

Multipillar Pension Systems in Central-Europe and Russia

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Financial markets are complex scale-free networks, established by bounded rational agents – which explains the occurrence of pricing bubbles, contagions, extreme bullish and bearish developments, when volatility of liquidity diffuse through the market. This analysis focuses on the pension reforms of Visegrád countries (Czech Republic, Hungary, Poland, Slovakia) and Russia, where different structures of multipillar pension systems were introduced. The composition rules of pension portfolio in emerging countries are half baked, because they were standardized only on developed countries. The main objective of this paper is to employ DCC GARCH processes to validate bond and stock oriented strategies in the emerging markets. An empirical exercise using the 10-year Bond rates, stock market indexes and exchange rates of the selected countries and the USA and Euro Area on an entire market cycle (between 2002 and 2009) will show that for specific time periods the comovements between series are due to inherent non-linear deterministic dynamics.

Introduction

The scheme of multipillar pension system was introduced in 1994 in the Averting Old Age Crisis Report by the World Bank, where each pillar have to be formulated in response to particular circumstances or needs of the country. This report defined the primary goals providing adequate, affordable, sustainable, and robust retirement income. Robustness means in this case the capacity to withstand major shocks, including those coming from economic, demographic (Botos 2009), and political volatility. To reach their primary goals, pension systems must contribute to future economic output supports growth and development and diminishes possible distortions in capital and labor markets. (Holzmann-Hinz 2005)

This study focuses only on the mandatory funded “second pillar”, which is essentially an individual savings account but its structure was not exactly defined neither in current reports Holzmann-Hinz (2005). The necessity compensation of demographic deficits trough capital gains was suggested by Schmitt-Hebbel (1998). Pension funds could be acting as an “economic accelerator” trough their various investments on the capital market. They are able invest into standardized mass products on capital markets (bonds, shares) according the law of large numbers (almost¹), or could use specialized form of investing trough professional subcontractors (like venture funds, hedge funds and real estate developer funds) or directly into selected companies (BIS 2007) as figure 1 presents.

¹ Law of large numbers are occuring only at efficient markets with normal distribution of returns, but kurtiosis and fat tailnes are common properties of capital maktes in the real life.

„(c) A mandatory „**second pillar**”: essentially an individual savings account but can be constructed in a variety of ways”

(HOLZMANN, R. – HINZ, R. 2005. *Old-Age Income Support in the 21st Century: An International Perspective on Pension Systems and Reform*. World Bank)

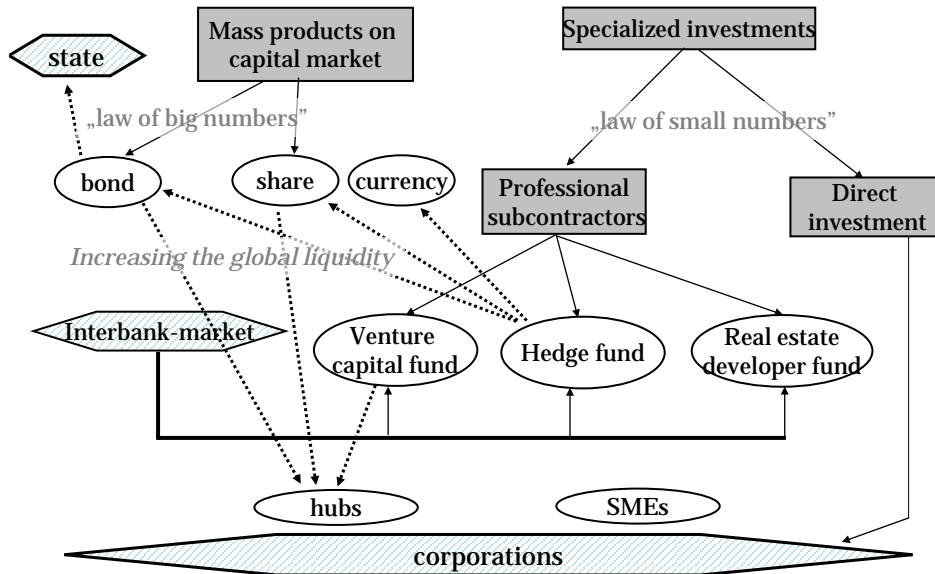


Figure 1. Various investment channels of second pillar pension funds

Source: own edition, based on BIS (2007), Holzman-Hinz (2005) and Callahan-Muegge (2003)

In the case of the Visegrad Countries (V4) and Russia, these investment possibilities have to fit to their transitional problems due to underdeveloped capitalization and labor market impacts of disintegrated real economy. Government bond oriented strategy could act as providing a stable hand on public debt markets and a safe haven for savers. Share and bond oriented strategy provides additional liquidity on domestic capital markets, while the first one looks like an accelerator of corporations. Venture capital and other focused investments are more useful to fulfill this accelerator-role – according to their robustness on extreme capital market developments. Therefore there are only two questions to optimize these problems:

1. Should mandatory second pillar be a stabilizer or accelerator of the economy?
2. How extreme events of capital markets are manageable through diversification?

These questions require the utilization of complex scale free network model to describe both real and capital markets, instead of the efficient or competitive models, and the actors should have bounded rational properties.

