DEMOGRAPHIC DYNAMICS AND SUSTAINABILITY OF PUBLIC PENSION EXPENDITURES WITHIN EUROPEAN UNION-15 MEMBER STATES

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Abstract
Recent demographic dynamics within the European Union member states urge public decision makers to find the right measures which could further on assure the sustainability of social public expenditures. Most of the specialised literature mainly highlights the macroeconomic variables which may affect the size of public pension expenditures. Nevertheless demographic effects, like fertility rate, old-age dependency ratio, effective retirement age or life expectancy are also important factors of the sustainability of social security expenditures, this also due to the latest economic approaches. Our econometric testing confirms the high relevance of all these variables upon public pension expenditures within EU-15 member states. Consequently, there should be some special measures which governments may consider in future public policies. We suggest that retirement should come later in citizens lives, but in order to enforce this new approach there is an urgent need of appropriate jobs which could be available for older generations. In fact the solution towards an increasing proportion of older people in nowadays society should be “active ageing”: encouraging older people to stay active and retire later. Also extremely important are the outcomes of targeting healthy and autonomous lives.

Key-words: demography, pensions, public expenditures, sustainability, government

JEL classification: H00, H55

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1. Introduction
The determinants of public pension expenditures are very important and should be one of the main concerns of present governments. We state the fact that nowadays public pension expenditures are significantly influenced by demographic matters and not only by macroeconomic variables. All this can be easily understood by focusing on the facts offered by the European Commission, Eurostat ([6]) through a very interesting statistical portrait, entitled “Active ageing and solidarity between generations A statistical portrait of the European Union”. This report indicates that the structure of the the European Union’s population is changing in time and the population is getting older. So, there were more than 87 million persons aged 65 and over on 1 January 2010 in the EU-27 (17.4 % of the total population) while data from 1 January 1985 shows that at that time there were only 59.3 million citizens aged 65 and over (12.8 % of the total population) [6].

At the same time, there was also registered an increase in life expectancy for the European Union’s member states within the last century, while in the latest period of time, the member states have experienced falling fertility rates. These demographic changes generated powerful effects regarding ageing and it is furthermore expected, that the ageing process will continue to remain one big problem for the next half century, as the percentage in total population of older persons is steadily growing. All these demographic changes are provoking significant concerns for families and individuals.

Governments should focus on this process, as the ageing of the population could determine serious constraints for public policies and budgets. At present, there are already important debates on future fiscal policies as a strong need for fiscal consolidation is required within EU member states, all this happening also because of the growing pressure regarding the sustainability of pension expenditures.

2. Literature review
Considering the main literature regarding the challenges with which governments were traditionally dealing, we may discover all those elements which underline the effects of macroeconomic parameters on the size of public...
pension expenditure and which could affect the sustainability of social security systems ([2], [4], [5], [7], [9]). However demographic effects, like fertility rate, life expectancy, migration or old-age dependency ratio, are also key elements which affect the sustainability of social security expenditures. In this respect we highlight the paper of Miroslav Verbic and Rok Spruk ([11]) who prove that demographic processes play a significant role as well, even a greater role sometimes than the role of macroeconomic parameters.

At the same time the European Union points out the obstacles occurred by population ageing and focuses on the challenges that arise from population aging reminding the future pressure exerted on public budgets including social security systems, and also revealing the higher demand for healthcare services and long-term (institutionalised) care. Another consequence upon the economy may concern the adjustment of the economy to an ageing labour force by shaping appropriately the existing workplaces. It is important to notice the fact that „for a developing country to have a sustainable development it must make efforts not only to increase its GDP but also to maintain a continuous trend of its increase”([3]).

In order to avoid social pressures, an important aspect to be considered is the limitation of unemployment and the focus on determining active living within the European Union. Consequently, according to EU policy, also one of the targets for the time horizon 2020 is to reach an EU-27 employment rate of 75 % for those aged 20-64. If this target is to be achieved then a higher proportion of the population needs to remain in employment up to a later age. The European Employment Strategy (EES) promotes several actions and guidelines targeted towards older people, including those measures calling for improved (occupational) health status and also appropriate incentives which keep citizens employed and discourage early retirement [6].

Eurostat population statistics shows that the median age has grown across population of the European Union. So, by 2060 the median age of the EU-27 population is projected to reach 47.6 years, which would be 15 years more than a century ago. Eurostat’s population projections suggest that there will be less than two people of working age (15 to 64 years) for every older person aged 65 or more in the EU-27 by 2060, which doubles the present ratio. Furthermore, it is important to be aware also of the fact that demographic dependency ratios may be further influenced by unemployment. The highest change in the size of the working age population is expected to come for the period from 2015 to 2035, when a large part of the babyboom population is expected to retire. Population projections do not indicate an important change regarding the total number of inhabitants in the EU-27 between 2010 and 2060. Anyway, the structure of the population will change and become much older. The modifications that are expected to come will represent a totally new impact, as there is no previous example of such an age distribution, meaning an inversed pyramid, with the older age classes bigger than the younger ones.

Furthermore, as discussed earlier, the impact of fertility on public pension expenditures seems to be significant ([11]; [8]). The empirical evidence suggests a negative relationship between age-related government spending and equilibrium fertility rates, anyway there should be considered an appropriate lag of time. In the same way, the literature suggests ([10]) that public pensions do respond strongly to the increases in old-age dependency ratio.

3. Methodology and results

The econometrical model we have chosen in order to prove the existing relation between total pension expenditure and demographic elements is a multifactorial regression and focuses on the following variables:
- Dependent variable: Pension expenditure as % of GDP: old age pension;
- Independent variables: old-age dependency ratio (population aged 65 and over/population between 15 and 64), fertility rate, life expectancy, gross saving and effective retirement.

