PENSION FUNDS AND ECONOMIC GROWTH: EVIDENCE FROM OECD COUNTRIES

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ABSTRACT

Raising life expectancy and decreasing fertility rates have caused the public pension systems to become financially unsustainablein many countries as of 1990s. Therefore, many countries have transited from unfunded pensions to funded pensions.The private pension plans and occupational pension plans which are generally funded pension plans have become important elements of overall pension systems. Consequently considerable increases in the value of pension funds have been witnessed in the recent years. This study investigates the growing value of the assets by pension funds on the economic growth in 26 OECD (Organisation for Economic Co-operation and Development) countries during the 2001-2015 period employing Dumitrescu and Hurlin (2012) causality test. The findings revealed a bilateral causality between pension funds and economic growth.

1. Introduction

Population ageing arising from increasing life expectancy and low fertility rates made the financially sustainability of the public pension systems mainly financed by unfunded pay-as-you-go (PAYG) difficult. In this context, it is estimated that the share of persons aged 65 and above will increase from 8% of the total world population in 2015 to almost 18% by 2050, and from 16% to 27% in the OECD (OECD, 2015). Therefore, many countries have begun to transit from unfunded pension systems to funded pension systems and supported the funded pensions with the funded private pensions and the assets of global private pensions have increased considerably in recent years and reached to USD 38 trillion in 2015 (OECD, 2016a).

Pension funds are one of the leading institutional investors which make investments in capital markets.
Financial asset holdings by all pension vehicles reached to USD 36.9 trillion in the 35 OECD countries in 2015 (OECD 2016a). So pension funds have potential to affect the economic growth positively through contributing to the development of financial markets with raising the deepness, liquidity, competitiveness and efficiency (Holzmann, 1997). But however, the studies investigating pension funds-growth nexus have remained limited. In this paper we research the casual interaction between pension funds and economic growth in 26 OECD countries over the

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2001-2015 period. In this context, the literature summary is given in the Section 2. Then data and method is explained in the Section 3. Empirical analysis is implemented and major findings are introduced in Section 4 and the study is concluded with Section 5.

2. Literature Review

Many countries have begun to transit to the funded pensions from public unfunded pensions partially or fully during the last thirty years considering the financial sustainability of the unfunded pensions. Therefore, the assets of the pension funds have rose considerably and in turn become a key institutional investor in the financial markets. The growing value of pension funds has led the researches to investigate the economic implications of the pension funds. In this regard, most of the studies have centered on the impact of pension funds on the development of capital markets and economic growth. The studies on the interaction between pension funds and financial market development have mainly revealed that the pension funds make a positive contribution to the development of capital markets (e.g., see Enache et al., 2015; Bayar, 2016). On the other hand, the studies related to the pension funds-growth nexus have reached mixed findings. However, most the studies revealed that pension funds affected the economic growth positively (e.g., see Holzmann, 1997; Davis and Hu, 2005; Bijlsma et al., 2014; Farayibi, 2016), while relatively few studies discovered that pension funds affected the economic growth negatively (e.g., see Zandberg and Spierdijk, 2010 and 2013).

In one of the early studies, Holzmann (1997) analyzed the impact of transition from unfunded pensions to funded pensions on the economic growth in Chile with a dataset of 1980-1994 and found a positive impact of pension funds on the economic growth through increasing the total factor productivity andcapital formation and decreasing the distortions of labor market.In another study,Davis and Hu (2005) researched the impact of pension funds on the economic growth in 38 countries from OECD and emerging markets employing various technique of panel data analysis revealed that pension funds affected the economic growth positively.However, Zandberg and Spierdijk (2010) investigated the same relationship for a sample of 58 countries consisting OECD and other countries over the 2001-2008 period with dynamic regression analysis and revealed no significant relationship between pension funds and economic growth. Furthermore, Zandberg and Spierdijk (2013) conducted a similar analysis for 54 countries from OECD and non-OECD over the 2001-2010 period and revealed no interaction between pension funds and economic growth in the short run, but they reached the mixed findings over the long run, they revealed a positive impact of pension funds on the economic growth in the model with overlapping observations over the long run, but no interaction between two variables in the cross-sectional model.

In another study, Bijlsma et al. (2014) researched the effect of pension funds on the economic growth in 34 OECD countries with regression analysis over the period 2001-2011 and discovered a positive influence of pension funds on the economic growth.Finally, Farayibi (2016) analyzed the impact of funded pension on the economic growth in Nigeria during the period 2005-2014 employing error correction model and regression analysis and found that funded pensions affected the economic growth positively.

3. Data and Econometric Methodology

We researched the causal interaction among economic growth, pension funds and financial sector development in 26 OECD countries during the period 2012-2015 employing Dumitrescu and Hurlin (2012) causality test.

3.1. Data

The annual growth rate of real GDP per capita was used as a proxy for the economic growth. On the other side, pension funds were represented by total pension funds as a percent of GDP, while financial development was substituted by domestic credit to private sector as percent of GDP in the paper. Our study period and sample were determined by the data availability. The variables used in the econometric analysis, their symbols and data sources were presented in Table 1.

Table 1. Data description

Variables	Description	Data Source
GRW	GDP per capita growth (annual %)	World Bank (2016a)
PENS	Pension funds (% of GDP)	OECD (2016b)
DCRD	Domestic credit to private sector (% of GDP)	World Bank (2016b)

The software packages of E-Views 9.0, Stata 14.0, and Gauss 11.0 were used in the econometric analysis of the paper. The descriptive statistics and correlation matrix of the variables in the study are presented in Table 2. The correlation matrix showed that there was positive correlation between financial development and pension funds.

