DOI: 10.52335/ekon/156779

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The Role of Pension Funds on Capital Market Growth in the New EU Member States

Introduction

Institutional investors have become increasingly important for both asset management and the development of financial systems. In fact, institutional investors are likely to be among the most important conduits of private and public savings, supplying capital for firms and countries to enable growth (see Vittas, 1999; Reisen, 2000; Blommestein, 2001; Davis and Steil, 2001). According to many authors, including Davis (1995) and Impavido and Musalem (2000), pension funds have played a crucial role among institutional investors across countries. Moreover, the bulk of the literature (see, for instance, Schmidt-Hebbel, 1999; Catalan, Impavido, and Musalem, 2000; Walker and Lefort, 2002; Catalan, 2004; Davis and Hu, 2005, 2008; Hu, 2005; Rezk, Irace, and Ricca, 2009; Kim, 2010; Meng and Pfau, 2010; Zandberg and Spierdijk, 2010; Raisa, 2012), contends that pension assets increase economic growth through increased savings, improved corporate governance, reduced labour market distortion, and capital market development.

Investigating the role of pension funds and capital market development will help to determine the impact of this relationship on economic growth, as the literature has established the capacity of capital markets to induce growth in developing countries (Barr, 2006; Hu, 2012; Hassan, 2013). Since pensioners live off their savings over a long period, pension funds (unlike other institutional or retail investors) are expected to be able to provide long-term financing to domestic corporations and governments. Pensioners additionally provide a steady flow of funds into pension funds over many years, making them a stable source of capital. Importantly, since pensioners are required to hold their investments in at least one pension fund until retirement, this gives stability to the system as

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a whole. Furthermore, given their size and commission fees, pension funds should be able to professionally manage asset allocation, diversify risk appropriately, and overcome the problems of asymmetric information and transaction costs.

Studies on the impact of pension assets on capital market development have mostly focused on the OECD (Catalán et al., 2000; Aras and Müslümov, 2003; Niggemann and Rocholl, 2010), and Latin America (Walker and Lefort, 2002; Raddatz and Schmuckler, 2008). Very little attention has been given to Central and Eastern Europe (CEE). To the best of our knowledge, only two studies investigating the role of pension funds on capital market development have focused on this region, viz. Hryckiewicz (2009), which examines eight CEE countries, and Cosmin et al. (2015), which examines ten.

The present study rectifies this omission by investigating the role of pension funds in capital market development in the 11 new EU member states from the CEE region. In the 1990s, all the countries from Eastern Europe and the Former Soviet Union witnessed a transformation, not only of their societies and economies, but also of their retirement schemes (Fultz and Ruck, 2000; Müller, 2001). These countries set about improving the financial health of the public pension insurance system by implementing a series of reforms. These reforms led to full or partial pension privatization and reorganized the former PAYG systems by introducing funded pension pillars. Hungary (1998) was first, followed by Poland (1999) and Latvia (2001), while Bulgaria, Croatia, and Estonia enacted similar reforms at the beginning of the 2000s.The introduction of funded pension pillars changed the calculation of future pension benefits from defined benefit (DB) to defined contribution (DC). In countries such as Poland and Latvia, the DC system was also introduced to PAYG pillars, whereas other countries, such as Bulgaria and Romania, decided to use points systems based on individual employee contributions. These radical reforms coincided with the emergence of a 'new pension orthodoxy', a global epistemic community particularly active in developing and transformation countries, advocating the privatization of old-age security (see Müller, 2001).

The present paper contributes to the dearth of empirical literature on the role of pension funds in capital market development in 11 new EU member states (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia) over the period 2010–2020. The Fully Modified Ordinary Least Squares (FMOLS) and the Dynamic Ordinary Least Squares (DOLS) models were used to account for potential heterogeneity in the results. These estimation models have been shown to produce less biased results, but to the best of our knowledge, have not been applied in previous studies. We believe that a deeper understanding of the role of pension systems in capital market development will foster the development of local capital markets. This is of considerable importance, as these markets are destined to become increasingly significant and to contribute more substantially to economic growth and to the financing of the real economy. Davis (2005) contends that sizeable developed capital markets can prevent economic crises or at least mitigate their effects – especially in emerging economies. This capability is set to assume greater

importance as private pension funds accumulate more assets, especially if they reorient their investment strategies towards more risk-oriented portfolios, where equity holdings are not so restrictive.

The remainder of the paper is organized as follows. Section 2 provides a brief overview of the literature. Section 3 presents the data and methodology. Section 4 presents the results. Section 5 outlines the conclusions.

