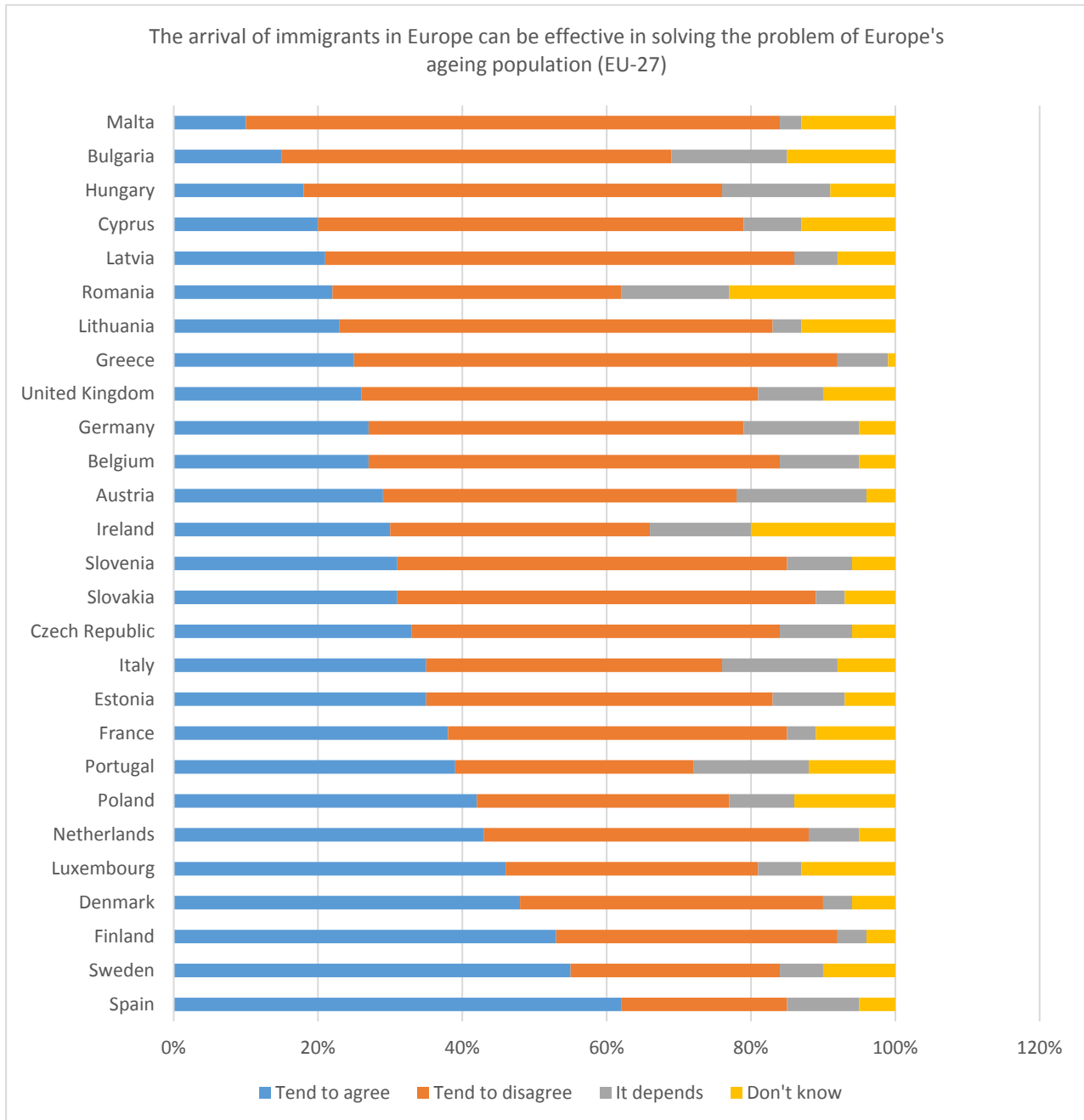
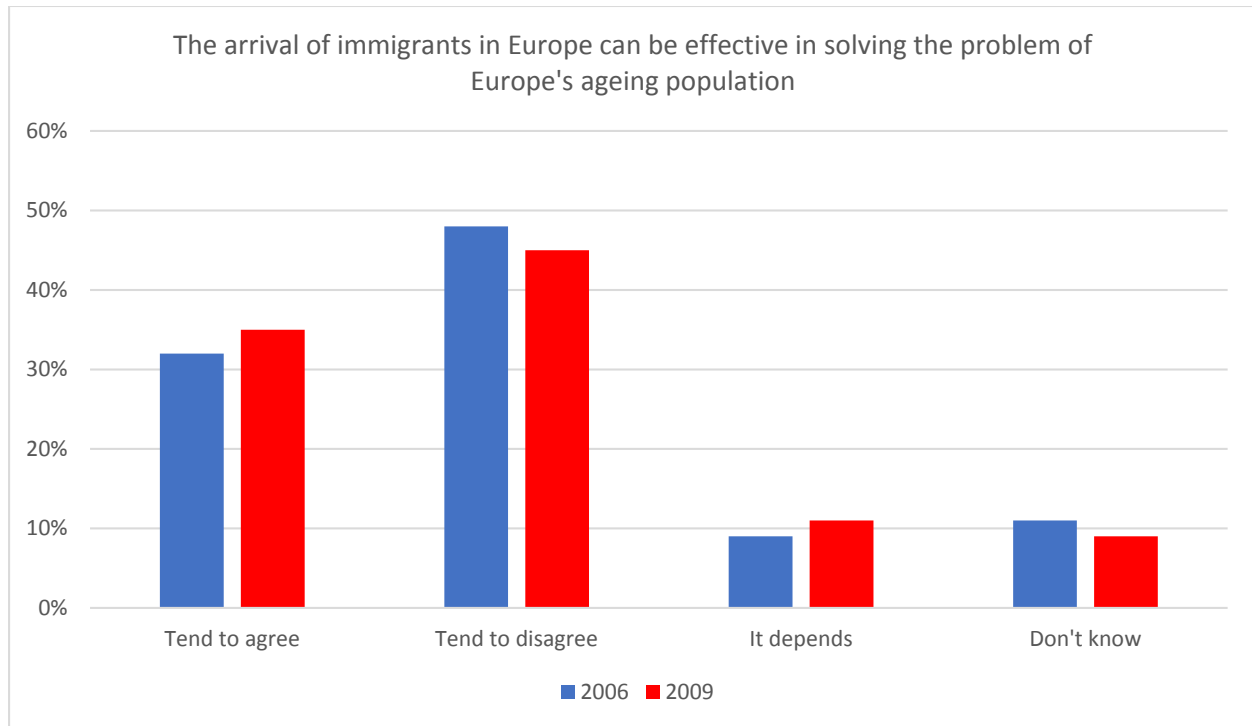


Figure 6: Source: Eurobarometer 77

continues at the same pace that it occurred between 2006 and 2009, by 2016 the attitudes could be 42% in favor of replacement immigration and 38% against. Of course, that is a very simplistic approach to

attitudes projections, especially since we know that in recent years a lot of right-wing extremist parties have been gaining more and more power across Europe. Moreover, the economic crisis across the continent has not helped attitudes towards immigration either. In **Figure 7**, we see the results of Eurobarometer 66.3 and 77.



**Figure 7:** Source: Eurobarometer 66.3 and 77

Part of the literature is trying to interpret these attitudes and the motivations behind them. Ivlevs (2012) studies the public attitudes on immigration in Latvia and found that Latvians are more possible to support higher immigration when they live in an area that has lower birth rates. Ivlevs' finding is encouraging since replacement migration aspires to be a solution to countries with low fertility rates. Calahorrano (2013) studied population ageing and individual attitudes towards immigration in Germany. She found that people are more possible to favor immigration when faced with the problem of population ageing. That finding matches the findings of Ivlevs (2012) in Latvia. Moreover, Calahorrano found that

over their life cycle people grew less averse to immigration. Finally, the author found that unemployment increased opposition to immigration and that older people favored immigration the least.

Ceobanu and Koropecjy-Cox (2012) analyzed the results of Eurobarometer 63.3. The main finding of their analysis was that people without children, who live in urban areas and have received a university-level education are more likely to support replacement migration inflows. Mainly for cultural reasons, childless people prefer more nontraditional lifestyles and therefore are more open to immigration. Childless people become more and more in Europe and that contributes to the ageing of the population, however, it also leads to more positive attitudes towards replacement migration. Ceobanu and Koropecjy-Cox (2012) also found that economic prosperity increases the approval of replacement migration, while the pre-existing proportion of foreign nationals in a country decreased attitudes towards replacement migration. So, it seems that the European crisis might have hurt public attitudes towards immigration.

