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Influence of demographic factors on the public pension spending

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Abstract: Demographic aging is a global phenomenon encountered especially in the developed states and is manifesting by the increase the share of people aged over 60-65 years in total population, a process that will affect all areas of the world in this century.

In the coming decades, population aging will put pressure on public spending in areas such as pensions and health care for the population aged 60-65 years. Moreover, the need to increase the share of these spending in total public expenditures will generate big problems in a way that budgets for other areas may suffer considerable discounts. The study aims to analyze the changes that may occur in the structure and volume of spending on social security (pensions) as a result of changes in demographic factors.

Keywords: demographic aging, social security spending, demographic factors, budget

JEL Classification: H51, J11, J14

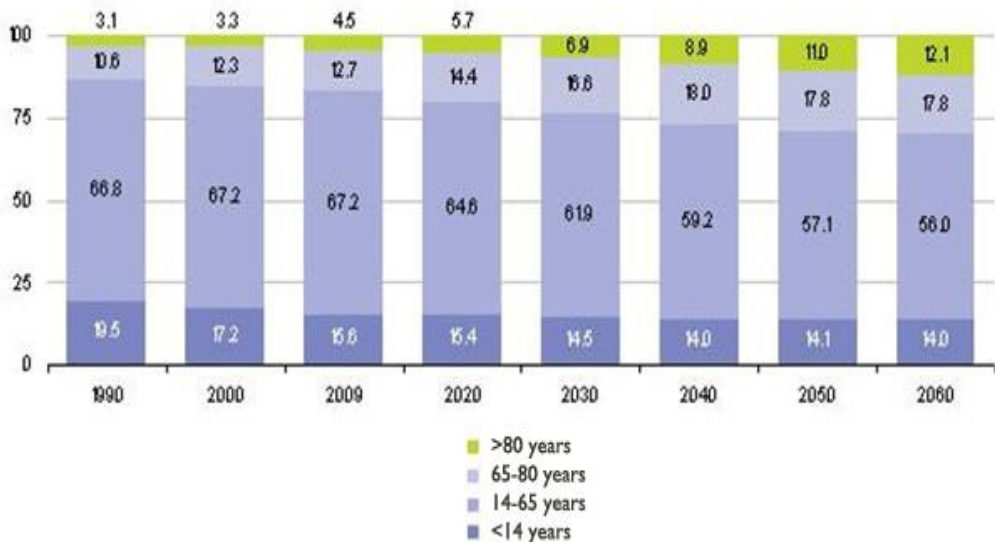
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1. Introduction

Demographic aging is the result of two fundamental changes: reduced fertility and increased life expectancy. In most of the developed world countries is experiencing a fertility decline or stagnant levels of fertility below replacement level and especially those highly developed record a considerable increase in life expectancy (Muenz, 2005). An example of this is the statistics of the European Union states, especially those in the central and western areas where demographic aging reaches a very high rate. Therefore the analysis of this study focuses mainly on the countries of this region, in order to see if the assumptions are relevant.

Economic Policy Committee projections for the Western and Central Europe for 2020 are that working population will decline by more than 12.8%. One of the consequences of these demographic changes could be the increase in public spending on pensions from 9.4% to 12.8% of GDP by 2060 as a result of the increasing number of retirees, the reduce of the average pension and a shortage of work, which leads to increase labor market dependency of older people (Duval, 2003).

Figure 1. The evolution of the structure of the population in EU 27 between 1990-2060



Source: Eurostat

2. Aspects from the literature

In 2010, EU Member States spent about 9.4% of GDP on public pensions. During this period, the public pension spending reached a high level in Austria (12.7% of GDP), Italy (14%), Greece (11.6%) and France (13.5%) all having pension system based on the working people earnings, paying pensions according to the retirement income from previous years. Compared to Austria and Italy, countries such as Ireland (4.1% of GDP) spent on public pensions only a third, while in Netherlands (6.5% of GDP) and UK (6.7% of GDP) these expenditures are approximately half. All three countries have a public pension funds in the form of fixed rate, based on the resident, while a significant part of the pension is offered by pension funds (Bouis and Duval, 2011)

According to projections made by the Economic Policy Committee until 2060, the average public spending on pensions will increase by 2.4 pp to 3.9 pp of GDP, up from 12,8 pp to 14,3 pp of GDP. In the absence of reforms, the pension spending is expected to grow by 8.8% in Spain, 9.2% in Romania or 12.4% in Greece.

In the most pessimistic simulations, it is possible that, on average, 25% of total public spending of EU countries to be allocated to support public pension plans. This development will aggravate the chance to achieve balanced state budgets and to reduce public debt under the Stability and Growth Pact. Their growth will peak around the year 2040 when the high mortality among baby-boom generation will begin to gradually reduce the fiscal burden of aging. In the literature there are many studies that suggest that there is a real need for change in the social security systems in use in order to avoid deficits in other countries also (Roşca and Rădoi, 2012).

