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FINANCIAL STABILITY OF PENSION SYSTEM IN THE EUROPEAN UNION MEMBER STATES

Abstract:

The pension systems in European Union member states are very diverse, due to traditions how to provide retirement income, and to phases of the reform process. This system is also very important in the context of the social security of every individual or the society in which is settled. Since the system is influenced by changes in demographic fluctuations, living conditions, economic growth and so forth, it is very challenging for every European Union member state to keep the financial stability. To solve that problem, this paper aims to examine the financial stability of pension system in the European Union member states in the period 2003-2018. To obtain empirical results panel data analysis has been applied. The results showed that countries with higher old-age dependency ratio, life expectancy at age 65, replacement rate and poverty rate and public debt will also have higher pension expenditure, in average, while factors related to labour market negatively affects the pension spending.

Keywords:

pension system, pension expenditure, financial stability, panel model, European Union

JEL Classification: H55, J21, J26

1 INTRODUCTION

A part of the social security system, which provides people source of retirement income, is a pension system. Every country toward economic situation and development has its own pension system characteristics. Based on experiences of some countries, for example Belgium, Denmark, Netherlands and Sweden, the only multi-pillar pension system is sustainable over long-term. This type of pension system is a combination between pay-as-you-go method of financing pension expenditures and funded pension plans. The characteristics of pay-as-you-go method are on state benefits to retirees, which are paid out of contributions from current workers. On the other side, characteristics of funded pension plans are that liabilities are covered by investments.

In the European Union (EU) the pension system is arranged with Directive 2003/41/EC on the activities and supervision of institutions for occupational retirement provision, with Directive 98/49/EC on safeguarding the supplementary pension rights of employed and self-employed persons moving within the Community and with Regulation 1408/71 on the application of social security schemes to employed persons, to self-employed persons and members of their families moving within the Community. Nowadays, the EU countries have a serious problem with financial stability of pension system. One of the reasons for this lies in the demographic changes (the fertility is low and life period is longer), economic situation, migrations and other. Therefore, EU countries face the challenge of ensuring the financing of compulsory pension schemes. To keep the public finance stable within pension system, different EU countries implemented reforms. The main reform measures are emphasized on the promotion of sustainability of European pension systems, which are facing the problem of aging. Because of dynamic demographic changes, EU countries are faced with the problem of well-functioning of pension systems and financial stability. Therefore, Marcinkiewicz and Chybalski (2014) explored the pension expenditure as one of the main indicators of pension system sustainability on a case of 31 European countries (EU-28, Iceland, Norway and Switzerland). They proposed two alternative indicators visualizing the level of pension expenditure (PE). The first one is the quotient of PE and gross domestic product (GDP) and old age dependency ratio (ODR). The second one is the old-age dependency ration with the proportion of the population aged 65 and over. Chybalski (2014) examined the main factors influencing the public expenditure on pensions in 25 European countries in the period 2005-2010 by panel regression. Using indicators from Marcinkiewicz and Chybalski (2014) and Chybalski (2014) we tried to fill the existing literature, by analyzing financial stability of pension system in EU-28 in the 2003-2018 period with panel data analysis in order to obtain empirical results. Our contribution in this paper is to fill the gap in the scientific literature to examine the financial stability of pension system in EU using panel data analysis.

The paper is organized as follows. Section 2 presents a brief review of literature that provides a theoretical motivation for the empirical part and the main indicators of pension sustainability. Section 3 presents the data and research methodology. Section 4 presents the empirical results. In Section 5 we provide final conclusion and recommendation for further research.

2 LITERATURE REVIEW

To keep the pension system stable, the more and more attention is given to sustainability and reforms of the pension system. Many researchers investigated pension systems reforms (Schmäl, 2000; Alonso and Conde-Ruiz, 2007, Martin and Whitehouse, 2008; Natali, 2008; Earles, 2013) but only a few researchers' sustainability (Chybalski, 2014; Rotschedl, 2015; Sika and Martišková 2016). Observing only analysis of pension expenditures mainly focuses on determinants of age-related public spending was conducted by Pampel and Williamson (1985), Loredana (2008), Schneider (2009), Sapiri et al. (2010), Grech (2010), Cristian (2012), De la Fuente and Doménech (2013), Croitoru (2012) and Marcinkiewicz and Chybalski (2014).