Analyzing a different survey (the European Social Survey), Bridges and Mateut (2014) found that race and ethnicity play a very important role when it comes to individual attitudes towards immigrations. People are more likely to oppose immigration if it refers to migrants of a different race. They also found a positive relationship between exposure to immigrants and acceptance of immigrants of different races. Although, interaction with immigrants did not reduce opposition of immigrants of the same race.

Bridges and Mateut (2014) discovered that people from countries that are not usually receiving large amounts of immigrants are more likely to be opposed to the presence of those immigrants in their countries. That is true especially for countries like Spain, Greece, Ireland and Portugal that are new to positive net migration. Generally in Europe, same race immigration causes economic concerns and different race immigration causes cultural concerns.

## Methodology

In my calculations I am following a relatively simple approach, similar to the one followed by the United Nations in their 2000 report on replacement migration (UN 2000, Population Division). I am basing my calculations of the extra migration needed to balance the old-age dependency ratios for the next 5 and 10 years on the demographic balancing equation.

$$P(t+n) = P(t) + B(t) - D(t) + I(t) - E(t)$$

\*In this equation,  $P(t)$  is populations at time  $t$ ,  $B(t)$  is the amount of births at time  $t$ ,  $D(t)$  is the amount of deaths at time  $t$ ,  $I(t)$  is the number of immigrants at time  $t$ , and  $E(t)$  is the number of emigrants at time  $t$ .

According to the demographic balancing equation, there are two ways to enter and two ways to exit a population. You can enter the population by being born in it or by immigrating to it. You can exit the population by dying or by emigrating out of it. This is a very basic model, but it is a model that the United Nations base a big part of their work on population.

The projections that I am basing my calculations on come from UN's World Population Prospects (2015) and the projected birth, death, immigration and emigration rates are included. I am going to use those projections to find the number of extra people that are needed in some countries' labor forces in order to maintain the ratio of labor force members (ages 15-64) to old-age dependents (over 65 years of age). Since the only way to join a population is by being born in it or by immigrating to it, and since my calculations are only covering a period of 5 to 10 years, the only way to increase the projected labor force is by adding extra immigration. If I expanded my calculations to 15 or more years into the future, I would have to also account for extra births, since people born today will be members of the labor force in 15 years. So, since births are not part of my calculation, all the extra working population will come from an increase in migration inflows. In this paper, extra migration is the migration above the level that UN's World Population Prospects (2015) has projected.

The old-age dependency ratio is calculated by dividing the number of people that are 65 years old or older with the number of people between the ages 15 and 64. If we want to keep the old-age dependency ratio constant the equation takes the following form.

$$ODR_{constant} = \frac{OLD_i}{WORK_i}$$

\*In this equation,  $ODR_{constant}$  is the fixed old-age dependency ratio,  $WORK_i$  is the working population (15-64) and  $OLD_i$  is the old-age dependency group (65+).

Since we are looking for the extra people needed in the working population group, we need to break the working population variable into two; "projected working population" and "extra working population needed". The equation takes the following form.

$$ODR_{constant} = \frac{OLD_i}{WORK_{pi} + WORK_{ei}}$$

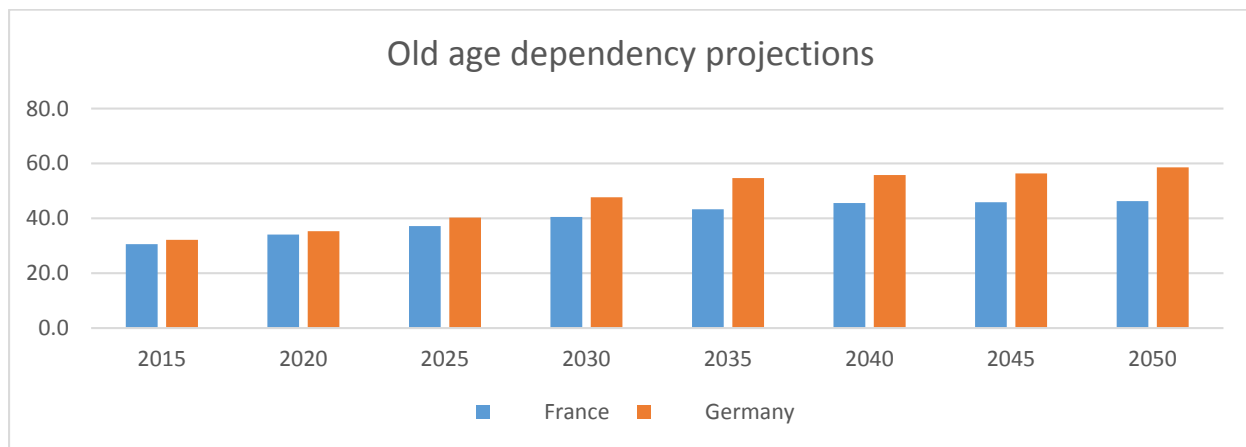
\*In this equation,  $WORK_{pi}$  is the projected working population and  $WORK_{ei}$  is the extra population needed to balance the constant old-age dependency ratio.

After manipulating the formula in order to have the "extra working population needed" at the dependent variable position, it takes the following form.

$$WORK_{ei} = \frac{OLD_i}{ODR_{constant}} - WORK_{pi}$$

## Replacement Calculations

Many European Union countries seem to be facing a population aging problem, including two of its biggest economies, Germany and France. As we can see in **Figure 8**, the United Nation's projections on both Germany and France reveal a future with very high old age dependency ratios. Germany seems to be facing a bigger problem than France, with its old age dependency ratio expected to exceed 50% in less than 20 years. In just 10 years, Germany's old age dependency ratio will reach 40%.



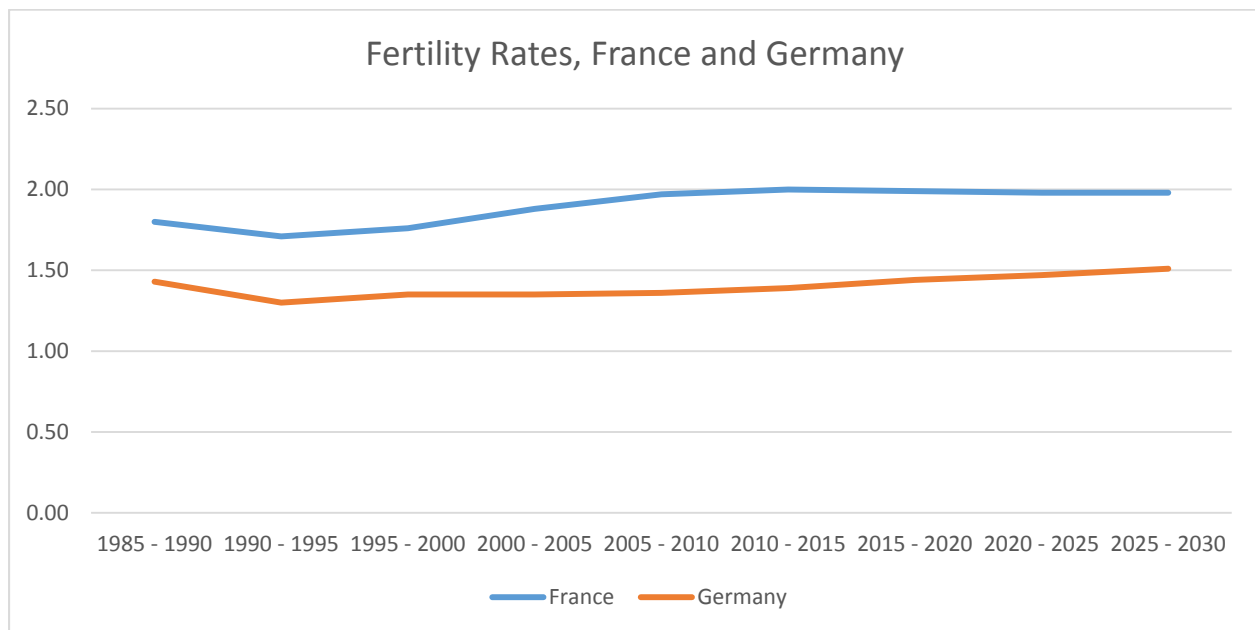
**Figure 8** - Source: UN Population Division, World Population Prospects, 2015 Revision

With such a huge ageing population problem, immigration should be welcomed, but it very possibly cannot solve the problem by itself. Right now, the old age dependency ratio in Germany is 32.2%, and according to my calculations Germany needs to have a net migration increase of 1.2 by 2025 just to maintain the same ratio. The number is really large and seems impossible to achieve. The situation looks even worse when we take into account that those immigrants should also be of young age, so that the old dependency ratio problem is not merely postponed for a few years. The number of net migration increase required might vary based on the fertility rates of the new migrants. It is possible that the net migration increase needed will be smaller once those migrants are settled and start having children. For that reason, setting a shorter term goal could make the picture look a little better and protect us from making wrong assumptions.