Due to demographic changes and the fact that the government will spend more on pensions, several measures have been implemented at European level such as increasing the retirement age, early retirement reduction, restriction where a person may benefit from early retirement. All these measures were taken due to the constant increase of the coating rate for pensions spending (King and Jackson, 2002).

$$\text{Coating rate} = \frac{\text{Number of beneficiaries}}{\text{Populatin over 65 years}}$$

In 2013, the European Union average of this ratio is 140%, so we conclude that there are more beneficiaries of the pension system than the population older than 65 years. For the coming years, thanks to the measures taken, it is expected that by 2060, the coating rate to fall by at least 30 pp. In Romania, this level exceeded 178%, which explains the low performing public pension system, but this situation is not new, because it persist for more than 20 years (Preda, 2004). There are also other indicators that confirms the low performing Romanian public pension system like the collection rate for social insurance contributions or the low development of the public pension sector (Miricescu, 2012).

3. Database, methodology and discussions

In this section we analyze the impact of the pension system on individual decision to retire as he conceived in most countries of the European Union. In the following we will demonstrate that the current legislation governing pension schemes in EU countries offer incentives for early retirement and not for further work, which is extremely important for understanding the current trend of social security contributions. The database contains different variables related to pension spending for all European Union state for the year 2010, data provided by Eurostat. The figures and research methodology are conducted according with Bouis and Duval (2011)

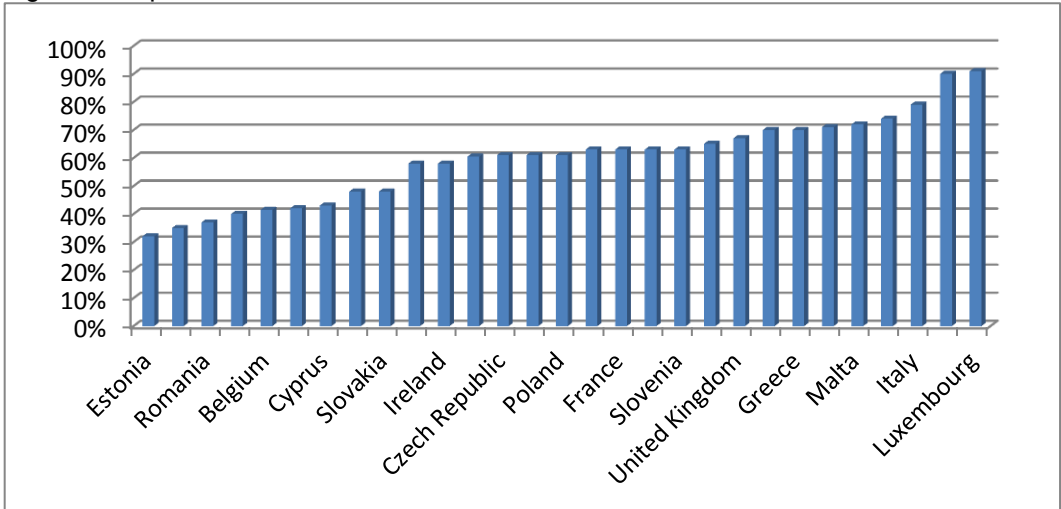
It is well known that the age of eligibility for retirement of an employee is not necessarily the same age when someone usually retires. In many cases it is possible for an extension of working lives which would be beneficial to employees because they have a theoretically higher income than the pension, for the employer that has an experienced employee and also for the state because the employee contributing to the budget social insurance (Moffitt, 1999; Lee, 2003). However, the statistics shows that the difference between the two ages is almost nonexistent due to factors such as that the people usually retire at the retirement age, the lack of information on opportunities for further work or the lack of possibility to continue to work even if it is required.

The retirement age varies across the EU Member States in 2010 between 60-62 years (France, Belgium, Malta) and 65-67 years (Estonia, Poland, Sweden) and the most frequently occurring value currently is 65. These figures have seen a trend of stagnation until the late 60s, is declining on the 70s-80s years and from the 90s countries are trying to get a rise in the number of taxpayers and a decrease in the number of beneficiaries, a solution that is shown to be the most appropriate to avoid a budget crisis or a too high tax burden.

To understand these developments we will analyze the dependence relation that exists between the employment rate, retirement age, and two indicators: the replacement rate and the default rate to continue work. Theoretically speaking, the employment rate should not be affected by retirement age, if we start on the premise that contributions can be interpreted as equal to the present value of the pensions and if the pension growth rate is equal to rate inflation. In practice, however, things are not so precisely because of demographic factors (changes in the structure of taxpayers and beneficiaries) which usually cannot be controlled. This can easily become a vicious circle: an unjustified increase of pension will leads to an increase in consumption of pensioners and therefore performed in a further increase in the demand for pensions and in this way ever more people will want to benefit from these advantages and retire (Poterba, 1998).