The remainder of this paper is as follows. Chapter 1 briefly reviews the relevancy of utilization of the complex scale-free network model to identify fundamental problems in the case of sample countries economy and capital markets. Chapter 2 discusses the technique of dynamic conditional correlation (DCC) analysis to present impacts of extreme events on the selected capital markets. Chapter 3 investigates the venture capital fund as an alternative investment tool to break the circle of liquidity based boom and doom contagions. Chapter 4 collects and evaluates the current pension, stabilization and accelerator policies in the V4 and Russia. The final chapter of the paper presents several important caveats to these results as well as suggestions for future research.

Capital market and world economy as a complex scale-free network

There are complex systems, in which conditions are constantly changing giving a rise to endogenously engendered novelty. Simple complexity models are characterized by fat tails in

returns distribution, long memory and interacting agents (Hommes – Wagene 2008). The extended characteristics are the followings: (1) particular states of the system are singular, (2) processes are non-linear and frequency-dependent, (3) strength and direction of causal relations are highly divergent in terms of magnitude and power, (4) exogenous events are influencing the system but events in the system are not completely dependent on the environment, (5) there is a hierarchical order between elements and particular emergent properties (Herrmann-Pillath 2000).

Complex networks have generic mechanisms. They are evolving by the addition of new vertices or sometimes rewiring the established connections. There is a high degree of self-organizing. The new vertices attach preferentially to sites that are already well connected. Initial difference in the connectivity between two vertices will increase further as the network grows (Barabási – Albert 1999).

Scale-free² networks are special cases of complex networks. They are inhomogeneous in nature, which means that nodes have very few link connections and yet a few nodes have many connections. In comparison with a random network, complex networks have the same size and an average degree, but the average path length is somewhat smaller. The clustering coefficient is much higher as well, while there are a few “big” nodes (hubs) with very large degrees (very large number of connections to bring the other nodes of the network close to each other). (Wang – Chen 2003, Csermely 2008)

The relevance of studying the dynamics inside complex scale-free networks is highlighted by the decentralized, but concentrated (“hub-based”) structure of world economy (Chen 2008). World economy could be analyzed as a network of national economies, which are networks of markets themselves. The markets are networks of market actors such as individuals, firms, public institutions and the capital market as a parallel network. The global network operates under the following rules: quasi-free movement of production factors (labor, capital, goods, and intellectual properties), technical progress, international markets, deregulation, liberalization, lack of coordination of economic policies, and liberalized capital accounts. (Wang – Chen 2003, Magas 2005)

To understand the development in former socialist countries after the transition, we have to study the error tolerance and the attack vulnerability of scale-free complex networks. This type of networks is robust during the random removal of a fraction of nodes; but after the preferential removal of key nodes – for example, due to large-scale implications at the macro level (Herrmann-Pillath 2000) – the system performance decreased³. Phase transition was described between scale-free and random networks. The connectivity number is emerging after the collapse of the “stable” scale-free state. The system is random in its “chaotic” phase with high evolutionary performance until a new “stable”, scale-free combination is established (Grubestic et al. 2008, Wang – Chen 2003, Yuan – Wang – Li 2007). Therefore it is hard to accelerate economic growth in transitional countries, until there is lack of new hubs – both on domestic and foreign level. Real economies could become dual structured, if foreign based hubs are not integrated deeply in domestic economy. Sample countries had to face with such integrating-disintegrating phases in the last century; therefore domestic actors mostly are in connections with external hubs or remained separated in living dead phase.

The existence of Porter-type regionalization and the implications of phase transition were underlined by the empirical studies of Vitorca et al. (2009), Gál (2009), Arratibel et al. (2007) and Lengyel (2007). Their results are suggesting the existence of parallel networks for

² scale-free: “The shape of the degree distribution does not change over time, namely, does not change due to further increase of the network scale.” (Wang – Chen 2003)

³ Decrease is not an automatic result of preferential removal – knocking out a redundant node in a system can actually increase global network efficiency. However, less redundancy means less tolerance of errors. (Grubestic et al. 2008)

production, services, knowledge and capital creation or utilization. Peripheral regions could be developed through the increased capitalization and innovation of the hub regions – this hierarchy has a significant impact on the “accelerator” role of the second pillar. Share oriented pension funds should export capital from undercapitalized regions with the hope of domestic reallocation through the hubs subsidiaries as figure 2 presents.

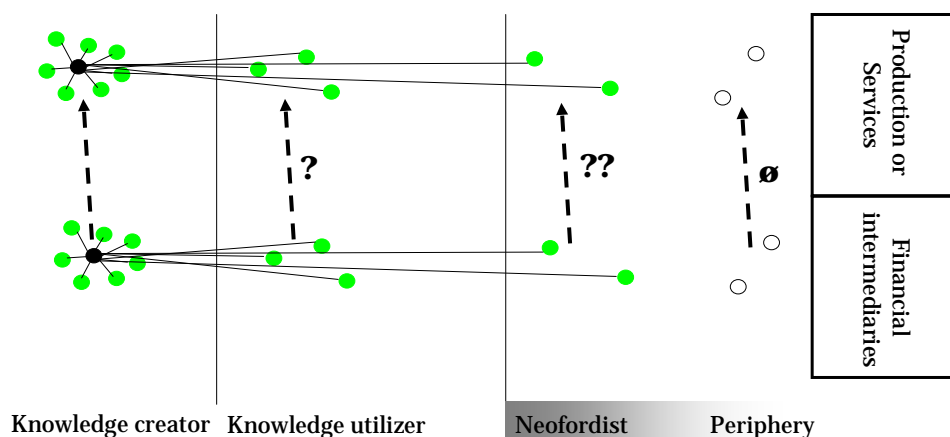


Figure 2. Possible financing channels between parallel layers of real economic networks and financial intermediaries – under Porter-type regional assumptions