By 2020, Germany's old age dependency ratio will be 35.3%, which is more than a 9% increase over the course of 5 years. If Germany aimed at sustaining the old age dependency ratio that it has today for just another 5 years, it would have to increase its net migration by 982 thousand migrants per year. That is a significant increase, although not as large as the 1.2 million a year of the potential longer term plan. These numbers are admittedly very high and the situation looks even worse when we calculate the percentage of the extra migrants needed in relation to the German population. The 1.2 million of new migrants per year corresponds to 1.54% of the country's total population, a really high ratio, especially when we take into account that in 10 years that ratio would add up to 15.43% of the total population. Moreover, Germany already has a positive migration rate, which increases the new immigrant rate from 15.43% to 17.29%. A 10-year net migration rate of 17.29% would mean that almost 1 out of 5 people living in Germany in 2025 will be new migrants that have not been in the country for more than 10 years. It looks like the more we analyze Germany's demographics, the more the need for extra migration seem impossible to meet.

Before we compare the population and demographics of the asylum seekers with the German net migration needs, let's have a look at France. France is in a slightly better position than Germany in the long-term, however, it is in a very similar position in the short term. According to my calculations, France will need a net migration increase of 858 thousand per year for the next 10 years in order to sustain its current old age dependency ratio of 30.6% until 2025. If France wants to maintain its old age dependency ratio until 2020, it needs to have an even greater increase in its immigrant influx; an increase that would reach the 902 thousand extra migrants. In this case, France might prefer to go with the longer-term plan. Although, in practice the longer term numbers can change based on the demographics and characteristics of the extra migrant population. It should also be pointed out that France already has a positive net migrant inflow, which means that according to this replacement plan the total number of new immigrants in 10 years would reach the 14.57% of the current population. The situation in France is a little better than

Germany, but at the same time not encouraging. The main reason why France is in a better position is its higher fertility rates, we can see that in **Figure 9**. Nevertheless, France still has an ageing problem. Even though its fertility rates are higher than Germany's, France is at a similar level of trouble. That can most possibly be attributed to its very high life expectancy, as well as to its life expectancy at the age of 65 (highest in Europe, see **Figure 16**, page 33). Another factor in France's situation is that their net immigration rates are lower than Germany's.



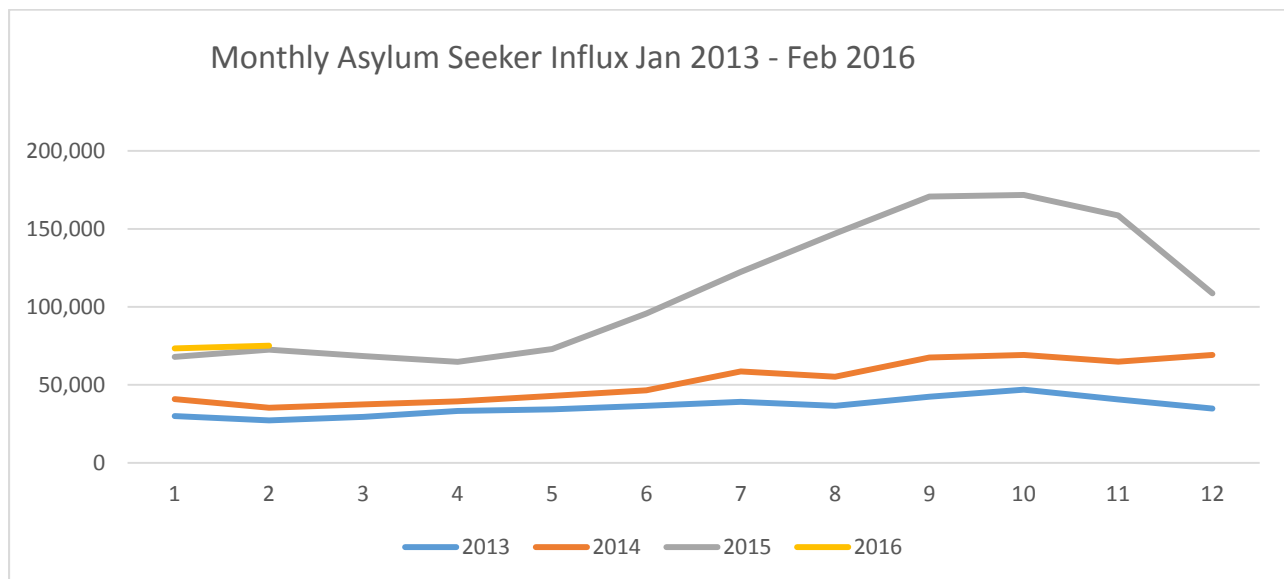
**Figure 9** - Source: UN Population Division, World Population Prospects, 2015 Revision

In the case of refugee influx, I believe we should make shorter term calculations, especially since we do not know when the influx will end. According to European Union's simulations in its economic forecast (Autumn 2015), the asylum seeker population is expected to rise to 1.5 million in 2016 and 500 thousand in 2017. The trend in the last couple of years seems to point out towards an increase as well (**Figure 10**).

Even with 1.5 million asylum seekers per year, there are not enough people to cover the immigration needs of Germany and France. Of course, there is not even a question about whether the asylum seekers can completely substitute for the decreasing working aged people (15-64). So, if the

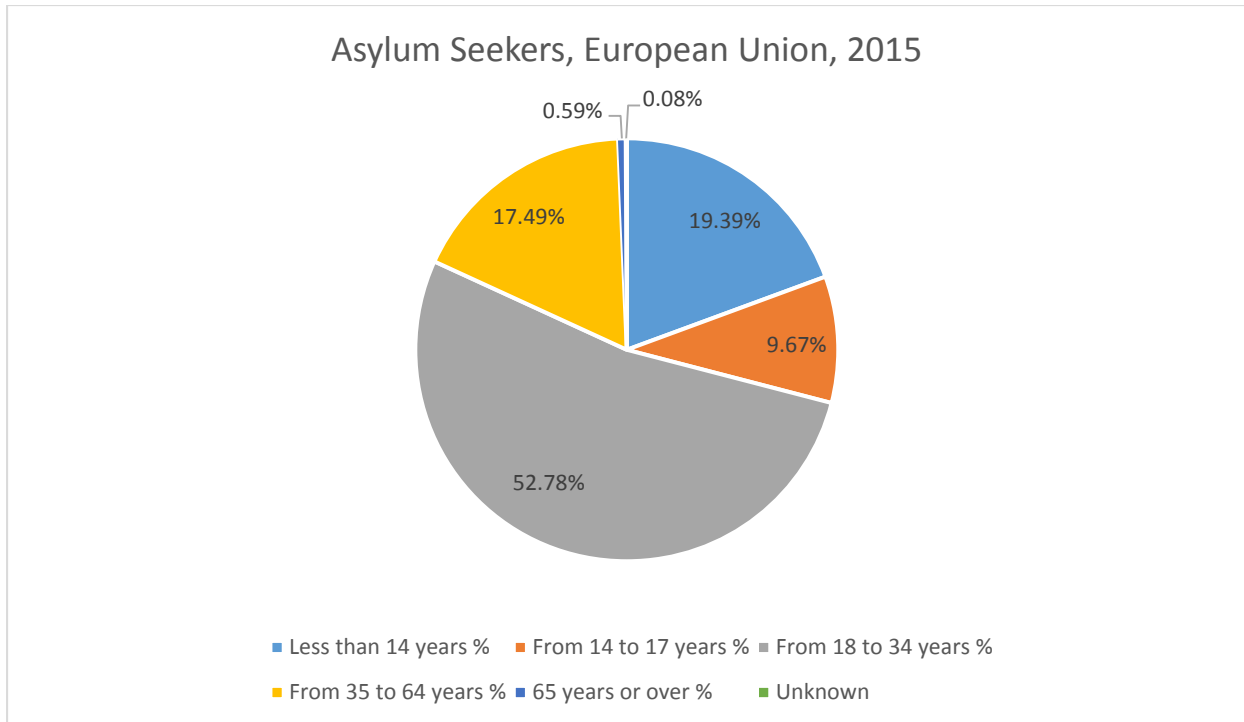


refugee influx maintains an average of 1 million per year for the period 2015-2020, there will be just enough refugees to meet the immigration needs of Germany. If those asylum seekers are completely absorbed by Germany, their old age dependency ratio will actually slightly decrease in 2020. Although, the fact that the number of asylum seekers is only enough for Germany to balance its ageing population, is discouraging, the age breakdown of the asylum seekers is very encouraging, we can see that in **Figure 11**.