To overcome this problem is important to define the replacement rate. This is a ratio between the average pension and average earnings per capita (or GDP per capita). It also measures the benefit of a pension or its rate of profitability (if the pension recipient gained the average GDP/capita). The disadvantage of using the replacement rate is the fluctuations in the values measured and the difficulty in calculating it. However, this indicator remains the most direct indicator of the generosity of a pension granted: such correlations can be made between different countries and in this way can decide by comparing similar data whether there is a direct correlation between the share of population over 65 years and the rate of replacement.

Figure 2. Replacement rate in 2010 in the EU 27



Source: A remake and update after Duval R., The retirement effects of old-age pension and early retirement schemes in OECD countries

The analysis shows that the average value in the European Union is around 60%, this means that if a person retires, he will gain only 60% of his initial earnings. There are states like Estonia, Bulgaria or Romania where the retirement rate is very low and so we expect that the citizens are willing to continue at their work place than to retire. In other states (Luxembourg, Spain, Italy) the retirement rate has a high value and there is a possibility that the citizens are willing to retire than to continue work.

The implicit tax on continued work is an indicator closely related to the pension wealth that an individual can have. The pension wealth can be determined as the present value of the future income from pension and is an indicator of the generosity of a pension larger than the replacement rate. A change in net pension wealth as a result from an additional year work (additional benefits minus any additional contributions) can be seen as a tax if we record a negative amount and as a subsidy if we record a positive amount.

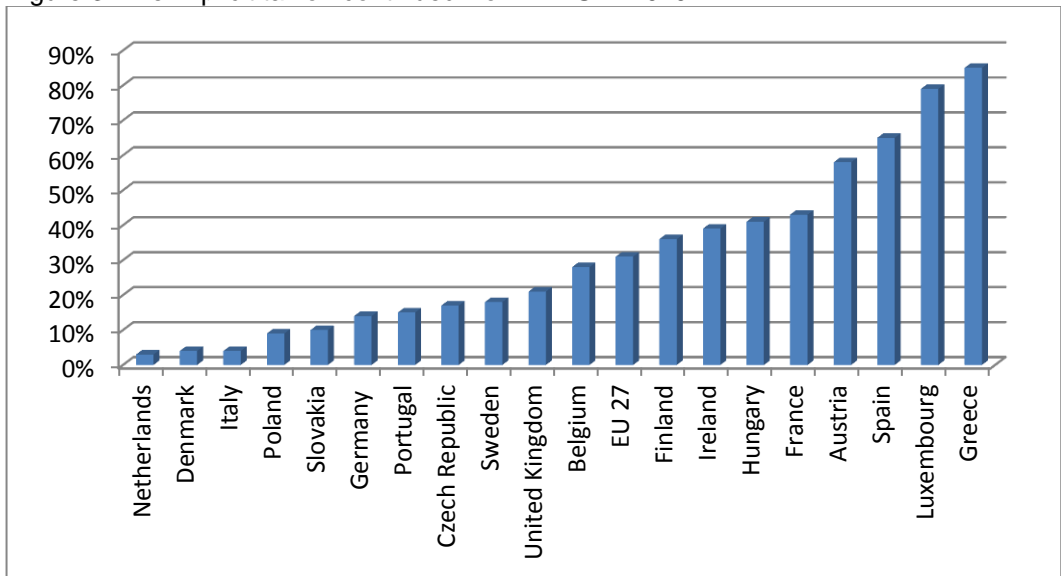
The implicit tax on continued work (%)

$$= \frac{\text{pension benefits} - \text{pension contribution}}{\text{Average income}}$$

Where: $\text{pension benefits} = \sum \frac{\text{Pension}}{(1+i)^n}$, i=inflation rate

The values recorded from these indicators can express the behavior of an individual, his reactions and attitudes related to retirement. In many cases if working an additional year can lead to a positive difference between the pension benefits and the contributions paid during this period, the right decision is to continue to work, if the two values are equal, the decision can be neutral, otherwise is considered that he pays a marginal tax. This effect directly affects the employee's decision to continue working or retire. In practice the most common effect is the tax which motivates early withdrawal from the labor market.