Source: own edition

Dynamic conditional correlation (DCC) analysis to present impacts of extreme events

Contagions could be defined as a significant increase in market comovement after a shock to one country as Forbes-Rigobon (2002), Caporale et al. (2005) and Kuper-Lestano (2007) mentioned. This phenomenon is explained mostly by two theorem: strong cross border relationships between the economies or sudden shifts in market actors expectations and confidence (Kuper-Lestano 2007). Therefore capital movements are the major factor in generating stock return fluctuations, while a sudden capital outflow could cause a sharp depreciation in real exchange rates (Wong-Li 2010). These are bad news for international diversified portfolio managers (as pension funds), because their risk management depends on time-varying correlation. Benefits of diversification eroded by increasing correlation on the tails of return probability distribution – especially on bear markets (Campbell et al. 2002). Hagstrom (2000) underlines the weak connection between the fundamental and market values on the medium run (in a decade), while Komáromi (2004) analyzes the occurrence of bubbles according to this phenomenon.

The aim of this study is to evaluate the utility of each possible investment channels for second pillar pension funds in the selected region. Farkas (2010) made the statement that these countries have underdeveloped capital markets – so their financial intermediaries have to be determined mostly by external developments.

Existence of interdependence could underline the hypothesis that pension funds could be act much more as liquidity providers than economic accelerators. There are several method to measure, how shocks are transmitted internationally. Cointegration techniques are useful only

on long periods to measure impacts of trade integrations or higher capital mobility. The usage of traditional cross-market correlations were rejected by Forbes-Rigobon (2002) due to the heteroscedasticity bias. MGARCH procedures are able to handle problems of serial correlations, heteroscedasticity and asymmetric probability distributions – BEKK-GARCH and dynamic conditional correlation (DCC) methods are meaning the mainstream today⁴.

This study used a DCC model⁵ to analyze inter-temporal interactions between the US, European, Hungarian, Polish and Russian daily bond, stock and currency market returns between 3. January 2002 and 30. January 2009 (1817 observations).

Standard picture of efficient markets are showed by the higher level of standard deviation at higher mean level of logarithmic means. But there is a lack of normal distribution as Kolmogorov-Smirnov test for normality suggest. Negative skewness means fatter left (dropping) side, against a robust right (emerging) side. Therefore extreme events had higher occurrence during negative developments, while positive movements were similar mostly in the case of all emerging stock markets opposing to Dow Jones Industrial. Bond markets behave quietly similar – except GKO-OFZ, which is the most fragile instrument in the sample. We can find the opposite in the case of currency markets due to the opposite logic of exchange rates. While the main currencies are determined by the devaluation trend of USD against EUR with rare test backs, emerging actors behave extremely during their devaluation. Kurtosis is the indicator of the representation of mode inside the distribution. High kurtosis means a robust mode with dangerous backyard filled with extreme events – so the market usually operates normally, but it collapses when something weird happen.

Table 1 Data overview and descriptive statistics for the return series

	N	Skewness	Kurtosis	Mean	SD	Kolmogorov-Smirnov	
						Z	Asymp. Sig. (2-tailed)
DJI	1817	0.1241	10.2356	-0.0001	0.0128	4.1869	0.0000
RTS	1817	-0.6625	14.1959	0.0004	0.0225	4.8399	0.0000
BUX	1817	-0.3164	9.2518	0.0002	0.0159	2.6750	0.0000
WIG 20	1817	-0.2585	2.4823	0.0001	0.0161	2.0375	0.0005
US 10Y	1817	-0.1076	2.0352	0.0000	0.0007	1.8553	0.0020
EU 10Y	1817	-0.1124	1.3083	0.0000	0.0004	1.7123	0.0057
MAX	1817	-0.1237	18.6461	0.0002	0.0044	7.0802	0.0000
DZ0110	1537	-0.1507	5.6904	0.0000	0.0022	5.9033	0.0000
GKO-OFZ	780	-3.6813	42.6656	0.0000	0.0014	9.0965	0.0000
USD/EUR	1817	-0.2348	3.7052	0.0002	0.0063	2.0230	0.0006
HUF/EUR	1817	1.3987	12.8395	0.0001	0.0057	4.2770	0.0000
RBL/EUR	1817	0.7882	8.5373	0.0003	0.0053	3.5858	0.0000
PLN/EUR	1790	0.6517	5.2166	0.0001	0.0064	3.1172	0.0000

Source: own calculations

According to literature suggestions, tail asymptotic distribution was examined on two ways. At first exponential and power-law tail distributions had to be separated by a simple R^2 based fitting-test⁶. Than estimated power-law properties were studied by Clauset, Shalizi and

⁴ for example: Kuper-Lestano (2007), Caporale et al. (2005), Wong-Li (2010), Stavárek (2009), Égert-Koubaa (2004), Babetskaia-Kukharchuk (2008), Kasch-Haroutounian – Price (2001), Arnerić et al. (2009)

⁵ this script for E-Views is available at: <http://forums.eviews.com/viewtopic.php?f=4&t=574>

⁶ R-square – measures how successful the fit is in explaining of the variation of the data. A value closer to 1 indicates a better fit. General model for exponential: $f(x) = a \cdot \exp(b \cdot x)$ and for power-law: $f(x) = a \cdot x^b + c$.