**Figure 10** - Source: Eurostat

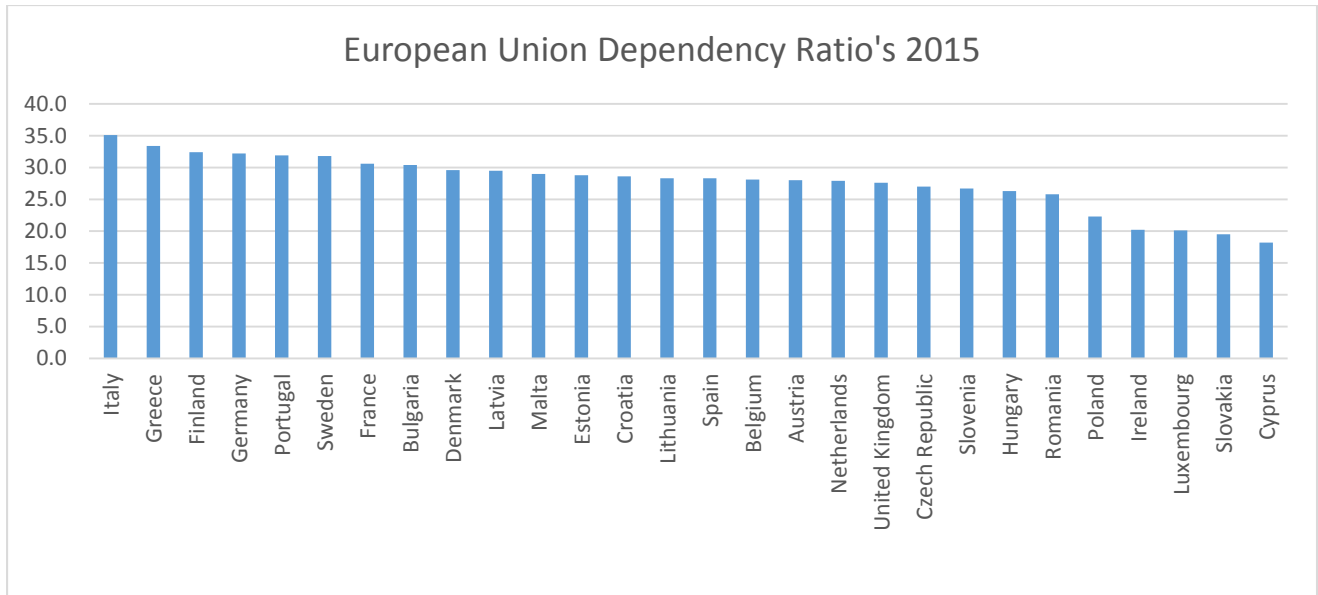
Almost 20% of the refugees last year were under the age of 14, which means that they will potentially be at working age for the total of the group's 50 years. More than half of the refugees (52%) were 18-34 years old. This translates to 697 thousand people ready to join the workforce and stay there for a minimum of 30 and a maximum of 47 years. All these people never had to be part of the young age dependency group in the receiving countries, which by itself is a benefit. An estimated 17.49% of last year's asylum seeker population belonged to the later part of the working force age group, it is the 35-64 year-olds. Some of these people are too old - or close to too old - to be incorporated into the working force, however, many of them could serve in the working force for a long time, as long as 30 years. The 0.59% of refugees over the age of 65 is negligible.



**Figure 11** - Source: Eurostat

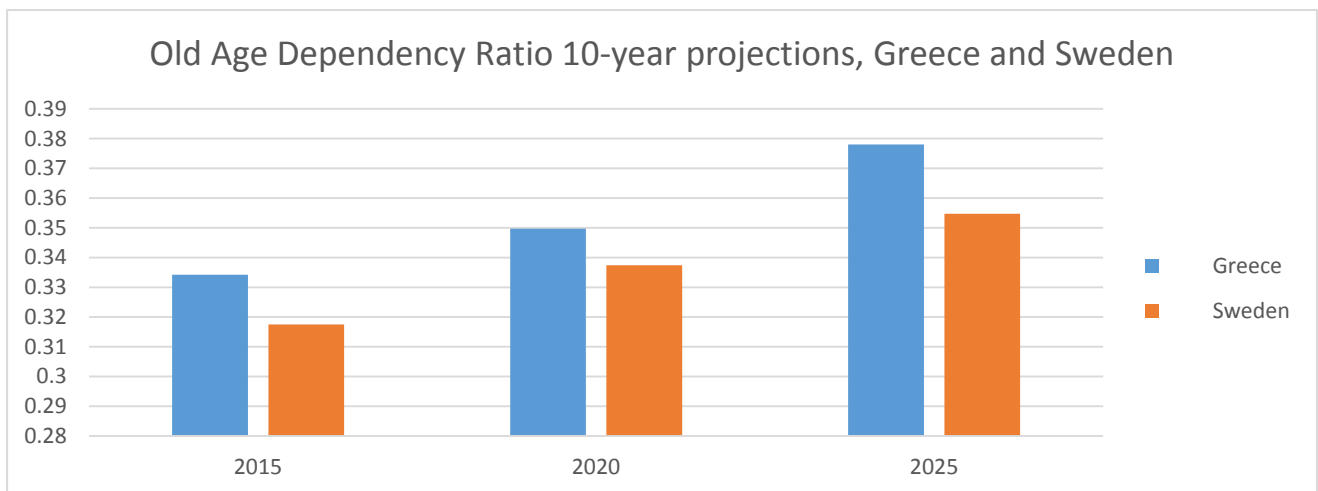
The numbers of refugees are high, and will very possibly become even higher, but they still do not seem enough to counterbalance the ageing population of the European Union as a whole. Germany and France, other than being the 1<sup>st</sup> and 3<sup>rd</sup> strongest economies in the EU respectively, are also the two largest in population. It is obvious that the larger the country the hardest it is to manipulate its demography. Germany and France's populations are 81 and 66 million respectively, however, EU's median population is 9.1 million and some of the ageing countries' immigration needs can be much lower. I am now going to pick two countries that might represent the average EU country and its needs a little better.

As we can see in **Figure 12**, Italy is currently the "oldest" country in Europe. Italy is clearly facing an ageing population problem, but I am not going to analyze its immigration needs because of its large size. Analyzing a similarly large country with Germany and France would bring about similar results. So I am going to move to the second oldest (in terms of old-age dependency ratio) country in the EU, Greece. Greece is the destination of almost none of the asylum seekers, however, most of them have to cross through its land in order to reach western and northern Europe. Until now, Greece has dealt with



**Figure 12** - Source: UN Population Division, World Population Prospects, 2015 Revision

asylum seekers as a temporary problem, instead of a potentially long-term solution to its ageing population. The other country I will talk about is Sweden. Analyzing Sweden’s immigration needs makes sense for four reasons: it is a country with a big ageing population problem, its population (9.7 mil.) is very close to Europe’s median, it is a very attractive destination for immigrants and refugees and its replacement migration approval (55%) is one of the biggest in Europe.



**Figure 13** - Source: UN Population Division, World Population Prospects, 2015 Revision

In **Figure 13** we can clearly see that, between the two countries, Greece has a bigger old-age dependency ratio problem, both in the present and in the projected future. According to my calculations, Greece will need an extra 318 thousand of immigrants by 2020 in order to maintain its 2015 old-age dependency ratio (33.43%). That is 63 thousand extra in net migration per year. For this 5-year plan, the corresponding ratio of new migrants to population is 0.67%, smaller than Germany and France's ratios of 1.40% and 1.52% respectively. The 318 thousand of extra migrants needed by 2020 correspond to 3.36% of the total population and can definitely cause a lot of debate and controversy, but it is much lower than the 7.01% and 7.62% that we observe in Germany and France. For a 10-year plan that aims at maintaining its current old-age dependency ratio, Greece would need a total of 880 thousand extra immigrants, or 88 thousand per year. Including Greece's projected positive migrant inflow, the ratio of new immigrants to current population will be at 8.95%, or 0.89% per year. The new immigrant ratio for a 10-year plan is high, but it is less than half the ratio that Germany would have (17.29%) after 10 years of maintaining its old-age dependency ratio. So, from the countries that I have analyzed so far, Greece seems to potentially experience the smallest impact on its demography under a replacement migration plan that aims at maintaining the old-age dependency. Moreover, fertility rates in Greece seem to have been affected by the deep economic crisis. In case that the Greek economy gets out of the crisis, Greece's fertility rates might increase.