2. Literature Review

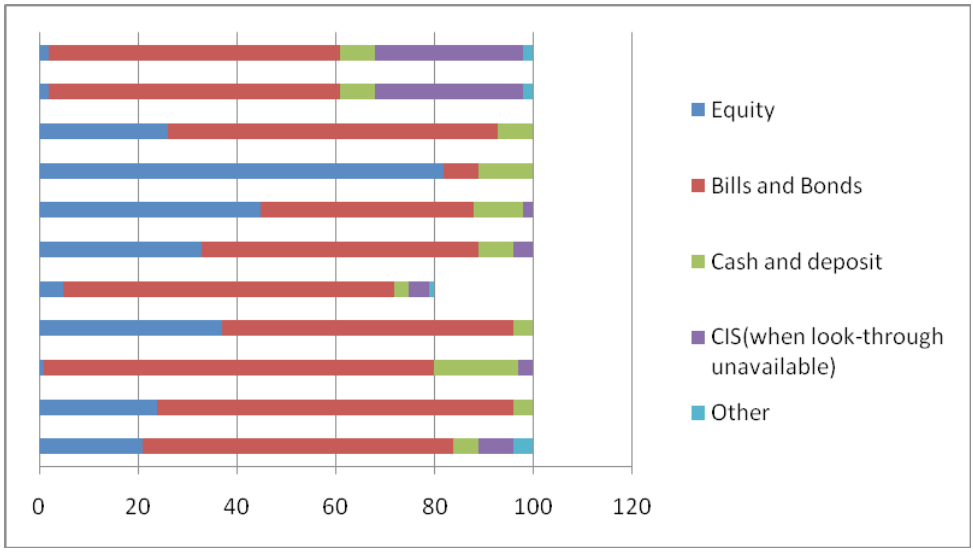
Pension funds play an important role among institutional investors, as they are long-term investors and assume far greater risk than non-institutional investors in terms of portfolio allocation. The literature enumerates several crucial functions of pension funds, viz. accumulating institutional capital, transferring financial resources, monitoring and managing risk, reducing price volatility, integrating the capital market at the international level, diversifying financial instruments, and intensifying competition (Cosmin et al., 2015). Davis (1995), Vittas (1998), and Blommestein (2001) claim that these functions will lead to a more developed stock market and to an overall improvement in financial stability. For their part, Dayoub and Lasagabaster (2008) cite the positive impact of pension funds on domestic capital markets, both for economies with developed financial systems and for those with less developed financial systems (albeit somewhat less pronounced). Other research outlines the effect(s) that more active pension funds have on the bond and equity markets (Davis, 1995; Vittas, 1998; Corbo and Schmidt-Hebbel, 2003; Catalán, 2004).

The structure of investment varies across countries, as it necessarily depends on the legal framework (statutes, delegated legislation etc.) and the restrictions it places on funds and investing. However, pension funds everywhere are legally constrained to pursue a risk-averse investment policy, i.e. to invest more in debt securities (e.g. bonds) than in equity securities (e.g. shares). The degree of risk is more pronounced in countries with developed capital markets than in transition countries; the former have a higher proportion of equities in the structure of their pension funds, while pension funds in the latter invest almost entirely in debt securities.

Of the sample countries, equities only represented more than 50% of pension fund portfolios in Poland. Despite the prolonged low interest rate environment, pension funds still hold a high share of their portfolios in bills and bonds, especially in Bulgaria, Czech Republic, and Hungary, where bills and bonds accounted for more than 60% of the portfolios.

Figure 1

Asset allocation of pension funds in selected investment categories in 2018



Since 2000, there has been a growing body of empirical literature aimed at testing the theoretical connection between the growth of the pension fund industry and the development of domestic capital markets. A review of the main studies reveals that most have focused on the OECD and Latin America, as these were the first to implement pension reforms. CEE countries, which have only recently move to a third-pillar functional pension system, have attracted very little attention. The remainder of this section is devoted to the few studies that analysed the 11 new EU member states.

Catalan et al. (2000) analysed the relationship between capital markets and contractual savings in a sample of 14 OECD countries plus five developing countries (Chile, Malaysia, Singapore, South Africa and Thailand) using the capital market indicators of stock market capitalization and stock market value traded. The results of their study show that there is Granger causation between pension funds and capital market development. However, their results have to be interpreted with caution because of the paucity of time observations. For example, there are only six observations for Austria, eight for Portugal, and nine for Australia.

Impavido, Musalem, and Tressel (2003) estimated the impact of contractual savings institutions on stock market and bond market development in 32 developed and developing countries, using differenced GMM estimators. Their results show that the institutionalization of savings, as measured by the proportion of financial assets in the economy held by contractual savings institutions, has an impact on the short-term dynamics of securities markets in that it deepens stock and bond markets, and in some cases increases stock market liquidity. The impact on the stock market is stronger in countries with a market-based financial system and/or countries with mandatory pension contributions, while the impact on the bond

market is stronger in countries with a bank-based financial system. However, bearing in mind the small number of cross-section units and short time periods (six years on average in their study), the GMM estimators suffer from potentially large finite sample bias.