Table 2. Descriptive statistics and the correlation matrix of the variables in the study

Variables	Obs.	Mean	Std. Dev.	Min	Max
GRW	390	1.543142	2.891875	-14.55986	10.92401
PENS	390	35.11444	39.85763	0.132	178.363
DCRD	390	99.34422	49.35036	0.1858704	312.1536
	GRW		PENS		DCRD
GRW	1.0000				
PENS	-0.0952		1.0000		
DCRD	-0.2538		0.5242		1.0000

3.2. Econometric Methodology

Cross-sectional dependency and homogeneity of the cointegrating coefficients are determinative for the selection of the further econometric tests used in the empirical analysis such as unit root test and causality test. Therefore, first we tested cross-sectional dependence among the series with LM CD test of Pesaran (2004), since cross-section dimension of the dataset (N=26) is higher than the time dimension (T=15) and tested homogeneity with adjusted delta tilde test of Pesaran and Yamagata (2008). Later, integration levels of the variables were analyzed with CIPS unit root test of Pesaran (2007) that takes notice of cross-sectional dependence. Finally, the causal interaction among economic growth, pension funds, and financial sector development were investigated with the causality test of Dumitrescu and Hurlin (2012).

4. Empirical Analysis

4.1. Cross-sectional dependency and homogeneity tests

The existence of cross-sectional dependence among the variables was tested with LM CD test of Pesaran (2004), because time dimension (T=15) is lower than cross-section dimension (N=26) and the results were displayed in Table 3. The null hypothesis, there is cross-sectional independency, was rejected at 1% significance level, because p value was found to be 0.0000. So we revealed a cross-section dependence among the series. Furthermore, we analyzed homogeneity with adjusted delta tilde test of Pesaran and Yamagata (2008) and our findings revealed that null hypothesis, there is homogeneity, was rejected and the cointegrating coefficients were found to be heterogeneous.

Table 3. Results of cross-sectional dependence and homogeneity tests

Cross-sectional dependency tests		
Test	**Statistic**	**p-value**
LM (Breusch and Pagan (1980))	2094	0.0000
LM CD (Pesaran (2004)*	129.5	0.0000
LM adjusted (Pesaran et al. (2008))*	44.03	0.0000
Homogeneity tests		
Test	**Statistic**	**p-value**
Delta_tilde	4.271	0.000
Delta_tilde_adj	4.932	0.000

*two-sided test

4.2. Panel Unit Root Tests

The integration levels of the variables were investigated by Pesaran (2007) CIPS (Cross-sectionally augmented IPS (Im-Pesaran-Shin (2003)) unit root test taking notice of cross-sectional dependence and the test results were displayed in Table 4. The test results indicated all the variables were I(1).

Table 4. Results of panel unit root tests

	CIPS panel unit root test	
Variables	**Constant**	**Constant + Trend**
GRW	-0.028 (0.489)	3.671(1.000)
d(GRW)	-2.435 (0.007)***	-0.617 (0.000)***
PENS	2.316 (0.990)	2.690 (0.996)***
d(PENS)	-3.784 (0.000)***	-2.365 (0.009)***
DCRD	0.938 (0.826)	-3.178 (0.761)
d(DCRD)	-5.536 (0.000) ***	-3.519 (0.000)***

*** significance at 1% level

Optimal lag length was selected as 1 considering LR, FPE, AIC, SC and HQ

4.3. Dumitrescu and Hurlin (2012) Causality Test

The causal interaction among economic growth, pension funds and financial development was investigated with the causality test of Dumitrescu and Hurlin (2012) and the findings were presented in Table 5. The results of the causality test revealed a one-way causality from financial development to the growth and a two-way causality between pension funds and economic growth. Furthermore, there was one-way causality from financial development to the pension funds.

Table 5. Causality test results

Lags=1			
Null hypothesis	**W-Stat.**	**Zbar-Stat.**	**Prob.**
$DDCRD \nrightarrow DGRW$	**2.12230**	**2.05439**	**0.0399**
$DGRW \nrightarrow DDCRD$	0.85107	-0.93954	0.3475
$DPENS \nrightarrow DGRW$	**5.88310**	**10.9116**	**0.0000**
$DGRW \nrightarrow DPENS$	**2.71385**	**3.44756**	**0.0006**
$DPENS \nrightarrow DDCRD$	1.29272	0.10061	0.9199
$DDCRD \nrightarrow DPENS$	1.16249	-0.20611	0.8367
Lags=2			
Null hypothesis	**W-Stat.**	**Zbar-Stat.**	**Prob.**
$DDCRD \nrightarrow DGRW$	**6.31579**	**4.19144**	**3.E-05**
$DGRW \nrightarrow DDCRD$	2.27840	-0.62184	0.5340
$DPENS \nrightarrow DGRW$	**7.75371**	**5.90569**	**4.E-09**
$DGRW \nrightarrow DPENS$	3.16537	0.43558	0.6631
$DPENS \nrightarrow DDCRD$	1.81254	-1.17722	0.2391
$DDCRD \nrightarrow DPENS$	**7.25542**	**5.31164**	**1.E-07**

5. Conclusions

We researched the impact of growing pension funds on the economic growth 11 CEE countries over the period 2001-2015 employing causality test of Dumitrescu and Hurlin (2012). The findings suggested revealed a one-way causality from financial development to the growth and a two-way causality between pension funds and economic growth. Furthermore, there was one-way causality from financial development to the pension funds.

Our findings supported the findings about finance-growth nexus in the literature and also development level of the financial sector is a significant factor for the pension funds. Furthermore, a bilateral causality between economic growth and pension funds shows that on the one hand, pension funds are important for the economic growth, on the other hand, economic growth is a significant factor for the pension funds. Future studies can be centered on the interaction channels between economic growth and pension funds considering our findings.

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