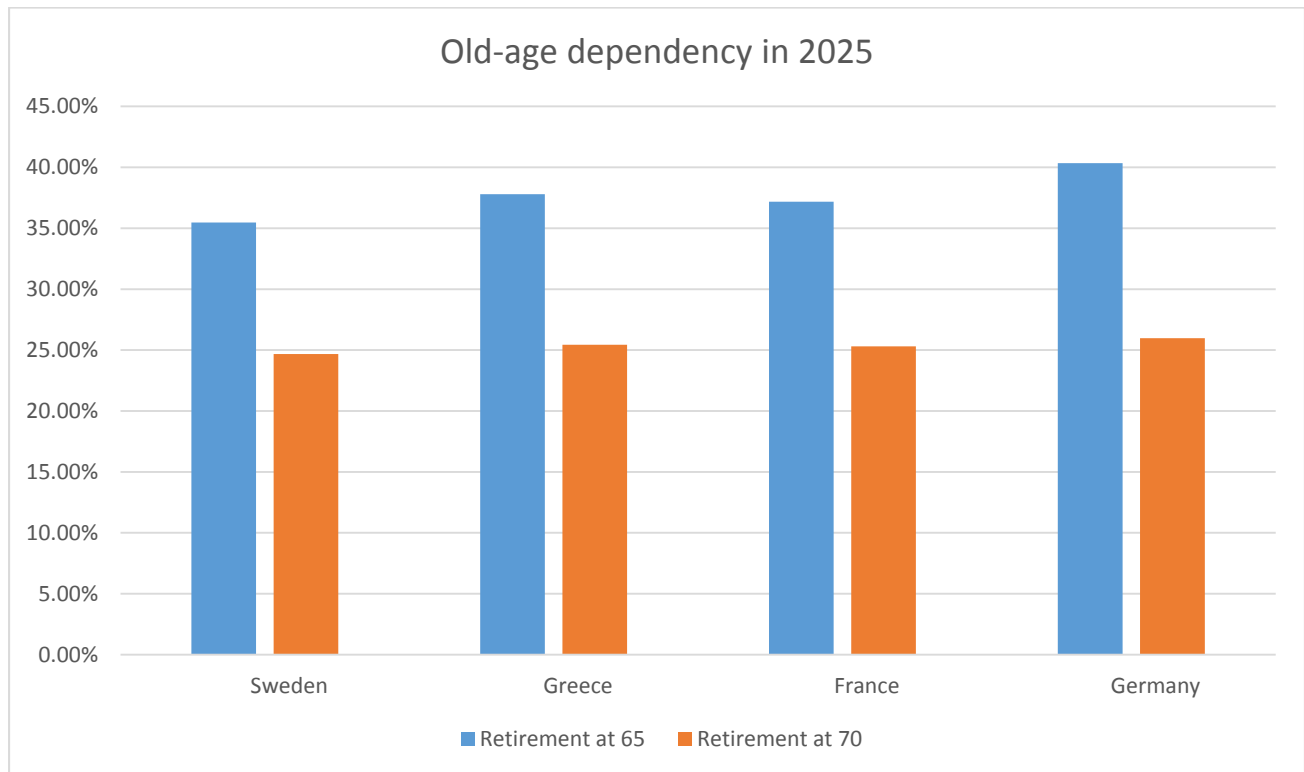
Sweden's projections on old-age dependency are not as pessimistic as Greece's are, however, that is mainly due to its already high net migration. For that reason, although the ratios of extra migrants that Sweden needs are comparable to Greece's ratios, when the normal migrant inflow is added, Sweden has higher ratios than Greece. More specifically, a 5-year immigration plan to maintain the old-age dependency ratio would require Sweden to receive an extra 77 thousand new migrants per year, or a total of 388 thousand in 5 years. Sweden's ratio of extra migrants by 2020 would be 3.97%, but if we bring normal migration inflows into the calculation, that ratio becomes a 5.85%. Nevertheless, the 5-year plan

looks better than the potential 10-year plan for Sweden. The 10-year plan would require Sweden to receive an extra 74 thousand immigrants per year, or a total of 740 thousand. The annual ratio of extra immigrants is as low as 0.76%, however, when the normal migration inflow is added that ratio jumps to 1.17% of new immigrants per year. Under such an immigration plan, the total ratio of new immigrants to current population in 2025 would be 11.31%. That means that by 2025 around 1 out of 9 people in Sweden would be new immigrants.

Out of the four countries, Greece seems to be the country that a replacement migration plan would have the least demographic impact. Nevertheless, Sweden is probably the most suitable country out of the four to follow such an immigration program. Sweden's ratios are very close to the ones Greece has and the Swedish attitudes towards replacement migration are much more favorable than the Greek attitudes (55% to 25% approval rate).

A big part of the literature agrees that migration or refugee inflows can be beneficial for the hosting economies. So there are definitely benefits in the case of the asylum seeker influx in Europe. Nevertheless, the refugee influx does not seem to be able to cover the needs of the European countries. For the next 5 years, the only countries that can completely balance their working force by accepting more refugees are the smaller countries, such as Greece and Sweden. So, the ageing population problem can be postponed in the short-term for some European countries, thanks to the asylum seekers. But population ageing is a long-term problem and the asylum seekers are only a small breath for Europe. The problem of population ageing is almost impossible to solve just with immigration. The asylum seeker influx is a great example of that. Even when such a large amount of workers enter the population, the ageing cannot really stop. That means that we need to take other measures that could counterbalance the effects of increasing old-age dependency ratios. The first that comes in mind, and that has been proposed by authors such as Coleman (2008), is the increase in retirement age. Life expectancy in the 1960s in the European Union was around the 70 years of age, while now it is around the 80 years. It makes

sense to increase the retirement age by at least half the amount of years that life expectancy has increased. An increase of the retirement age from 65 to 70 years of age would keep people in the labor force for a longer time and would help in the ageing population problem in two ways. First, it would increase the labor force and decrease the old-age dependents. Second, it would increase public retirement plan earnings and decrease public retirement spending. European Union members have to mutually understand that ageing population is a big problem and they must implement a higher retirement age. In **Figure 14** we see the potential old-age dependency ratios that the EU would have if it gradually implemented a program that would make people retire at age 70 by 2025.



**Figure 14** – Data Source: UN Population Division, World Population Prospects, 2015 Revision

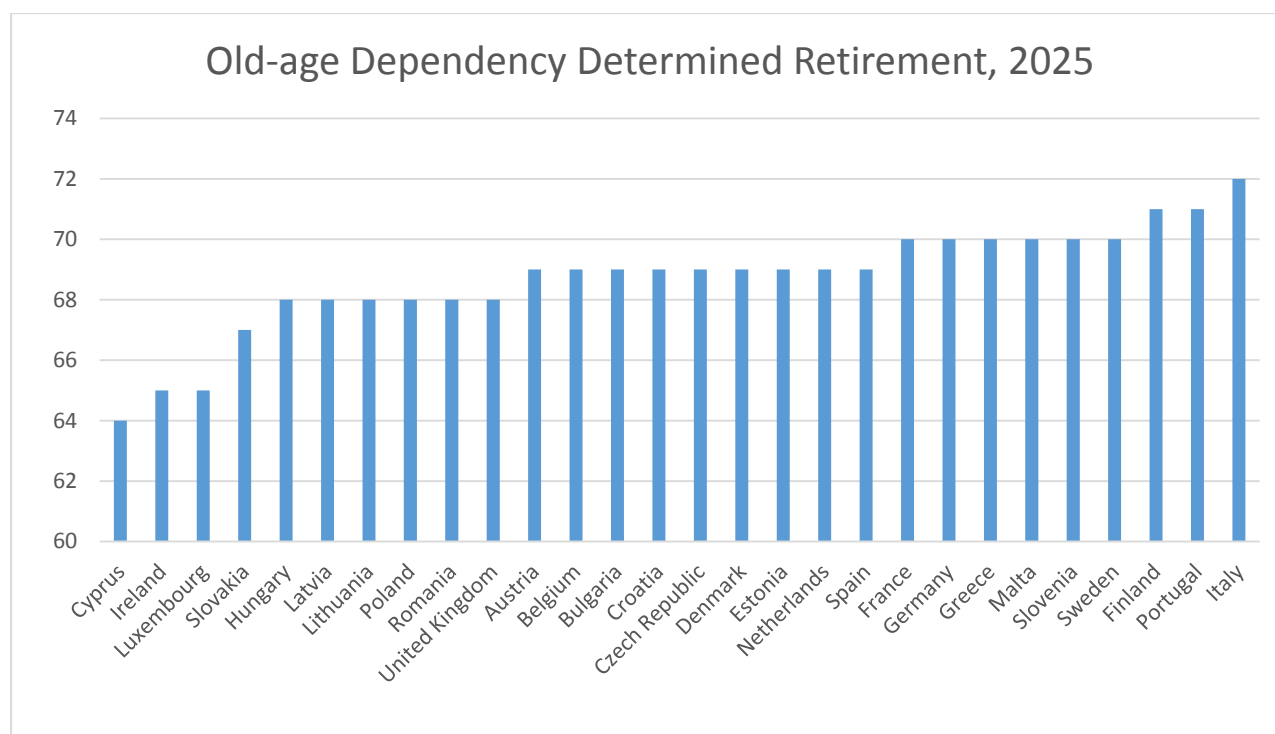
Usually the most populated subgroup in the 65+ age group is the 65-69 group, so the decrease in the old-age dependency ratio should not come as a surprise. What is very interesting in this higher retirement age scenario is that all countries reached an old-age dependency ratio around 25%. What is