Newman's (2007) improved quantile-based maximum likelihood estimation (MLE) method⁷, to estimate the scale parameter α . Size of the tails is determined by the scale parameter α – as smaller the α , as fatter is the tail. P-values are given by Monte Carlo procedures: the power-law model is fitted for generated synthetic data sets, and the number of times is counted when the Kolmogorov-Smirnov is larger than observed goodness-of-fit (maximum distance between the tail probability or cumulative distribution function of the empirical data and the fitted power-law model). (Clauset et al. 2009, Quismorio 2009)

As literature said, there are significant differences in the thickness, which means that emerging markets have fatter negative tails than developed markets. During periods of boom longer and thicker tails were detected with a power-law exponent α close to 3, while periods of stagnation characterized by shorter and thinner tails with an exponential decay close to 1. (Quismorio 2009)

Table 2 Tail distributions

	Power-law distribution				Exponential distribution	
	Negative tail		Positive tail		Negative tail	Positive tail
	α	p	α	p	R ²	R ²
WIG 20	1.9738	18.80%	2.1418	75.20%	91.08%	94.30%
DJI	1.8995	80.00%	1.8557	80.80%	86.59%	81.05%
BUX	1.7643	90.40%	2.0204	7.00%	79.25%	80.93%
RTS	1.8351	7.70%	1.9407	7.80%	84.86%	72.34%
US 10Y	2.0591	98.80%	2.1089	80.80%	93.94%	91.90%
DZ0110	2.2477	96.40%	1.5072	0.00%	90.46%	92.95%
MAX	1.7265	21.90%	1.7709	6.80%	88.72%	77.89%
EU 10Y	2.5059	5.90%	1.7372	0.00%	95.78%	92.87%
GKO OFZ	1.2255	0.00%	1.2343	0.00%	95.79%	97.25%
USD/EUR	2.0549	70.70%	2.0764	18.60%	98.00%	91.58%
RBL/EUR	1.9410	53.10%	1.8987	60.80%	91.04%	82.85%
PLN/EUR	1.9573	36.30%	1.8881	83.10%	88.97%	87.27%
HUF/EUR	1.9826	46.30%	1.8470	20.60%	98.66%	78.38%

Source: own calculations

Such asymmetries are identified at the negative tails of the sample. Stock and currency markets are behaving as power-law in both cases of market developments, and their α exponent remains under the literally presented 2.5 to 3.5 interval – which signs a lot of opportunities for unpredictable events in each conjuncture phase. Bond markets have only negative power-law tails, but the fitting process could be too difficult due to the observed enormous kurtosis. EU 10Y indicator is smoother than US 10Y, which could be the result of strict inflation targeting monetary policy of the ECB.

According to the forms of distribution, there are no strict differences between developed and emerging markets, the difference in α is marginal.

Relative autonomy of capital markets could be presented by nearly zero DCCs on the selected markets. According to the collection of results in Appendix 1, emerging and developed markets are slightly moving together. US and European bond markets are highly

⁷ Scripted in MATLAB, see <http://www.santafe.edu/~aaronc/powerlaws/>.

interconnected, while Hungarian, Russian and Polish indicators are giving a quasi constant or time-variant picture – this is a similar picture as the “exogenous” bond market study by Mills and Mills (1991). Polish Warsaw Stock Exchange is mentioned today as a regional leader according to its capitalization or the number of IPOs (Karsai 2009), but the average DCC of WIG 20 looks similar as Russian RTS indicator. Hungarian and Polish currencies had to face both with the changes in USD/EUR courses, appreciations after exchange regime changes (loosing pegs) (Stavárek 2009, Babetskaia-Kukharchuk 2008), and depreciations after capital outflows.

These results are making questionable the focusing on bond and stock markets. At first, pension funds providing liquidity only due the lack of corporate financing demand, second the diversification practices are not enough alone to avoid capital losses under extreme market turbulences.

Venture capital funds as an alternative investment tool

VC funds could be defined as local players according to their “close to home” investments and geographical clustering to provide the required manpower, customers, potential partners and managers. The main added value of VCs is the labor intensive ability to bring a deep knowledge of the technologies and markets into targeted enterprises according the VCs large networks of contacts (Callahan – Muege 2003). VC and private equity funds have a significant role in the (re)optimization of production factors trough the focusing (or refocusing) the strategic activities of the selected firms trough the selling of lower performing activities and concentration the interest on greater growth areas. The narrowing of strategy increases new product development and the focusing of intellectual property portfolios trough establishing technological alliances, entrepreneurial ventures and increasing R&D staff size and capabilities as Wright et al. (2009) suggest. The increase of plant-level productivity has a mixed impact on employment, because of the frozen level of wages, the reduction in the number of non-production employees and conversion from full- to part-time working (Wright et al. 2009). Purchasing of shares were the most common investments tool in the past, convertible preferred shares and senior liquidation rights with minimum conversion values became more popular in financing. VC investments are commonly staged with milestones and ends with a liquidity event after 4-5 years, like initial public offering (IPO), acquisition to an another company (for e.g. a buying out fund) or forcing bankruptcy (Callahan – Muege 2003). Open or closed end VC funds are raised by VC firms (as general partner) trough selling units of interest to limited partners (LPs) such as banks, endowments, foundations, worthy individuals pension funds and insurance companies. Subscription targets and investment policies are defined by the VC firm, and they have to manage information asymmetries and decrease agency costs. LPs providing their capital and paying management fees, but have no role in managing the funds. LPs can realize liquidity on their investment, when the fund is terminated (usually after 10 years), and capital gains are shared between general partners (ca. 20%) and LPs. (Callahan – Muege 2003, Barnes – Menzies 2005)