Regarding the pension system reforms, the major reforms carried out in European countries have been studied by Alonso and Conde-Ruiz (2007). They framed the reforms in three directions: implementing parametric reforms that make the current distribution system less generous; increasing the purchasing power of lower pension's disadvantages groups and the establishment of a funded system. Martin and Whitehouse (2008) studied the impact of pension system reform on the future value of pensions on an example of OECD countries. They concluded that there are still outstanding issues in pension system reform. These are that many OECD countries encourage early retirement, although the effective retirement age tends to reach age 65 or older and that reforms can bring about low-income elderly people to a longer degree of poverty. This is influenced by demographic trends, employment, education, and socio-political and economic situation in the country examined by Choi et al. (2001), Blake (2006), Barr and Diamond (2006), Starineca and Voronchuk (2015), Oganisjana et al. (2015), Samašonok et al. (2015), Pather (2015), Matetskaya (2015), Rezk et al. (2015), Tvaronavičiené et al. (2015).

If we take into consideration only gender consequences Earles (2013) noticed that European Union member states implemented a number of pension reforms to decrease state responsibility and increase individual responsibility, but these reforms are negative for the majority of women, as they favor male work patterns. Natali (2008) noticed several trends in recent pension reforms in European Union member states. These are: 1) policy goals and ambitions in the public pillar have been revised and that generosity of the public pillar is decreasing in all European Union member states; 2) there is no increased emphasis on the individualization of risk within pension system; 3) benefits have become more directly linked to contributions; 4) multi-pillar pension schemes (public, occupational and individual) are becoming the norm; 5) member states have introduced a privatization element. The main objective of all of this elements and trends in pension reforms is to decrease public expenditure on a pension in all EU countries.

Pampel and Williams (1985) using time-series and cross-national data, examined that pension expenditures were mainly affected by age-structure variables and social insurance program experience. Cristian (2012) has proven on the sample of EU-15 member states that fertility rate, life expectancy, effective retirement and gross saving significantly affect public pension expenditures. Sapiri et al. (2010) analyzed the impact of various political scenarios on old-age related public spending by using System Dynamic Model. Marcinkiewicz and Chybalski (2014) proposed two alternative indicators visualizing the level of pension expenditure on an example of 31 European countries. These are the quotient of pension expanditure and old dependency ratio, while the second one replaces the old dependency ratio with the proportion of the population

aged 65 and over. They found that the old dependency ratio in Italy is nearly 33 percent, while in Ireland it is only 19 percent which means that the load on the working population is much lower in the latter country.

The base for our research was Marcinkiewicz and Chybalski (2014) and Chybalski (2014). Based on alternative indicators examined by Marcinkiewicz and Chybalski (2014), Chybalski (2014) explored the financial stability of pension systems on an example of 25 European countries in the period 2005-2010. In his paper, the models were estimated with two different dependent variables: old-age pension expenditure as a proportion of GDP and the quotient of the old-age pension expenditure/GDP ratio and old dependency ratio. The first variable measure financial stability of pension systems, while the second one takes into account the demographic situation in the measurement of pension expenditure. The results showed that demographics is not the only factor that affects pension expenditure. Other factors are the economic activity of the working-age group and GDP.