even more interesting is the magnitude of old-age dependency convergence under the 'retirement at 70' scenario. For instance, Sweden and Germany's 'retirement at 65' dependency ratios are 35.47% and 40.35 respectively, while their 'retirement at 70' dependency ratios are 24.67% and 25.95%. So, the difference between the two countries' dependency ratios decreased from 4.88 percentage units to 1.28 percentage units. According to this convergence, if we had decided to choose first the desirable old-age dependency and then the corresponding retirement age, the results would be similar. Maybe the retirement age should be shaped by the old-dependency rate and not the other way around. Even if such a plan is not realized, there must be a stricter application of retirement at the age of 65, because -just as Bijak et al. (2008) pointed out - the real retirement age is usually lower than the legally-defined one. Next, I am going to propose a simple retirement age model that is derived from an old-age dependency target ratio.

### **Old-Age Dependency Based Retirement**

Pension reform has already been suggested as a solution to ageing population in past literature (Pichelmann and Roeger 2004; Boongarts 2004; Coleman 2008). Pension reform could mean many things, such as increasing the retirement age (Coleman 2008), decreasing pension benefits or getting rid of the widely established pay-as-you go systems (Boongarts 2004). Normally, authors come to the conclusion that there is a need for pension reform after observing the increasing old-age dependency ratios. Nevertheless, I am about to present a simple retirement-age system that is based on a target old-age dependency ratio (25%). In this system, it is not retirement age that determines the old-age dependency ratio, but the other way around.

In **Figure 15** we see how the retirement ages would be shaped by 2025 if the European Union gradually implemented a system under which retirement age is always the retirement age that results in an old-age dependency ratio of 25%. The retirement ages have been adjusted so that each country has a



**Figure 15** – Author's calculations based on data from: UN Population Division, World Population Prospects, 2015 Revision round retirement age. For instance, if a country needed a retirement age of 65.8 in order to reach a 25% old-age dependency ratio, then its suggested retirement age would be 66; and if a country needed a retirement age of 65.3 in order to reach the old-age dependency target, the suggested retirement would be 65.

As expected, under this retirement scheme, there would be large disparities across EU members' retirement ages; "young" Cyprus will enjoy a low retirement age of 64, while "old" Italy will have to retire at the late age of 72. **Figure 15** also reveals three main groups of retirement ages. Most of the EU countries will be retiring between the ages of 68 and 70 (21 out of the 28), that is the "middle" group. We then have two outlier groups of countries. The second group is the group of the "young" countries; Cyprus, Ireland and Luxembourg, with retirement ages between 64 and 65. The third group is the group of the "old" countries; Finland, Portugal and Italy, with retirement ages between 71 and 72. In the middle group of countries we can add Slovakia, which has a potential retirement age of 67 and fits better with that group than the "young" group.

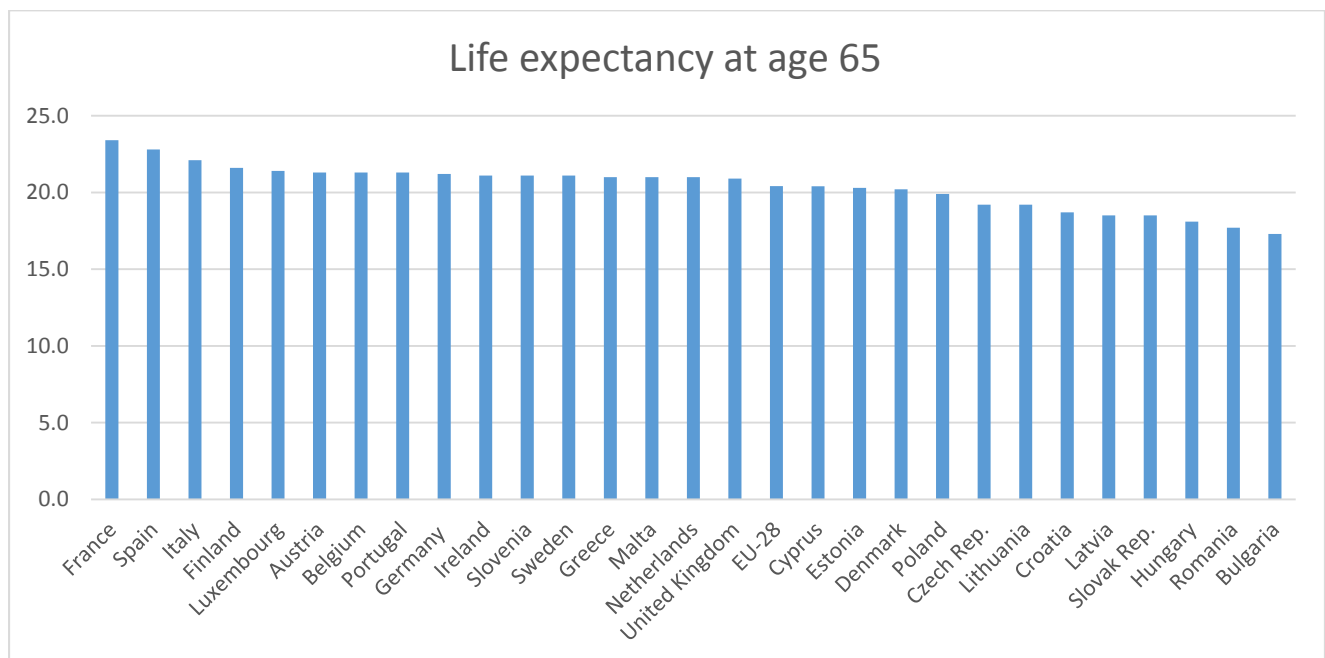


The "middle" group is not of big concern, since the retirement ages among its members are relatively homogenous. There is definitely a concern though when it comes to the large retirement age difference between the "young" and the old group. Politically, it would be very hard to increase the retirement age to 72 in Italy, while Cypriots retire 8 years earlier. One solution to this problem could be a retirement age floor and a ceiling. For instance, the lowest retirement age could be 65 and the highest 70. That way the implementation of such a program becomes more realistic, both in a social and a political perspective. In that case, some countries would diverge from the old-age dependency target, but that might be a necessary sacrifice in order to make such a program possible. Most people do not like the prospect of a higher retirement age, an example of that is Greece in 2010. As part of the new memorandum, the country had to increase its retirement age from 61 to 63 and the Greek people protested against the decision for months. The low real retirement age in Greece is also an example of how much lower retirement ages are in practice; just like Bijak et al. pointed out in 2008.

An admittedly optimistic implication of such a retirement scheme could be an increase in positive immigration attitudes. That increase in positive immigration attitudes could be caused by the fact that, under this program, the higher the immigration, the lower the retirement age. For instance, Portugal could decrease its retirement age by a year if it received 30 thousand extra working-age immigrants per year until 2025. Of course, this kind of logic would have to be promoted by the government as well. A potential motivation for more positive attitudes towards immigration would be welcomed, but it is not necessarily the main implication of this program. As we saw in **Figure 6**, very few EU members are significantly positive to immigration as a solution to the ageing population, and to argue that this program would completely change that picture would be, to the very least, optimistic. Another positive effect of this policy is that thanks to the increase in the working-age group, the young-age dependency ration will slightly decrease as well (1-2%). There is also a potential health benefit in working during an older age. For example, in their

review of the available literature, Anderson et al. (2014) point out that volunteering and staying active at an old age brings a variety of positive effects in the form of cognitive, psychological and physical benefits.

This program could be considered controversial because it requires significant retirement age increases. Many people find the potential of a longer participation in the labor force unreasonable. Nevertheless, this type of reactions are misinformed. In **Figure 16** we see the number of years that people are expected to live once they have reached the 65 years of age.