The study by Hu (2006) shows a positive effect of the growth of pension assets on equity prices across OECD economies and EMEs. Hu looked at the relationship for both the short run and the long run. It was found that a 1% increase in the pension assets-to-GDP ratio in OECD countries would result in an increase in equity prices of 0.3% in the short run and 0.1% in the long run. Similar results are observed for EMEs, but the effect is stronger. One reason for this difference might be the smaller market size in EMEs, making it easier for pension funds to influence prices.

Hryckiewicz (2009) analysed the link between recent growth in institutional assets, institutional behaviour, and stock market performance in eight CEE countries over the period 1995–2006 using the GMM technique. Her results indicate that institutional development exerts a robust and significant impact on the growth of securities markets. She also found that institutional investors contribute to greater activity on emerging capital markets as a result of the greater demand for the local securities induced by these institutions. Her findings suggest that pension reform has contributed significantly to institutional development and stock market growth in the CEE countries.

Meng and Pfau (2010) investigated the linkage between pension assets and capital market indicators using an unbalanced panel of 32 developed and emerging countries with an average length of 18.5 years per country. They used stock market capitalization over GDP (MC/GDP) and stock market value traded over GDP (VT/GDP) as a proxy for stock market development. Their results indicate that pension assets have a positive impact on the stock market in terms of depth and liquidity. However, when the regressions were run by dividing the dataset into groups by level of financial development, the relationship is only statistically significant for those more developed countries.

Rocholl and Niggemann (2010) analysed 87 pension funding reforms in 57 countries between 1976 and 2007. They found evidence that a country's pension system is an important determinant for the development of its capital markets. Furthermore, they found that the effect is particularly significant in emerging markets with less developed capital markets. Further evidence from a cross-sectional analysis suggests that the degree of pension funding is an important determinant of the cross-country variation in capital market development. It remains robust even after controlling for other important determinants of capital market development, such as the legal framework and trade openness.

Kim (2010) devised models to explain the role of pension funds on the development of capital markets of 21 OECD countries from 1991 to 2003, while controlling other potentially material factors such as population aging and the degree of economic development, using GMM models. The sample was divided into two subsamples. The first comprised the four 'English-speaking' countries of Australia, Canada, the U.K., and the U.S.A., and the second comprised 11

Continental European countries and Japan. This was done in order to control for the influences of old-age income security and financial systems in the two groups. The results confirm the 'externality hypothesis' for the 'English-speaking' countries, but not for the Continental European countries and Japan. Moreover, they imply that achieving a critical mass of pension funds and securing the market mechanism for managing pension funds may suffice for pension reforms to contribute to the development of capital markets.

Cosmin et al. (2015) estimated the connection between pension reform and capital market development using a sample of 10 CEE countries (Bulgaria, Czech Republic, Hungary, Estonia, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia) for the period 2001–2010. Using a single-equation error correction model as a proxy indicator for capital market development, they expressed the market capitalization of listed companies as a percentage of GDP (MC). The results confirm the existence of a strong positive short-term effect, as well as a positive, albeit weaker, long-term effect of the pension funds' assets on market capitalization.

In sum, the selected empirical support the hypothesis that private pension funds have a positive impact on financial market capitalization. However, surprisingly, most of the empirical studies conducted to date have focused on the OECD or Latin America, or have used mixed samples of developed and emerging economies. Very little interest has been shown in Central and Eastern Europe. Regardless of the methodological framework, most of these studies conclude that pension funds positively influence capital market development. However, there are differences in the results that could be related to the financial development of the country and its equity markets, the indicators taken into consideration when considering the capital market (e.g. whether they apply to both equity and bond markets or just one of these), any legislative restrictions on the investment strategies of private pension funds, and the herd mentality of pension funds (which tends to align their investment strategies).

3. Data

The dataset for this study consists of a sample of 11 new EU member states from Central, Eastern, and South-eastern Europe (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia) over the period 2010–2020. These countries were selected on the basis of their deepening political, economic, and institutional integration with the European Union.