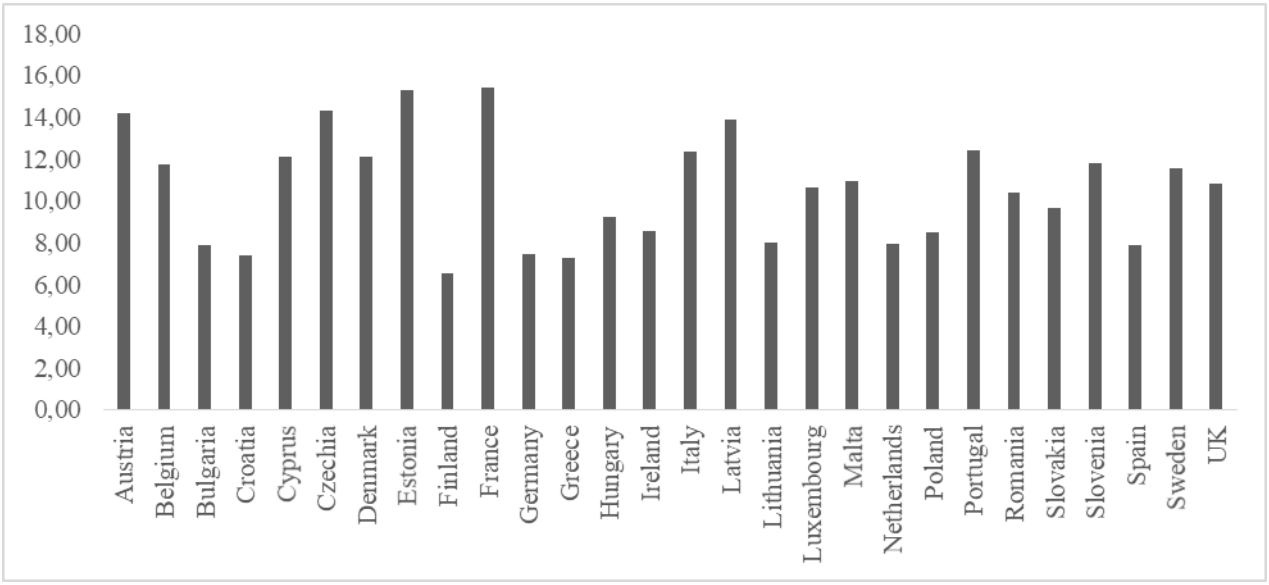
According to Rotschedl (2015) there are two perspectives of sustainability. The first one – quantitative perspective represents a demographic view, while the second one – monetary issues in terms of the income structure of the population. Using the data of Czech Republic author explored that the pay-as-you-go pension system may be considered as unsustainable. In a similar way, but on a case of Slovak Republic, Sika and Martišková (2016) found that the Slovak Republic will have to incorporate automatic stabilizers in the calculation of pension entitlements, to strengthen the financial sustainability of the pension system.

Summarizing all scientific literature and investigating the determinants of financial sustainability our paper contributes to the literature by investigating the financial stability of pension system in EU in the period 2003-2018 based on alternative indicators Marcinkiewicz and Chybalski (2014) and Chybalski (2014).

INDICATORS OF PENSION SUSTAINABILITY

Each pension system may be evaluated by six criteria developed by World Bank (2010). These are: coverage of pension system by both mandatory and voluntary schemes; adequacy of retirement benefits; financial sustainability of pensions to the society; economic efficiency; administrative efficiency reflected in low administrative costs of a system and security of retirement benefits. According to European Commission (2009) a national indicator in the field of analyzing pension expenditure is pension expenditure as a share of the gross domestic product (PE/GDP). An additional indicator is ODR, which takes into account demographic situation in the measurement of pension expenditure. Figure 1 presents the average value of PE/GDP in EU-28 in the 2003-2018 period.

Figure 1 Average of PE/GDP ratio in EU-28 from 2003-2018



Source: Author's calculation based on Eurostat database-General and regional statistics.

Figure 1 shows that France, Estonia and Czechia have highest PE/GDP ratio among EU-28. This can be explained by the fact that pensions system in those countries plays an important role in budget and public finance. In addition, this is a result of the better economic situation for pensioners. On the other side, the countries with lowest PE/GDP ratio are Finland, Greece and Croatia. This can be interpreted with the unstable economic situation, especially in Greece and Croatia and with unbalanced public finance policy.

In the literature, many researchers investigated indicators of pension sustainability. Holzmann and Hinz (2005) showed that all measures should be planned in advance and included in the structure of the system in order to maintain financial sustainability of a pension system. Grech (2010) considered that successful pension system is a system which achieves goals with the least pressure on constraints. Pallares-Miralles et al. (2012) defined the sustainability of pension system as an ability from the government side to fulfill all obligations in current and future pension system. They also proposed a set of pension sustainability indicators- pension spending to GDP ratio, pension spending to general tax revenue ratio, unfunded pension liability as a share of GDP and tax revenues and net pension liability as a share of GDP and tax revenues. Pension reform index was proposed by Schneider (2009). This index presents the difference between projected pension expenditure in a single moment in time determined in two different periods.

3 DATA AND RESEARCH METHODOLOGY

In this paper we examine the determinants of old-age pension expenditure. In order to do so, we estimate the following equation (1) using panel methodology:

$$PE/GDP = \beta_0 + \beta_1 ODR + \beta_2 LE + \beta_3 EMP + \beta_4 RR + \beta_5 PR + \beta_6 GOV + \varepsilon_{it} \quad (1)$$

where ε_{it} stands for a total random component in the panel model covering pure random error and fixed effects or random effects.