**Figure 16** – OECD 2014

The figure demonstrates that EU countries live long, especially after they reach the age of 65. Someone who retires at 65 in Spain will live almost 23 more years on average, which is 23 years of pension benefits. Of course, one can argue that the fact that someone is still alive does not mean that they are also capable of working. In **Figure 17** we see the expected number of years that a person is expected to live healthy (with no disability or activity limitation) when she reaches the age of 65.

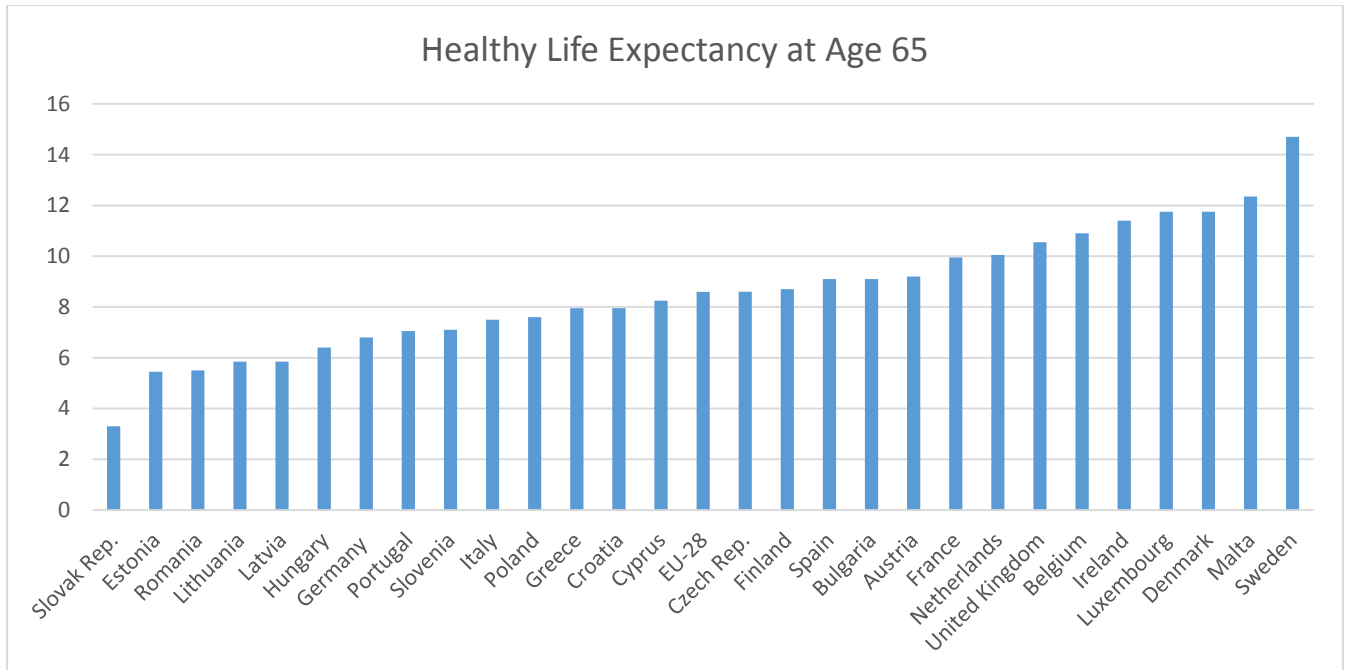


Figure 17 – OECD 2014

Except for Slovakia, most 65-year-olds in the EU are expected to live a healthy life even after the age of 70. **Figure 17** once more highlights the differences in the demographic situations of the member countries. Slovaks are expected to stay healthy for a little longer than 3 years after they reach 65, while Swedish are expected to stay healthy for almost 15 more years.

All these differences across the European demography are bringing to light the best aspect of this kind of retirement age program, which is that it provides an EU wide solution while treating each member separately. The EU needs policies that can apply fairly to all its members, but at the same time take into account their individual needs. This is obviously not a complete policy proposal, but it is a good example of the direction at which Europe should head in order to deal with its aging problem.

## Conclusion

Europe is faced with two major problems, an ageing population and a high asylum seeker influx. According to this paper, the second problem could only ameliorate the first. Nevertheless, Europeans do not seem willing to accept it as a partial solution, even if the literature supports that there will not necessarily be a significant effect on their social cohesion and capital. The ageing population is a real danger to EU economies and even the very large numbers of asylum seekers are not enough to fix the immense ageing problem that Europe is facing. Some smaller European countries such as Sweden and Greece could solve their ageing problem in the short-term by admitting more refugees. For larger in population states such as Germany and France the required numbers of extra immigrants are too high to be satisfied by the refugee population, even in the shorter-term. Nonetheless, the refugees could potentially benefit the European economies by partially decreasing its ageing process and increasing its labor market performance. EU members like Sweden and Finland could be the ideal host countries for refugees, thanks to their positive attitudes towards replacement migration and their need for a higher working-age population. Those countries could benefit by a system that promotes accelerated incorporation of refugees in their labor force.

Replacement migration can play a big part, but it cannot be the solution to this problem. Europe has to tackle its ageing population problem in more than one ways. Higher fertility, pension and healthcare reform, and higher labor participation are much needed. More specifically, the retirement age has to rise to better represent the life expectancy and healthy life expectancy in Europe. The typical retirement age has stayed at the 65 years of age in most parts of the world for more than 100 years. Life expectancy in the early 20th century was less than 50 years; in today's Europe life expectancy has reached the 80 years. It is irrational to maintain the same retirement age while our lives are getting so much longer and healthier. As a society, we have to redefine what retirement means. Retirement should not be the award for being part of the labor force for a few years, it should rather be the time in our lives that we are not

capable of working anymore. On top of that, the real retirement rates seem to not reflect the theoretical benchmark of 65 years. In practice, that creates an even smaller labor force and more old-age dependents.

For these reasons, we might want to consider that the retirement age shouldn't set the old-age dependency ratio, but the old-age dependency ratio should set the retirement age. Higher fertility rates could reduce Europe's ageing problem, but they cannot solve it, because low fertility is not the problem. The real problem is that we stop working much before the time that we actually become unable to work. Europe must set an old-age dependency goal and adjust its retirement age according to that. An old-age dependency rate around 25% seems logical and will set most EU members' retirement age between 68 and 70. A higher retirement age in combination with increased replacement migration, more effective incorporation of immigrants and refugees, higher labor participation, and slightly increased fertility rates through fertility-targeting programs, can eradicate the negative economic effects of the ageing population.

What makes the old-age dependency based retirement age plan special is its ability to provide the EU with a common policy while managing to accommodate each country's demographic characteristics and needs. Of course, there should be a more extensive analysis regarding the form that the policy would take in practice. Moreover, the feasibility of the plan should be examined both in economic and in sociopolitical terms. To conclude, it looks like the problem is not that we are getting old. The problem is that we do not want to change the way we operate, even if it is for our own benefit.

## References

- Ackermann, M., & Freitag, M. (2015). What actually matters? understanding attitudes toward immigration in Switzerland. *Swiss Political Science Review*, 21(1), 36-47.  
doi:<http://onlinelibrary.wiley.com/journal/10.1002/%28ISSN%291662-6370/issues>
- Albanese, G., & de Blasio, G. (2014). Who trusts others more? A cross-European study. *Empirica*, 41(4), 803-820. doi:<http://link.springer.com/journal/volumesAndIssues/10663>
- Alesina, A., Devleeschauwer, A., Easterly, W., Kurlat, S., & Wacziarg, R. (2003). Fractionalization. *Journal of Economic Growth*, 8, 155-194.
- Alesina, A., & La Ferrara, E. (2002). Who trusts others? *Journal of Public Economics*, 85(2), 207-234.  
doi:<http://www.sciencedirect.com/science/journal/00472727>
- Anderson, N. D., Damianakis, T., Kröger, E., Wagner, L. M., Dawson, D. R., Binns, M. A., Bernstein, S., Caspi, E., Cook, S. L., & The BRAVO Team (2014, August 25). The Benefits Associated With Volunteering Among Seniors: A Critical Review and Recommendations for Future Research. *Psychological Bulletin*. Advance online publication.  
doi: <http://dx.doi.org/10.1037/a0037610>
- Berk, J., & Weil, D. N. (2015). Old teachers, old ideas, and the effect of population aging on economic growth. *Research in Economics*, 69(4), 661-670.  
doi:<http://www.sciencedirect.com/science/journal/10909443>
- Bermingham, J. R. (2001). Immigration: Not a solution to problems of population decline and aging. *Population and Environment*, 22(4), 355-363. Retrieved from <http://www.jstor.org/stable/27503749>
- Bijak, J., Kupiszewska, D., & Kupiszewski, M. (2008). Replacement migration revisited: Simulations of the effects of selected population and labor market strategies for the aging Europe, 2002-2052. *Population Research and Policy Review*, 27(3), 321-342.  
doi:<http://link.springer.com/journal/volumesAndIssues/11113>
- Bongaarts, J. (2004). Population aging and the rising cost of public pensions. *Population and Development Review*, 30(1), 1-23.  
doi:<http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291728-4457/issues>
- Bourdieu, P. (1986). Forms of capital. ["Ökonomisches Kapital, kulturelles Kapital, soziales Kapital."] *J. Richardson (Ed.) Handbook of Theory and Research for the Sociology of Education*, , 241-258.