The core determinants selected in our model have been used in the academic literature (Impavido et al., 2003; Meng and Pfau, 2010; Rocholl and Niggemann, 2010). These internationally comparable and reliable data come from a variety of providers: Eurostat, IMF's International Financial Statistics, the World Bank's World Development Indicators, and Heritage Foundation. As this paper aims to indicate the growth in capital markets, two different variables are used. We thus follow La Porta et al. (1997), Demirgüç-Kunt and Maksimovic (1998), Rajan and Zingales (1998, 2003), Beck et al. (1999), Catalan et al. (2000), and Impavido et

al. (2003) and use stock market capitalization as a proxy for the development of stock markets (SMC). For bond markets, in contradistinction to Impavido et al. (2003), we only use the capitalization of private bond markets, rather than the combined capitalization of public and private bond markets. This is equal to the total amount of outstanding domestic debt securities issued by private or public domestic entities divided by GDP (OIP). The reason for excluding public bond markets is that, as Davis (2005) and Meng and Pfau (2010) have shown, private bond market capitalization serves as a better proxy for the development of financial markets, whereas public bond issuance largely depends on the government's fiscal position and other requirements. SMC and OIP are therefore two dependent variables in different empirical specifications.

Based on the theoretical and empirical guidance from the literature review, the following explanatory variables are used:
macroeconomic and microeconomic determinants:

- GDP per capita growth (GDPPCG). This is the annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2010 U.S. dollars;
- The inflation rate (INF). Inflation as measured by the CPI reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals (usually annually). The CPI is normally calculated using the Laspeyres formula;
- The real interest rate. The RIR is the lending interest rate adjusted for inflation as measured by the GDP deflator. The terms and conditions attached to lending rates, however, differ by country, which makes international comparisons difficult;

financial determinants:

- pension funds, measured in terms of pension fund financial assets as a proportion of GDP (PENG);
- domestic credit provided by the financial sector to GDP (DCPS);
- the Economic Freedom index (INDEX).

At the core of all the studies discussed above, the variables related to Gross Domestic Product (GDP) are among the main macroeconomic determinants of capital market development. In this context, several variations of this determinant, such as the annual growth rate of real GDP, the growth of income per capita, etc. are well covered in the literature. This study follows Hryckiewicz (2009) and Impavido et al. (2003) and uses GDP per capita growth, which they refer to as demand for finance.

The inflation rate is defined as the annual growth in the Consumer Price Index and reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services. It is also a measure of macroeconomic stability and is an indicator for monetary policy. The justification for its inclusion in the model is that it quantifies the loss of purchasing power to investors when they shift their investments in capital markets (Adarov and Tchaidze, 2011). With this in mind, we expect inflation to have a negative effect on capital market development.

Inspired by Impavido et al. (2003), we include the real interest rate in our model. This is calculated as the lending interest rate adjusted for inflation as measured by the GDP deflator. The effect of interest rates, especially on the bond market, must be controlled for, as any change in yields affects the demand for stocks and bonds. We expect that a rise in yields is likely to decrease the demand for stocks and increase the demand for bonds.

To account for the pensions effect on capital market development, we use pension funds' assets as a percentage of GDP (PENG). This choice was dictated by the design of the second pillar of CEE pension systems reform (especially the legislative restriction on recipient pension funds investing in the domestic capital market).

In order to measure the development of the financial sector, we follow Raisa (2012) and use the ratio of domestic credit provided by the financial sector to GDP, which is a common indicator to measure development levels. The higher the level of financial sector development, the better able financial intermediaries are to mobilize savings for investment capital. We expect higher levels of financial development, as measured by private sector domestic credit, to improve capital markets.

Niggemann and Rocholl (2010) show that pension systems have a much stronger impact on capital market development when the country has a more developed legal system, more trade freedom, and more regulatory efficiency. The Index of Economic Freedom from the Heritage Foundation is therefore used to measure this characteristic. This index consists of six broad categories (rule of law, limited government, regulatory efficiency, open markets – trade freedom, investment freedom, financial freedom). There are 10 freedoms within these broad categories. These are each scored on a scale of 0 to 100. The overall score is their arithmetic mean. Some authors only consider trade freedom when controlling for the development of domestic stock markets (Rocholl and Niggemann, 2010), while others consider investment freedom, capital openness, and the Law-and-Order Index (e.g. Hryckiewicz, 2009).

Table 1

Descriptive statistics

	SMC	OIP	GDPPCG	INF	RIR	PENG	DCPS	INDEX
Mean	18.40	8.590	2.085	1.767	3.629	8.890	52.39	68.14
Median	12.1	6.182	2.694	1.801	2.39	7.276	51.15	67.2
Maximum	73.2	36.4	7.443	6.091	19.7	34.5	95.31	79.1
Minimum	2.5	0.092	-8.099	-1.544	-3.736	0.6	24.71	59.1
Std. Dev.	15.60	8.652	2.842	1.701	4.782	6.349	13.85	4.792
Observations	117	95	121	121	113	119	121	121

Source: Own calculations.