LPs are using the same screening methods to select VC firms and to allocate their VC funds – according their historic returns, diversification strategy and perceptions of ‘adding value’. There is an evolutionary pathway, allocating only from annual budget or using external sources could be mixed there (Barnes – Menzies 2005). Investment policy and allocation process of pension funds are strongly depend form the externalization of asset management. Pension funds could be bank or insurance group subsidiaries, where non-core activities are managed by other subsidiaries, while corporate of individual pension funds are using external managers. Allocation decisions of subsidiaries can not be independent form the accumulating

or profitability strategies of sponsor institutions as the Hungarian Financial Supervisory Authority (2009) suggest.

Financial engineering facilitates the transformation and reshaping of risk, but there is a common debate in the literature about the interaction between the real economy and liberalized financial systems (Fischer-Chenard 1997, Tadesse 2002, Freixas et al. 2007, Csontos et al. 1997, Jenkinson 2008). Some authors emphasize the disadvantage of network operations, in which the high efficiency on liquidity allocation capability and the ability of fast feedback through current account cause immanent instability of the current financial system with short-term orientation and unrelenting concentration of wealth (Brunnhuber et al. 2005, Magas 2005).

Venture Capital is a specialized form of investing, which strongly favors high growing industries and accelerates commercialization of products through active involvement in the management. In the world of “law of small numbers”, VC prefers firms in expanding phase or supports restructuring, while their returns generated by a small fraction of investments. The more established and experienced funds with small portfolio sizes per manager ratios generally achieve higher returns – as a sign of “manufacturing scopes” of the segment. Valuation failures on the capital markets – as differences between long-term dividend or cash producing ability and share price – could be useful to allow purchases with a discount. Robustness against global liquidity turbulences of long-term investor VC funds are underlined by these aspects.

However, VC funds and investments are finite allocations, so their value and liquidity is sensitive to volatile market conditions, because willingness of invest is strongly depend on the current state of equity markets. On the other hands, VCs operating with high leverage and the cash flow coverage of interest payments are depend on debt swap market.

Venture Capital is robust only against stock market developments in the phase of target firm acquisitions, but strongly depend during liquidation events (IPOs). This dependency is reduced slightly by buying out funds, but the high level of leverage make them sensible on the developments of debt markets and yield curve. (Hagstrom 2000, Wright 2009, Callahan – Muege 2003)

Private equity firms have been accused of asset stripping, and profiting from asset flipping, so the ethic and financial dilemma of value creation versus value appropriation is given. LP investor characteristics are strongly in connection with the performance of VC funds, so the selection of VCs could be similar structured process as they are choosing target firms. Measurement of ‘reputation’ means a monitoring of former returns and the rate of bankruptcy in VCs portfolio. Unfortunately, pension funds are allowing mostly for poor performer general partners to rise new funds in the developed countries as literature suggest. Therefore, it is hard to offer the investment in VCs for Hungarian pension funds, while they were shocked with the introduction of stock-oriented portfolios in 2006 – as they suggested in the interviews. (Wright 2009, Callahan – Muege 2003, Barnes – Menzies 2005)

Allocation between global and domestic based VCs could be also a good question, respondents signed the problem of tax optimizing and poor prudential control of the segment at global VCs. Domestic VCs will using JEREMIE funds, provided by the EU, but there is a lack of track record in their past and JEREMIE is an alternative of pension capital.

Current pension, stabilization and accelerator policies in the V4 and Russia

Mandatory funded pillars are exist almost in all country – the only exception is the Czech Republic. Hungary and Slovakia have to face with low capitalized domestic stock markets, so bond oriented strategies could be obvious in their case. Poland has an outperforming stock exchange in the region and the pension funds are traditionally following a stock oriented

strategy as Sierhej (2008) and Fultz-Ruck (2001) mentioned. De facto state monopoly Russian second pillar fits perfectly in the defensive financial structure of the state. Therefore it is necessary to study, how bond-oriented strategy could promote external financial stability.

The first systemic pension reform in Central and Eastern Europe was approved in Hungary in 1997 with the introduction of a privately-managed mandatory pension funds (MPF) as second pillar. MPF assets had increased to 9,7 percent of GDP in 2006, which compares to assets of 2.6 percent of GDP managed by the voluntary pension funds, which has been operating since 1993 (the third pillar). Developments differed from assumptions. Firstly, participation in the second pillar was higher than expected. Portfolios were too conservative with slow growth, while operational costs remained high. (Impavido–Rocha 2006) After regulatory changes in 2006, government bonds remained as a dominant component in the portfolio (51%), while shares and investment funds has an increasing role (33%) at the end of 2007 (Gaál 2007). This Hungarian strategic transition could be a good example on the trap of the unlucky combination of bond oriented strategy, introduction of multipillar pension system and de facto fixed contributions. Second pillar is able only to convert the implicit demographic debt to an explicit public debt – how to generate surplus debt without certain financial gains for the future pensioners and postpone Euro-zone accession.