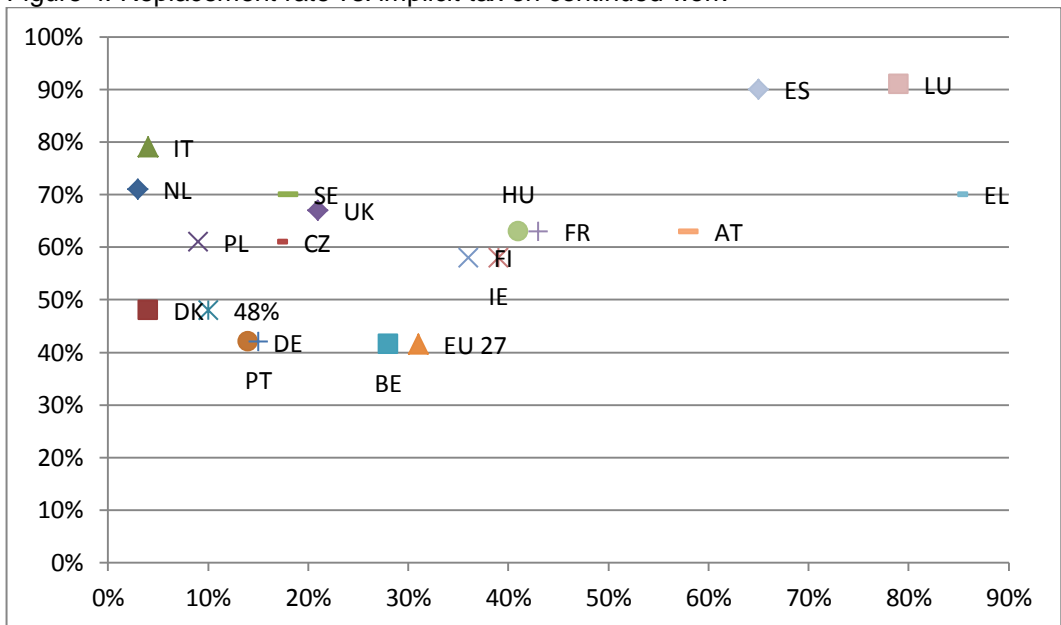
Figure 3. The implicit tax on continued work in EU in 2010



Source: A remake and update after Duval R., The retirement effects of old-age pension and early retirement schemes in OECD countries

If we analyze this data we can find a correlation between these two indicators: countries where there is a high replacement rate there are also high implicit tax on continued work (France, Luxembourg, Greece age 60 and Austria, Spain age 65). The same study also presents significant correlation (0.52) between the implicit tax on continued work for 55-59 year people and changes in the employment of persons between 55 and 59 years. The conclusion is simple: if the state provides pension about the same level as the average income realized by the employee, then that person will choose retirement.

Figure 4. Replacement rate vs. implicit tax on continued work



Source: A remake and update after Duval R., The retirement effects of old-age pension and early retirement schemes in OECD countries

In the end the conclusion is simple: people are encouraged to retire by the social systems because they tolerate the implicit tax on continued work.

We also conducted an empirical study to analyze the determinants of public pension spending in 2010. We created a regression model whose dependent variable is the public pensions spending per GDP and the independent variables are the share of population over 65 in the total

population, unemployment rate, GDP per capita growth (as a percentage) and public debt to GDP. Indicators were determined in each Member State of the European Union. The database was provided by Eurostat for the year 2010. The purpose of this research is to see which of the above factors are significant and influence the public pension spending and whether the correlation is positive or negative. The results are in the Table 1.

Table 1. Regression results

| Variable | |
|--------------------------|-----------------------------------|
| C | 0.61* (1.98) |
| Publid debt | 0.036*** (2.91) |
| Economic growth | 0.021 (0.082) |
| GDP/cap | -0.05 (-0.56) |
| Pop over 65 years | 0.46*** (2.98) |
| Unemployment rate | -0.71*** (-1.91) |

As can be seen from the table above, the significant variables are the public debt/GDP, population over 65 years/total population and the unemployment rate. While the first two variables are positively correlated with public pension spending, the unemployment rate has a negative correlation. So an increase in the unemployment rate is expected to reduce the spending on pensions and bring a growth in the unemployment spending.

Public debt is positively correlated with pension spending in 2010, but we cannot conclude that the EU member states cover the pension budget deficit with public loans. It is well known that the member states faced a difficult economic crises and it is possible that those with a high public pensions spending per GDP applied for public loans in order to finance other government spending. The population over 65 is also positively correlated, which is natural because with an increase in the

population who reaches the retirement age, will increase state spending on pensions for them.

4. Conclusions

The aging process directly affects public expenditure of the states due to the increase in public pension spending and the social security provided. Population over 65 is expected to have an increase of 12.8% over the next 50 years which will lead to increase public spending on pensions by an average of 2.4 to 3.9% of GDP in European Union.

People are encouraged to early retirement by the social systems because they provide a replacement rate (average pension relative to average income) and a implicit tax on continued work quite high in most of the European countries. From our analysis the public pension spending is influenced positively by the public debt, and age structure of the population and negatively by the unemployment rate.

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