The data used in the analysis are yearly data collected from Eurostat for period 2003 - 2018, depending on availability for each EU-28 country. The dependent variable is pension expenditure given as percentage of GDP (*PEGDP*). For explanatory variables, we use two control variables, one, which measures public finance, and the other that measures labor market conditions. Sustainability of pension systems largely depends on public debt as well as labor market conditions. In order to catch this effect we include in model variable *GOV* which represents government consolidated gross debt, as a percentage of gross domestic product. The second control variable is related to labour markets and represents employment rate in the age group 15-64 (*EMP)*. We also include in model demographic variables: *ODR* which represents old-age dependency ratio and *LE* which represents life expectancy at age 65. The next independent variable is related to income adequacy of pensions - replacement rate *RR*. And the last variable is poverty rate before social transfers (pensions are included in social transfers) - *PR*.

In the following section of this paper are given the empirical results. We employ the Hausman test in order to test the adequacy of fixed and random effects (Hausman, 1978).

4 EMPIRICAL RESULTS

The results of panel regression models are shown in Table 1. The results of Hausman test go in favour of fixed effects and are given in Table 2.

Table 1: Results of the estimation - fixed and random effects

	1st model (FE)	2nd model (RE)
ODR	0.07	0.06
	(0.03)**	(0.03)**
LE	0.38	0.38
	(0.09)***	(0.08)***
EMP	-0.17	-0.14
	(0.03)***	(0.02)***
RR	2.48	2.47
	(0.74)***	(0.75)***
PR	0.07	0.06
	(0.02)***	(0.02)***
GOV	0.03	0.03
	(0.00)***	(0.00)***
_cons	7.91	6.39
	(1.56)***	(1.53)***
F test	124.4	
No. obs.	391.00	391.00
Wald test		742.8
R sq.	0.68	0.67

*NOTES: *statistically significant at the 10% level; ** at the 5% level; *** at the 1% level*

SOURCE: Author's calculations

Table 2: Results of Hausman test

	Coefficients			
	(b) Random	(B) fix	(b-B) Difference	Sqrt(diag(V_b-V-B)) S.E.
ODR	0.0635111	0.0715628	-0.0080517	.
LE	0.376829	0.3785546	-0.0017256	.
EMP	-0.1430818	-0.1703033	0.0272215	.
RR	2.474553	2.484306	-0.0097535	0.089953
PR	0.0626663	0.0690886	-0.0064223	.
GOV	0.0300839	0.0290964	0.0009874	.

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg
Test: Ho: difference in coefficients not systematic
Chi2 (6) = (b-B) ' [(V_b – V_B) ˆ (-1)] (b-B)
= ***13.62***
Prob>chi2 = ***0.0341***
(V_b – V_B is not positive definite)

SOURCE: Author's calculations

Based on the results presented in Table 1 all variables are statistically significant in the model. Hausman test (Table 2) goes in favour of fixed effects, but the results do not vary in terms of coefficient size and sign. Countries with higher old-age dependency ratio, life expectancy at age 65, replacement rate and poverty rate and public debt will also have higher pension expenditure, in average. These results confirm theoretical expectations and imply that aging society have positive effect on pension spending. Factors related to labour market, which is given with variable, *EMP* negatively affects the pension spending, which is also expected result.

These results can be explained that the countries with higher employment ratios (i.e. Sweden, Denmark and the Netherlands) in the working-age population, the share of pensioners' population in GDP distribution in the relation to the *ODR* is smaller. Similar like in a study of Chybalski (2014) the results of our empirical analysis showed that in countries with higher pension adequacy, the share of pension expenditure in the part of GDP due for the pensioners' generation based on their share in population was, in fact, higher.

5 CONCLUSION

The stability of every pension system in the EU-28 is significantly affected by economic factors. This is extremely important part of the social security of every individual or the society in general. In every EU-28 country to achieve stability in pension system is one of the fundamental problems. One of the challenges arising in large measures from the demographic ageing of the population. That type of the system is necessary for balanced functioning of the whole society and maintenance of its social cohesion.

The objective of this paper was to examine the financial stability of pension system in EU-28 in the period 2003-2018. To obtain significant results the panel data analysis has been applied. The results showed that countries with higher old-age dependency ratio, life expectancy at age 65,

replacement rate and poverty rate and public debt will also have higher pension expenditure, in average, while factors related to labour market negatively affects the pension spending. To achieve stability within the pension system, two perspectives plays an important role. The first one is quantitative, presented from demographic view, and second one is monetary, in terms of income structure of the population. The recommendations for further research is to examine the efficiency of pension reforms in EU-28 which are directly linked with the aim of achieving financial stability and to obtain in more detail analysis of every EU-28.

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