- Bridges, S., & Mateut, S. (2014). Should they stay or should they go? attitudes towards immigration in europe. *Scottish Journal of Political Economy*, 61(4), 397-429.  
doi:<http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291467-9485>
- Calahorrano, L. (2013). Population aging and individual attitudes toward immigration: Disentangling age, cohort and time effects. *Review of International Economics*, 21(2), 342-353.  
doi:<http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291467-9396/issues>
- Caldwell, J. C., Caldwell, P., & McDonald, P. (2002). Policy responses to low fertility and its consequences: A global survey. *Journal of Population Research*, 19(1), 1-24. Retrieved from <http://www.jstor.org/stable/41110736>
- Campos, N. F., Saleh, A., & Kuzeyev, V. (2011). Dynamic ethnic fractionalization and economic growth. *Journal of International Trade and Economic Development*, 20(2), 129-152.  
doi:<http://www.tandfonline.com/loi/rjte20>
- Ceobanu, A. M., & Koropecj-Cox, T. (2012). Should international migration be encouraged to offset population aging? A cross-country analysis of public attitudes in europe. *Population Research and Policy Review*, 32, 261. doi:10.1007/s11113-012-9260-7
- Choi, K., & Shin, S. (2015). Population aging, economic growth, and the social transmission of human capital: An analysis with an overlapping generations model. *Economic Modelling*, 50, 138-147.  
doi:<http://www.sciencedirect.com/science/journal/02649993>
- Coleman, D. A. (2001). Replacement migration, or why everyone is going to have to live in korea: A fable for our times from the united nations. *The Royal Society of London*, 357, 583-598. doi:DOI 10.1098/rstb.2001.1034
- Coleman, D. (2008). The demographic effects of international migration in europe. *Oxford Review of Economic Policy*, 24(3), 452-476. doi:<http://oxrep.oxfordjournals.org/content/by/year>
- Coleman, J. S. (2003). Social capital in the creation of human capital. In E. Ostrom, & T. K. Ahn (Eds.), (pp. 159-184) Elgar Reference Collection. Critical Studies in Economic Institutions, vol. 2; Cheltenham, U.K. and Northampton, Mass.; Elgar; distributed by American International Distribution Corporation, Williston, Vt. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&db=eoh&AN=0790487&site=ehost-live>
- Cortes, K. E. (2004). Are refugees different from economic immigrants? some empirical evidence on the heterogeneity of immigrant groups in the united states. *Review of Economics and Statistics*, 86(2), 465-480. doi:<http://www.mitpressjournals.org/loi/rest>

- Dalla Zuanna, G. (2006). Population replacement, social mobility and development in Italy in the twentieth century. *Journal of Modern Italian Studies*, 11(2), 188-208.  
doi:10.1080/13545710600658560
- Diaconu (Maxim), Laura. (2015). *Ageing population: Comparative analysis among European Union states*. Unpublished manuscript. Retrieved from  
[http://search.ebscohost.com/login.aspx?direct=true&db=eoh&AN=1495490&site=ehost-live;](http://search.ebscohost.com/login.aspx?direct=true&db=eoh&AN=1495490&site=ehost-live)  
[http://ceswp.uaic.ro/articles/CESWP2015\\_VII1\\_DIA.pdf](http://ceswp.uaic.ro/articles/CESWP2015_VII1_DIA.pdf)
- Duwicquet, V., Mouhoud, E. M., & Oudinet, J. (2014). International migration by 2030: Impact of immigration policies scenarios on growth and employment. *Foresight*, 16(2), 142-164.  
doi:<http://www.emeraldinsight.com/journals.htm?issn=1463-6689>
- Espenshade, T. J., Bouvier, L. F., & Arthur, W. B. (1982). Immigration and the stable population model. *Demography*, 19(1), 125-133. doi:<http://link.springer.com/journal/volumesAndIssues/13524>
- Futagami, K., & Nakajima, T. (2001). Population aging and economic growth. *Journal of Macroeconomics*, 23(1), 31-44. doi:<http://www.sciencedirect.com/science/journal/01640704>
- Gesthuizen, M., van der Meer, T., & Scheepers, P. (2008). Ethnic diversity and social capital in Europe: Tests of Putnam's thesis in European countries. *Nordic Political Science Association*, 32(2), 121.  
doi:10.1111/j.1467-9477.2008.00217.x
- Godet, M. (2006). Europe: Gray hair and low growth. *Foresight*, 8(2), 10-29.  
doi:<http://www.emeraldinsight.com/journals.htm?issn=1463-6689>
- Green, E. G. T., Sarrasin, O., Fasel, N., & Staerkle, C. (2011). Nationalism and patriotism as predictors of immigration attitudes in Switzerland: A municipality-level analysis. *Swiss Political Science Review*, 17(4), 369-393. doi:<http://onlinelibrary.wiley.com/journal/10.1002/%28ISSN%291662-6370/issues>
- Hooghe, M., Reeskens, T., Stolle, D., & Trappers, A. (2009). Ethnic diversity and generalized trust in Europe; A cross-national multilevel study. *Comparative Political Studies*, 42(2), 198.
- Ivlevs, A. (2012). Ageing, local birth rates and attitudes towards immigration: Evidence from a transition economy. *Regional Studies*, 46(7), 947-959. doi: <http://www.tandfonline.com/loi/cres20>
- Missing Migrants (May 2016). Migration Flows Europe: Arrivals and Fatalities. International Organization for Migration, Mediterranean Update  
[https://missingmigrants.iom.int/sites/default/files/Mediterranean\\_Update\\_3\\_May\\_2016.pdf](https://missingmigrants.iom.int/sites/default/files/Mediterranean_Update_3_May_2016.pdf)
- OECD and EU. (2014), *Health at a Glance: Europe 2014*, OECD Publishing, Paris.  
doi: [http://dx.doi.org/10.1787/health\\_glance\\_eur-2014-en](http://dx.doi.org/10.1787/health_glance_eur-2014-en)



- Pichelmann, K., & Roeger, W. (2004). The EU growth strategy and the impact of aging. *Review of International Economics*, 12(2), 213-232.  
doi:<http://onlinelibrary.wiley.com/journal/10.1111/%28ISSN%291467-9396/issues>
- Pichler, F., & Wallace, C. (2007). Patterns of formal and informal social capital in europe. *European Sociological Review*, 23, 423. doi:10.1093/esr/jcm013
- Putnam, R. D. (2000). *Bowling alone : The collapse and revival of american community* New York : Simon & Schuster, c2000. Retrieved from  
<http://lib2.skidmore.edu:2048/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=cat02943a&AN=skid.271321&site=eds-live&scope=site>
- Putnam, R. D. (2007). *E pluribus unum: Diversity and community in the twenty-first century* the 2006 johan skytte prize lecture. *Nordic Political Science Association*, , 137.
- Roed, M., & Schone, P. (2012). Does immigration increase labour market flexibility? *Labour Economics*, 19(4), 527-540. doi:<http://www.sciencedirect.com/science/journal/09275371>
- Rose, R. (1994). Postcommunism and the problem of trust. *Journal of Democracy*, 5, 18.
- Saczuk, K. (2013). Development and critique of the concept of replacement migration. In M. Kupiszewski (Ed.), (pp. 233-242) *Springer Series on Demographic Methods and Population Analysis*, vol. 32. New York and Heidelberg: Springer. Retrieved from  
<http://search.ebscohost.com/login.aspx?direct=true&db=eoh&AN=1460911&site=ehost-live>
- United Nations. (2000). *Replacement migration: Is it a solution to declining and ageing population?* (Population Division).Department of Economic and Social Affairs.
- United Nations. (2015). *World population prospects: The 2015 revision, key findings and advance tables*. (Population Division).Department of Economic and Social Affairs.
- Weil, D. N. (1997). The economics of population aging. In M. R. Rosenzweig, & O. Stark (Eds.), (pp. 967-1014) *Handbooks in Economics*, vol. 14; Amsterdam; New York and Oxford; Elsevier Science, North-Holland. Retrieved from  
<http://search.ebscohost.com/login.aspx?direct=true&db=eoh&AN=0520562&site=ehost-live>