The size of the pension displays large differences: it ranges from a minimum of 0.6% of GDP to a maximum of 34.5% of GDP. These substantial differences among the 11 new EU member states justify the classification of the sample countries into three more homogeneous sub-groups to obtain a more precise investigation of the determinants of shadow banking.

3.1 Methodology

The empirical strategy in this study is based on panel data analysis. Before proceeding with the econometric method, we need to verify the stationarity of the variables selected. We performed a panel analysis and applied panel unit root tests – the *Im-Pesaran-Shin* (IPS) test (Im, Pesaran, and Shin, 2003) and two alternatives of a Fisher-type test (Augmented Dickey–Fuller [ADF] and Phillips–Perron [PP] test), as outlined by Maddala and Wu (1999). These tests allow for the deterministic and dynamic effects differing across the panel members. A 10% significance level was applied as the critical value for determining whether the time series was stationary.

According to Baltagi (2001), Fisher-type tests are more advantageous in that: (1) the cross-sectional dimension can be either finite or infinite; (2) each group can have non-stochastic and stochastic components; and (3) the time-series dimension can vary for each cross-section. An additional advantage is that, unlike the IPS test, Fisher-type tests do not require a balanced panel, and they allow for the use of different lag lengths in the individual ADF regressions. Although we prefer the Fisher-type tests, we also report the results of the IPS tests as an additional check.

Furthermore, determining the existence of a long-run relationship between the dependent variable and the explanatory variables, requires testing the cointegration equations in the panel. This paper employs the Pedroni (1999) and Kao (1999) cointegration tests to test the null hypothesis of no cointegration between the selected determinants.

Having established the cointegration tests, the next step is to estimate the long-term relationship between the variables. The literature proposes different estimation methods for panel cointegration models. This paper employs the Fully Modified Ordinary Least Squares (FMOLS) and the Dynamic Ordinary Least Squares (DOLS) estimators. These methods were chosen for several reasons. Firstly, the OLS estimator is a biased and inconsistent estimator when applied to a cointegrated panel. By contrast, DOLS and FMOLS minimize both small sample bias and endogeneity bias by taking the leads and lags of the first-differenced regressors (Kao and Chiang, 2000). Secondly, these estimators allow for greater flexibility in the presence of heterogeneity in the examined cointegrated vectors (Pedroni, 1999, 2001; Banerjee, 1999).

The DOLS parametric approach is preferred to the FMOLS non-parametric one, because the latter additionally requires integrating all the variables in the same order I(1) but not cointegrating the regressors (Masih and Masih, 1996). Moreover, the FMOLS estimator is complicated by the dependence of the correction

terms upon the preliminary estimator, which may be very biased in finite samples with panel data (Kao and Chiang, 2000). The DOLS estimator has the additional advantage of controlling the endogeneity in the model, as augmentation of the lead and lagged differences of the regressor suppress the endogenous feedback (Lean and Smyth, 2010; Afons and Jalles, 2012).

All this indicates that the DOLS estimator is more promising than the OLS or FMOLS in estimating cointegrated panel regressions.

4. Results

The first step of the empirical analysis was to perform panel unit root tests (Table 2). As mentioned in the previous section, we applied panel-IPS unit root tests and Fisher-type tests using ADF and PPtests, as described by Maddala and Wu (1999).

These tests are conducted on both levels and first differences for all variables in the models. Given the traditional null hypothesis of stationarity, the results indicate acceptance of stationarity at first difference and reject stationarity at level, indicating that all series are I(1).

Table 2

Panel unit root tests (11 new EU member states)

	Im, Pesaran and Shin W-stat		ADF-Fisher Chi square		PP-Fisher Chi square		Con-clusion
Variables	At a level of	First differen-tiation	At a level of	First differen-tiation	At a level of	First differen-tiation	
SMC	-0.54	-1.48**	23.94	34.38***	80.43***	121.3***	I(1)
OIP	1.16	-2.1**	33.18	38.28***	25.84	63.84***	I(1)
GDPPCG	0.26	-1.52***	15.51	32.43***	25.24	34.50***	I(1)
INF	-1.15	-3.07***	28.14	47.57***	22.89	44.32***	I(1)
RIR	-0.72	-2.65***	27.42	47.17***	18.49	53.31***	I(1)
TRADE	0.32	-1.53***	19.02	37.23***	48.71***	62.97***	I(1)
PENG	2.32	-1.43**	11.69	42.58***	24.71	61.77***	I(1)
DCPS	-0.62	-1.73***	27.56	46.52***	55.16***	61.07***	I(1)
INDEX	1.96	-2.02***	6.98	39.79***	12.84	91.41***	I(1)

*, ** and *** indicate that the test statistic is significant at the 10%, 5% and 1% levels.

Source: Own calculations.