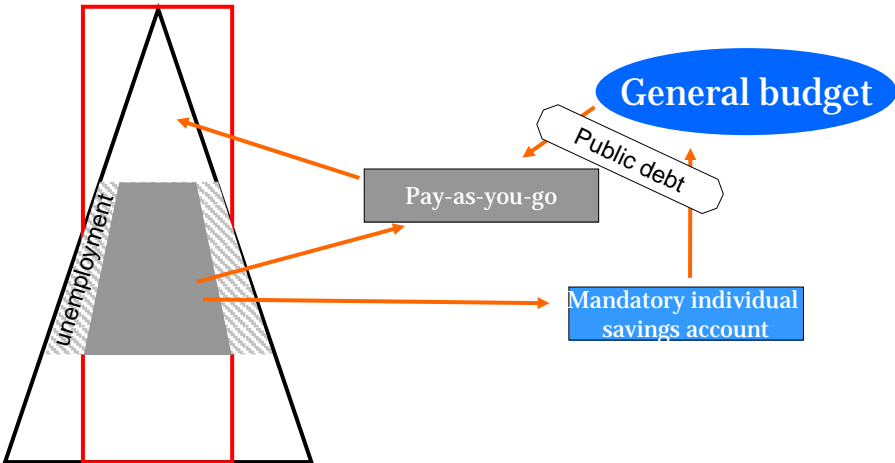


Figure 3. The Hungarian trap during the introduction of multipillar pension system.
Source: own edition

State owned asset manager, the Vnesheconombank has a monopolistic role in the first and second pillar in Russia. The Private Asset Managers in the second pillar and Non Governmental Pension Funds or Independent Pension Funds in the third pillar had only 4% share together from the entire pension asset at January 2006, but IPFs increased to 12.8% in Q2 2009, while PAMs remained at 2.4% (Gajdar – Mau 2008, Gurvich 2008, IET 2009). State managed portfolios remained very conservative with a share of government bonds at 88,4% at the end of 2007. It is despite of the Government Resolution #379 of June 30, 2003, which allows holding shares of open joint-stock companies up to 65 percent. (Gajdar – Mau 2008, Gurvich 2008) RF rouble denominated government securities had 96.4% at the end of 2008, but it was reduced to 72.6% due to the transfer of the pension contributions for the year 2007 from the PFR so 24.9% share of deposit signs only that managers had no time to invest

these monies in securities. A much more diversified investment strategy were followed by PAMs in the second pillar, preferring mostly bonds of Russian economic societies (43%), while subfederal and municipal bonds have the same weight as shares (15%). Value of the assets in the case of Vnesheconombank fell back in April 2009 on the level of October 2007 (325 billion RBL), but historical returns became 'positive' in July (446.6 billion RBL) due to the higher level of global liquidity. PAM assets were less volatile, significant decline existed only for three quartile years (3Q 2008-1Q2009). (IET 2009)

The former Stabilization Fund was the another stabilization tool in Russia. This quasi sovereign⁸ fund was formed in 2004 as a part of the federal budget to balance it at the time of when oil price falls below a cut-off price, currently set up at \$27 per barrel⁹ and to ensure the redemption of the loans¹⁰ of the Paris Club, IMF, and based on the revenues of oil export duties and extraction taxes. Russia's external debt fell in 2006 to 5 % of GDP, therefore V. Putin has proposed to maintain the reserve function fixed as a percentage of GDP, and a "the future generations' fund" is being formed from the excess of this level (IET 2006).

Subdividing of the Stabilization Fund was accomplished in 2008 with the introduction of Reserve Fund (with 141 billion USD) and National Wealth Fund (with 48.7 billion USD). Reserve Fund is limited to 10% of the Russian Federation GDP¹¹ accumulates federal budget revenues (production taxes and export duties) from production and export of oil, natural gas and oil products. The Fund follows strict rules to reach capital preservation and stable level of return in long-term perspective through purchasing of foreign currencies (USD, EUR, GBP) and financial assets denominated in foreign currencies¹². Assets are invested by the Bank of Russia after the allocation to the Federal Treasury's accounts. The peak point of the Funds assets was in September 2008 with 142.6 billion USD (9.7% of GDP), than a linear decrease started according to the Federal law No.58-FZ dated 9 April 2009¹³. Only 59.91 billion USD remained at the Reserve Fund in 1 February 2010 – as 4.7% of GDP. (MFRF 2010, IET 2010) National Wealth Fund aims at capital preservation and stable level of return in long-term perspective, with a possibility of negative return in short-term period through the purchase of foreign currencies (US dollars, euro, GB pounds) or financial assets denominated in Russian ruble and eligible foreign currencies¹⁴. The Funds capital fluctuated around 32-34 billion USD (7.1% of GDP) in 2009 after the 10.4 billion USD initial transfer from Stabilization fund in January 2008. Vnesheconombank act as the domestic investor of the fund: 2 billion USD was allocated in "not regulated" deposit since the end of 2009, while 434 billion RBL was

⁸ „Russia does not yet have a sovereign wealth fund (SWF) but is working to create one, Prime Minister Vladimir Putin told U.S. Treasury Secretary Henry Paulson on Jun 30, 2008“ (Reuters).

⁹ Budget code of the Russian Federation, Chapter 13.1, Article 96.1, 96.2

¹⁰ Sovereign debt declined with 61% between 2000 and 2006, former Soviet debt, IMF loans (3.3 bln USD) and Paris Club loans were paid back ahead of schedule (IMF Country Report No. 06/431, IET 2006, MFRF 2010).

¹¹ forecasted for the corresponding fiscal year (MFRF 2010)

¹² Ministry of Finance constituted the following rules in compliance with the authority vested by the Government of the Russian Federation:

- Currency composition: 45% USD, 45% EUR, 10% GBP;
- Period of maturity for debt securities denominated in USD and EUR between 3 months and 3 years, while for GBP between 3 months and 5 years;
- There is a dedicated list of foreign government agencies.