The source of the data is Eurostat and World Bank (World Development Indicators) the time period 1995-2009 and the sample of countries is EU-15. The results of our model can be seen in the table below (Table no. 1):
Table no. 1 Results of the econometric model

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OLS</td>
<td>OLS</td>
<td>EGLS</td>
<td>EGLS</td>
</tr>
<tr>
<td></td>
<td>Fixed effects</td>
<td>Cross-section</td>
<td>weights</td>
<td>Robust</td>
</tr>
<tr>
<td>Fertility</td>
<td>-0.9678</td>
<td>-1.1055</td>
<td>-1.1968*</td>
<td>-1.1945*</td>
</tr>
<tr>
<td></td>
<td>(0.2291)</td>
<td>(0.8455)</td>
<td>(0.6924)</td>
<td>(0.6947)</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>0.0489</td>
<td>0.0720</td>
<td>0.0943</td>
<td>0.0940*</td>
</tr>
<tr>
<td></td>
<td>(0.6701)</td>
<td>(0.1682)</td>
<td>(0.0635)</td>
<td>(0.0665)</td>
</tr>
<tr>
<td>Gross saving</td>
<td>-0.1100**</td>
<td>-0.1115***</td>
<td>-0.1427***</td>
<td>-0.1412***</td>
</tr>
<tr>
<td></td>
<td>(0.0153)</td>
<td>(0.0164)</td>
<td>(0.0192)</td>
<td>(0.0197)</td>
</tr>
<tr>
<td>OADR</td>
<td>0.1658*</td>
<td>0.1567</td>
<td>0.0842*</td>
<td>0.0905**</td>
</tr>
<tr>
<td></td>
<td>(0.0999)</td>
<td>(0.1499)</td>
<td>(0.0439)</td>
<td>(0.0438)</td>
</tr>
<tr>
<td>Effective retirement</td>
<td>0.0243*</td>
<td>0.0117***</td>
<td>0.0443</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0518)</td>
<td>(0.0539)</td>
<td>(0.0345)</td>
<td></td>
</tr>
</tbody>
</table>

Observations: 208  208  208  208  
Number of countries: 15  15  15  15  
R-squared: 0.2137  0.2562  0.3759  0.3694  
Adj. R-squared: 0.1982  0.1810  0.3636  0.3601  
DW-stat: 1.9574  2.07  1.6239  1.6126  
Jarque-Bera: 1344.80  1561.092  14.0503  15.6268  
Prob: 0.0000  0.0000  0.0008  0.0004  

Standard errors in parantheses
***p<0.01, **p<0.05, *p<0.1

Notes: Public pension expenditure is the endogenous variable of the model. Standard errors are given in parantheses.
Asterisks * and ** denote significance at 5 percent and 10 percent level, respectively.
Source: Author’s calculation

The results seem to confirm most of the expected hypothesis. In this respect, fertility is definitely affecting pension expenditures, in the sense that low fertility rates (lower than the rate of replacement) determine an older structure of population and consequently higher pension expenditures. The result obtained reveals the negative relation between fertility rates and pension expenditures as % of GDP.

Life expectancy growth determines the growth of public pension expenditures, which could have been anticipated. Anyway, it seems that the high increase of life expectancy in the latest decades, did not change a lot the size of pension expenditures as % of GDP. This fact could be explained mainly by the steadily positive evolution of the economies in the western European countries and maybe also by the transition towards alternative private pension schemes within the EU-15 countries (the last fact is definitely developing within countries like UK, Ireland, Netherlands etc).

At the same time, the increase of the gross saving, might have diminished the pressure on the public pension expenditures. As the results show, gross savings have a negative effect upon the growth of public pension expenditures, this outcome proving the importance of future public policies which should encourage gross savings.

The last significant result confirms that old age dependency ratio determines the growth of public pension expenditures. However this influence was not very high for the countries considered and for the time period analysed. This might have also happened because of the migration of young and qualified workers from outside EU-15 towards the developed countries of the European Union.

Positive implications of our empirical findings suggest that aging population and diminishing fertility rates could somehow impose considerable pressure on longterm sustainability of public pension expenditure, mainly also because of the recent economic crisis which does not allow a constant positive perspective of the EU-15 economies. We consider that the main aims of future policies should be creating better job opportunities and working conditions for the growing number of older people in Europe. Retirement should happen at an older age but only if appropriate jobs are available for older generations.

Future research will consider:
- more control variables
- a delimitation of the European Union member states, by considering also the new member states (ex. EU-12, EU-15)
- more tests in order to establish the right estimation method.
4. Conclusions

As the results indicate, we can observe that most demographic variables chosen affect the public pension expenditures. Anyway, we should also consider that public pension expenditures within EU-15 are already pretty high and the pressure for these countries involves a big concern of trying to diminish or at least freeze the existing amount of public pension expenditures as % of GDP. These matters are important, as public deficits nowadays can hardly be covered and it seems that only by diminishing unproductive public spending, economic growth could be reenhanced. It should be obvious that Eastern European countries are even more affected by demographic variables, as there is also a big concern for this countries regarding migration. Therefore further research should also consider the new EU member states. Trying to focus on the variables chosen, we do also state that old age dependency ratio should be really considered when determining further future public policies.

Considering all the aspects mentioned above, we think that urgent and efficient measures are necessary in order to keep social expenditures sustainable and also to diminish the potential suffering of ageing people. It is important to support and encourage the active participation of older persons to the labour market and in this way to increase pension ages according to life expectancy, while early retirement schemes should be avoided as much as possible.

5. Bibliography