Following the panel unit root tests results for all series of interest, the null hypothesis of a unit root cannot be rejected. As the null hypothesis of a unit root holds for all series of interest, the next step was to conduct panel cointegration tests.

Table 3

Results of Pedroni's and Kao's panel cointegration tests

Model	SMC	OIP
Panel v-Statistic	-2.549	-2.412
Panel rho-Statistic	3.798	2.215
Panel PP-Statistic	-7.568***	-5.037***
Panel ADF-Statistic	-1.907***	-2.072***
Group rho-Statistic	4.125	3.352
Group PP-Statistic	-14.81***	-2.932***
Group ADF-Statistic	-8.621***	-0.702
Kao Residual Cointegration Test (*p*-value)	0.075	0.009

*, ** and *** indicate that the test statistic is significant at the 10%, 5% or 1% level.

Source: Own calculations.

As presented in Table 3, most of Pedroni's (1999, 2001) tests indicate that there is a cointegration relationship in all models as does Kao's (1999) test.

Having established that all determinants in all models are cointegrated, the next steps involved testing long-run linkage among the pension funds and other selected determinants and capital market growth using FMOLS and DOLS tests.

Table 4

Estimation results (Total 11 NMS)

Dependent variables / Independent variables	SMC		OIP	
	FMOLS	DOLS	FMOLS	DOLS
GDPPCG	0.307*** (0.068)	0.341 (0.248)	0.521*** (0.136)	0.474** (0.256)
INF	-0.143 (0.094)	-0.040 (0.515)	-0.197*** (0.094)	-0.152 (0.178)
RIR	-0.023 (0.033)	0.243 (0.191)	-0.347*** (0.103)	-0.037 (0.378)
PENG	1.202*** (0.034)	1.313*** (0.198)	3.055*** (0.808)	2.854*** (0.722)
DCPS	0.004 (0.013)	0.052 (0.040)	0.056 (0.045)	0.088 (0.122)
INDEX	0.101*** (0.010)	0.047 (0.039)	0.209*** (0.046)	0.237*** (0.109)
Adjusted R-squared	0.56	0.62	0.60	0.52
Observations	94	107	77	88

NB: *, ** and *** indicate that the test statistic is significant at the 10%, 5% and 1% levels.

Standard errors in parentheses.

Table 4 illustrates the results from the FMOLS and DOLS models for stock market capitalization, and private bond market capitalization estimated from the entire sample. These results provide statistically significant evidence that the growth of pension fund financial assets positively impacts the growth of stock market capitalization and bond market capitalization. The impact on bond market capitalization is greater than that on stock market capitalization. For instance, a one percentage-point increase in pension fund financial assets relative to GDP, on average, leads to 1.20 and 1.31 percentage-point increases in stock value traded, while private bond market capitalization relative to GDP increases by between 2.85 and 3.05 percentage points. These results confirm our starting hypothesis that the accumulation of pension fund assets is beneficial for the development of the financial market, increasing its capitalisation. They also corroborate the empirical results detailed in the literature (see Hryckiewicz, 2009; Impavido and Musalem, 2000; Kim, 2010; Meng and Pfau, 2010; Niggemann and Rocholl, 2010). In light of this, policymakers would be well advised to consider using public pension reforms to develop capital markets. Given the institutional design of the pension system reform in the 11 NMS, these results prove the beneficial impact of pension reform on the development of domestic capital markets. Moreover, this impact is likely to be more significant in the future, when private pension funds will have accumulated more assets and reoriented their investment strategies towards more risk-oriented portfolios, where equity holdings are not so restrictive.

As for the other controlled variables, both estimation procedures lead to coefficients with the same signs, although in some cases with different statistical significance. Thus, the estimation results with the FMOLS and DOLS for GDPPCG suggest that this variable has a positive and statistically significant impact on capital market development and bond market capitalization. This implies that countries with higher incomes tend to have deeper and better functioning capital and bond markets. This result is consistent with the results of La Porta et al. (1997) and Rajan and Zingales (1998, 2003). According to the demand driven hypothesis, economic expansion creates demand for financial services. This increase in demand then exerts pressure to establish larger and more sophisticated financial institutions to satisfy it (Yartey, 2008). There is a general consensus in the theoretical literature that the real income level and its growth have positive impacts on financial market development, which encompasses the development of stock markets. Models that link the level and growth rate of the economy to the financial system assume that there are significant fixed costs associated with the formation of financial intermediaries. When the economy develops, the importance of this fixed cost reduces, allowing more people to participate in financial activities. Hence, economic development enables more people to benefit from financial services and products (see Hicks, 1969; North, 1981; Greenwood and Jovanovic, 1990). Greenwood and Smith (1997) agree with this view by arguing that due to the significant fixed costs involved in the formation of markets, these markets may not become active until economies have developed to certain stages. Once economies reach those stages, financial markets can sustain enough activities to become cost effective. It follows that there are 'threshold effects' in the formation