<http://www1.minfin.ru/en/reservefund/management/>

¹³ Since 2009 up to 2012 returns and assets are used to deploy payments that reduce debt, borrowing programs and ensure that federal budget is balanced (including financing of oil and gas transfer). Deployment of funds can exceed overall federal budget expenditures in case and in scope of increase of federal budget expenditures for ensuring budget balance of non-budgetary government funds of the Russian Federation. (Federal law No.58-FZ dated 9 April 2009)

¹⁴ Additional investment requirements by The Ministry of Finance:

- Maximum amount of NWF assets in Russian rubles are 40% while in foreign currency it is 100%;
- While the currency composition of NWF for assets and the period to maturity of debt securities has the same rules as the Reserve Fund.

<http://www1.minfin.ru/en/nationalwealthfund/management/>

allocated in deposit to finance subordinated loans to Russian banks (404 billion RBL until 2019 and 2020), loans to small and middle enterprises (30 billion RBL until 2017), loans to Open joint-stock company “The Agency for Housing Mortgage Lending” (frame of 40 billion RBL until 2015)¹⁵. (MFRF 2010, IET 2010)

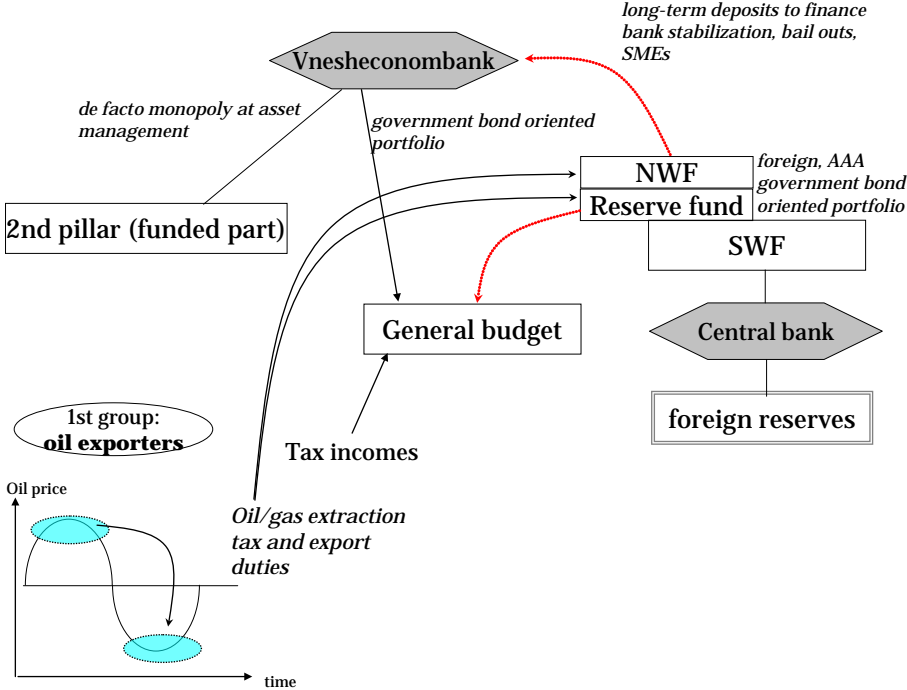


Figure 4: Russian patchwork of stabilisation – cooperation between SWFs and the second pillar.

Source: Beck – Fidora (2008), MFRF (www.minfin.ru), IET (2009)

Bond oriented strategy is something different in the Russian context. Stock oriented private asset managers were marginalized (but they are evolving in 3rd pillar), while Reserve Fund and National Wealth Fund oriented on outstanding foreign government bonds. It is necessary to smooth the impact of volatility of oil and raw material prices on the sustainability of federal budget.

Strategic questions are the levels of managing cost and net returns in the case of second and third pillar. According to World Bank, Polish and Russian experiences, second pillar is adequate, when portfolio is less conservative and management fees are under 2%. Polish portfolios (from 70% fixed and 30% stock assets) produced 12.3% nominal return between 2001-2007, which was the double of Hungarian pension yields – where portfolios were filled from 15% to 30% only after 2006 on the top of bullish market (Sierhej 2008, Impavido – Rocha 2006).

Conclusion

This study aimed to evaluate pension reforms in V4 countries and in Russia – how the existing system fulfills the social and economic demands. The quality of a pension system can be described by the following measures: (1) ability to meet its formal obligations; (2) maintenance of the purchasing power of pension payments; (3) maintenance of an established ratio of pensions to wages; and (4) adequacy of a target value of the replacement coefficient

¹⁵ <http://www1.minfin.ru/en/nationalwealthfund/statistics/vnesheconombank/>

or index (Gurvich 2008). In the case of funded pillars (second, third or fourth) this quality depends on contributions in the past, income accruing from the investment in the future, and managerial costs and fees during the accumulation period – besides demographic and labour market conditions (Simonovits 2002).

To make this evaluation on spatial and serial scales it was necessary to pay attention on the following issues:

- Most intercountry linkages are intra-industrial connections according to production and supply chains. Such forward-backward dependences are measurable inside the European Union, where international fragmentation of the production process occurs as an internationalization of production of large firms headquartered in the euro area and using production facilities located in the new Member States (Dietzenbacher – Romero 2007, di Mauro et al. 2008). If we would like to accelerate the economic growth, we have find the way to establish hubs and enhance domestic network performance.
- Share of government bonds in pension portfolios raises a moral issue – do bonds act as a safe, fixed component of pension portfolios to minimize effects of global market turbulences, or pension system is a stabilizer of public debt market? In optimal case, both statements have to be true. If we want to stabilize our currency and want to establish financial puffers, it is better to form AAA government bond oriented SWFs instead of converting additional public debt trough “explicitizations”.
- Venture Capital is robust only against stock market developments in the phase of target firm acquisitions, but strongly depend during liquidation events (IPOs). This dependency is reduced slightly by buying out funds, but the high level of leverage make them sensible on the developments of debt markets and yield curve. (Wright 2009, Callahan – Muege 2003) If privatization was already happened and pension fund has weak capacity (or opportunity) to allocate directly into well-performing enterprises, it is better to use professional managers, as VCs. VC is not fully resistant on capital market turbulences, but – with a good track record – it can promote the performance of domestic economy.

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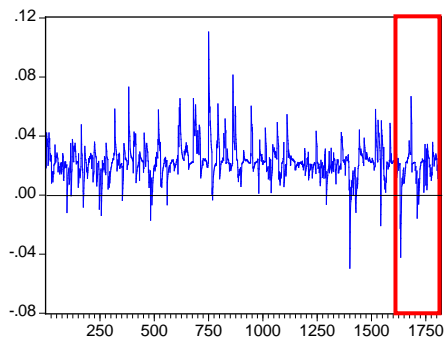
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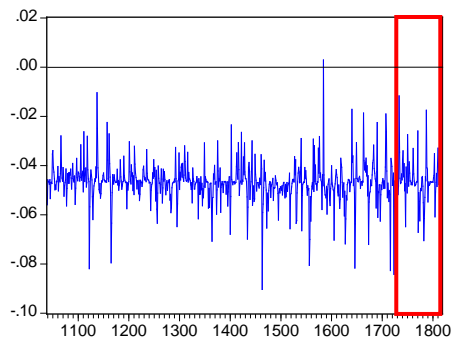
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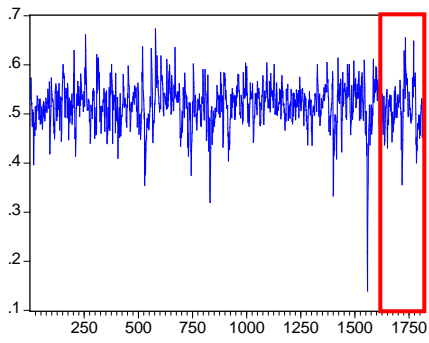
Appendix 1 – Results of DCC tests



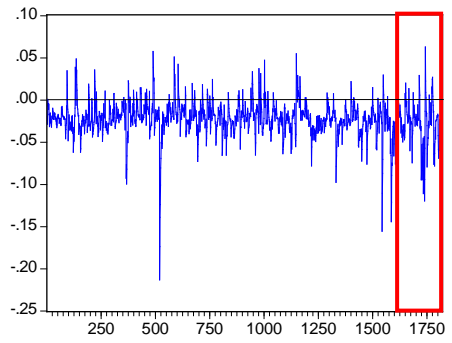
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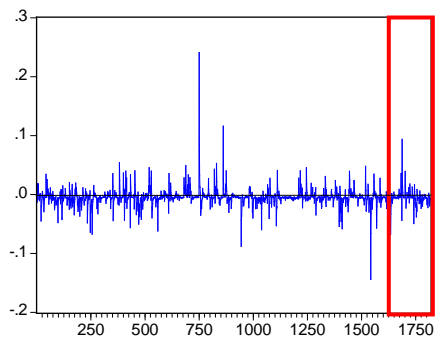
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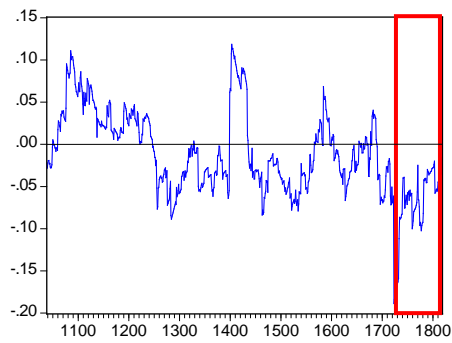
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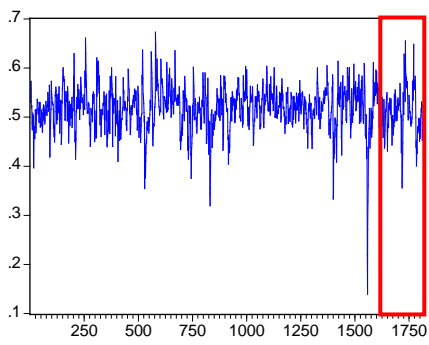
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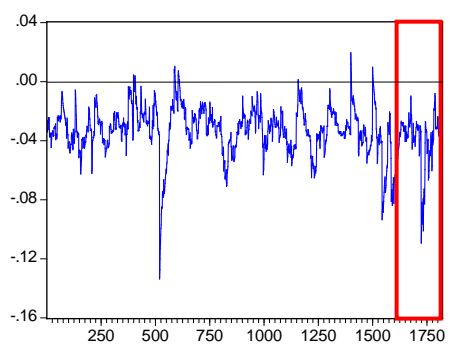
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DCC US10YMAX