of financial markets. In the same vein, Boyd and Smith (1998) develop a growth model in which capital accumulation is financed externally through a combination of debt and equity. Their model demonstrates why the stock market may grow rapidly as an economy develops. They argue that as an economy develops and accumulates more capital, the relative price of capital falls. Investment projects produce capital whereas government spending consumes final goods and services. This implies that relative monitoring costs rise as the economy grows. As a result, investors may employ relatively more of the technology with observable returns to economize on verification, as the economy develops. Because the use of the technology with observable returns is generally associated with equity issues, it follows that economic growth will be accompanied by an increase in stock market activity.

Furthermore, the results from real interest rates show that this determinant was negative and only statistically significant when FMOLS was used for bond market capitalization. In other words as interest rates rise, bond prices fall (and vice versa). It is confirmed that the higher cost of financing, as measured by higher interest rates, tends to negatively affect bond market liquidity (Yartey and Adjasi, 2007; Enisan and Olufisay, 2009; Kapingura and Ikhide, 2015). A corollary of this is that when the Central Bank raises interest rates, newly offered government securities (e.g. bonds) are often viewed as the safest investments. As the risk--free rate of return goes up, these investments naturally become more desirable, and the ROI required to justify investing in stocks increases. Therefore, if the required risk premium decreases while the potential return remains the same (or decreases), investors may feel stocks have become too risky and put their money elsewhere. One way governments and businesses raise money is through the sale of bonds. As interest rates rise, the cost of borrowing obviously becomes more expensive for them. At the same time, demand for existing, lower-coupon bonds will fall (causing their prices to drop and yields to rise).

The coefficient of inflation is negative and only statistically significant (at the 1% significance level) for bond market capitalization. This implies that an increase in inflation will reduce the size of the stock and bond markets, owing to the high cost of financing. Bencivenga and Smith (1993) claim that governments are reluctant to impose additional tax burdens on the financial sector to reduce the budget deficit in inflationary periods. It has been shown that inflation impedes the performance of markets by discouraging investment.

The results of the Economic Freedom Index are consistent with the other financial variables, revealing that this determinant has a positive impact on stock market capitalization and bond market capitalization. A 1 percentage point increase in the Economic Freedom Index is likely to lead to a 0.10-0.20 p.p. increase in stock market capitalization and a 0.23 p.p. increase in bond market capitalization. These results are consistent with those of other researchers (Brenton et al., 1999; Domowitz et al., 2001; Schmiedel, 2001; Claessens et al., 2006).

Namelly Brenton et al. (1999) show that a higher freedom index is correlated with higher FDI inflow, which in turn positively affects stock market growth (Claessens et al., 2002). In other words, capital markets are much more likely to

grow in countries with more developed legal systems (La Porta et al., 1997, 1998), shareholder protection (Pagano and Volpin, 2005, 2006), wealth distribution (Perotti and von Thadden, 2006), and openness to trade and capital mobility (Rajan and Zingales, 2003).

In fine, the growth of pension fund financial assets leads to the development of stock markets and private bond markets for the data as a whole.

The results for the inflation rate were in line with expectations. The inflation rate was negatively correlated with equity and debt market growth, but this determinant was only significant for the whole group of countries when the DOLS method was applied to bond markets.

5. Conclusion

The assets accumulated by pension funds have been growing rapidly since radical reforms were made to the pension system. These assets are increasingly providing a source of investment funds for domestic financial markets. Pension fund investments are expected to increase the availability of long-term funds, enhance competition, induce financial innovation, and improve corporate governance. The recent growth experienced by private pension funds in the 11 NMS, due to the pension reform, raises the question of whether this will have a positive impact on the development of local capital.

The FMOLS and DOLS estimation techniques revealed that pension funds have a positive effect on bond and stock market growth. Given the institutional design of the pension system reform in the 11 NMS, the results prove the beneficial impact of pension reform on the development of domestic capital and bond markets. This impact is likely to be more significant as private pension funds accumulate more assets. An increase in their assets was shown to have a strong positive effect on market capitalization. This result confirms that implementing the second pillar of pension system reform in the 11 NMS and requiring pension funds to invest in local financial markets will be conducive to financial development. Policymakers, can therefore assist the development of institutional investors, thereby promoting stock and bond market growth in the 11 NMS, by enacting appropriate legislation and implementing necessary reforms.

The results raise a number of implications that call for a careful reconsideration of the management approach to pension funds and for a reassessment of their investment strategies. As pension funds accumulate sizeable assets, they should switch their investment strategies towards more risk-oriented portfolios. This is particularly relevant for jurisdictions with few restrictions on equity holdings. Given the institutional design of the pension system reform in the 11 NMS, these results prove the beneficial impact of the pension reforms on the development of domestic capital markets. This impact is likely to be more significant in the future, when private pension funds will have accumulated more assets.

It is necessary to highlight a few important limitations to our empirical analysis. In many European transition economies, pension fund portfolios have been

leaning heavily towards fixed income (and, especially, public debt) instruments. The need to shift to higher risk/return profiles and greater equity allocations does not explicitly follow from our analyses. This is also related to the lack of discussion concerning the regulatory and financial sectors' specificities of the countries covered; factors that also enter into asset allocation considerations. Lastly, we have not investigated the possible effect of pension savings on generating asset price bubbles, especially in markets where demand for equities is dominated by pension funds, as this is a complex topic that goes beyond the scope of this study. Our implicit assumption has been that capital account liberalization among new EU member states has enabled a satisfactory degree of diversification. However, home biases in investment portfolios and localized asset price bubbles cannot be excluded on *a priori* grounds.

Several avenues for future investigation can be identified. Firstly, this research may broaden the scope of examination by expanding the number of potential explanatory variables. For instance, future research could shed light on investment behaviour, the role of regulations, and the role of incentives as conditioning factors. Another possibility is to increase explanatory power by including either macroeconomic (monetary aggregates, stock prices, and exchange rates) or bank-specific factors (size, loans-to-assets ratio, etc.). The lack of long-term data on selected determinants is clearly a serious problem. Long-time data series would enable more accurate and more reliable results. Secondly, future research may broaden the geographical context and consider the situation in South-eastern Europe, by including some of the EU candidate and/or potential candidate countries. Thirdly, a natural extension of our analysis would be to consider the policy reversals between 2008 and 2012. Many of these reversals were perpetuated and have directly impacted pension fund revenues. Fourthly, future inquiries could also consider exogenous factors, such as demographic changes (size of population and age composition). Market size and the structure of the sectors that service the pension fund industry also merit closer attention.

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THE ROLE OF PENSION FUNDS ON CAPITAL MARKET GROWTH IN THE NEW EU MEMBER STATES

Abstract

The main goal of this paper is to analyse the impact of pension funds on capital market development in 11 new EU member states[1] (NMS) from Central and Eastern Europe, using annual data from 2010 to 2020. Stock market capitalization and private bond market capitalization are used as a proxy for capital market growth. The relationship between the variables is examined using the Fully Modified Ordinary Least Squares (FMOLS) and Dynamic Ordinary Least Squares (DOLS) methods. The results indicate that pension funds have a positive effect on growth in stock and bond markets. These results raise a number of implications that call for a careful reconsideration of the management approach to pension funds and for a reassessment of their investment strategies. As pension funds accumulate sizable assets, they should switch their investment strategies towards more risk-oriented portfolios.

JEL: G15, G23, G30, H55

Keywords: Capital Market Development, Pension Funding, Panel Cointegration

ROLA FUNDUSZY EMERYTALNYCH W ROZWOJU RYNKU KAPITAŁOWEGO W NOWYCH PAŃSTWACH CZŁONKOWSKICH UNII EUROPEJSKIEJ

Streszczenie

Podstawowym celem artykułu jest analiza wpływu wywieranego przez fundusze emerytalne na rozwój rynku kapitałowego jedenastu nowych krajów członkowski UE z obszaru Europy Środkowo-Wschodniej. Wykorzystane dane mają charakter roczny i pochodzą z lat 2010–2020. Jako wskaźniki wzrostu rynku kapitałowego wykorzystujemy dwie zmienne, którymi są: kapitalizacja rynku giełdowego i kapitalizacja rynku obligacji prywatnych. Zależność między zmiennymi oszacowano za pomocą estymatorów DOLS (ang. *dynamic ordinary least squares*) oraz FMOLS (ang. *fully modified ordinary least squares*). Wyniki analizy wskazują, że fundusze emerytalne wywierają pozytywny wpływ na wzrost rynku giełdowego oraz rynku obligacji prywatnych. Wyniki badania są istotne z punktu widzenia zarządzania i strategii inwestycyjnych stosowanych przez fundusze emerytalne. W najbliższej przyszłości, gdy fundusze emerytalne zgromadzą znaczne aktywa, powinny zmienić swoje strategie inwestycyjne w kierunku portfeli bardziej nastawionych na ryzyko.

Słowa kluczowe: rozwój rynku kapitałowego, finansowanie emerytur, kointegracja panelowa

JEL: G15, G23, G30, H55

[1] Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia.