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Market dependency and financial buffers in Russia

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During Russia's transition, debates raged over the formation of a market economy and the role of the state. Behind these debates lay both the control of oligarchs over strategic branches of the economy that export raw materials and the experience of the 1998 crisis that drew attention to the country's external and internal economic vulnerability. This study deals with the operation of the country's sovereign wealth funds (SWFs), including the effects of raw material prices, the pension system and aspects of the lessons of capital market turbulences under the current crisis. The Russian version of the multipillar pension system puts the emphasis on financial sustainability, by which only a minimum of financial risk has been taken by the State, while its monopoly in the management of pension funds has ensured a market for its own debt.

Keywords: imbalances, sovereign wealth fund, Russia, oil, DCC MGARCH
JEL code: E44, E62, I38, O16

1. Introduction

How is market volatility manageable by sovereign financial buffers? Were sovereign funds and the second, funded pension pillar established to handle raw material export dependency? Sovereign Wealth Funds (SWFs) were defined by Beck and Fidora (2008) as public investment agencies which manage part of the (foreign) assets of national states' sovereign wealth funds more similar to private mutual funds. There is a lack of explicit liabilities, so they can focus on long-term investment strategies. Substantial exposure to foreign investments could occur, or they are even entirely invested in foreign assets to stabilize the domestic currency. The recent rise of SWFs could be caused by poor trust in the "efficiency" of capital flows and supranational crisis management (Beck–Fidora 2008, Redrado 2006) or to avoid deterioration in the non extraction branches with higher added value (Weiner 2004, Mehara 2004 and Mehara–Oskoui 2008).

The main difference between SWFs and funded pension funds are the latter's explicit liabilities and their obligation to provide a continuous stream of fixed payments – which limits the scope of possible investment products under the accumulation period (Beck–Fidora 2008, Vittas et al 2010). If multipillar pension systems have to deliver on expectations, financial sectors must be adequate in three basic dimensions as Holzmann et al (2009) suggest: macroeconomic stability, a sound financial infrastructure, and adequate regulatory and supervisory capacity.

Unfortunately, an established institutional environment is not the only prerequisite for a well-functioning capital market if imbalances and vulnerabilities are arising from the country's energy supplier role in the world economy. Domestic financial markets could be the indicator of this dependence, and could have pro-cyclical impact on the development of the real economy. Therefore it is necessary to study these segments together to analyze the strategy of Russian pension and sovereign fund policies.

This paper is structured as follows in order to study the vulnerability of the Russian economy: after the overview of the possible trade-related sources of imbalances, financial tools and solutions are presented to summarize this special way of crisis management, then developments on Russian financial markets underlying the necessity of these strategies are presented.

2. The structural dependence on energy prices

To describe the oil and gas-dependency of the Russian economy, this study deals with the following aspects: the direction and significance of Russian oil export, the sustainability of this process (the relationship between proven reserves and existing extraction capacities) and the impact on ownership composition.

Mineral product prices are highly volatile, and they have a major role in Russian exports (42.5% in 1995, then 69.6% in 2008). While Russian oil production reached it's peak point in 1988 with 12.5 million barrels a day extraction, crude oil prices remained under 30 USD (in 2007 prices), while it declined on 6 million during the Russian crises in 1998 (with an average price under 20 USD). Before the current economic crisis, the prices stepped over the 100 USD level, with a daily production of 9.9 million barrels.

The BRIC hypothesis – where Russia and Brazil will become commodity suppliers to China and India – as a Goldman Sachs Economic Research report suggested (Cheng et al 2007) – could be rejected according to the main direction of Russian oil and gas export. The European Union is the main buyer of Russian gas and oil with a 32.6% share from crude oil and a 38.7% share of EU gas import (Tenth Progress Report 2009). EU-Russian relations look much more monopsonic, than monopolistic, due to both the Russian and CIS export direction: of 627 million tons of oil extraction, 318.5 million tons were exported into Europe, 23.8 million tons into the USA and only 22.4 million tons into China, while the domestic consumption remained 222.7 million tons (BP 2009). China was only in 5th place concerning Russian exports (4.5%), while Europe gained 65% (Russia in Figures – 2009). This strong interdependence necessitates the institution of an energy dialogue and EU-Russia Energy Partnership since the sixth EU-Russia Summit (30th October 2000, Paris) (Ludvig 2008).

Price and trade dependences are not the only problems: current oil extraction is still based on the fields of Western Siberia and Sakhalin (Asif–Muneer 2007, BP 2009). Nationalization[1] and a punitive tax regime in the oil sector resulted only in the higher efficiency of the existing infrastructure in the upstream segment (Puffer–McCarthy 2007, Davies 2003). Sustainability problems are indicated by the rate of the output volume and global weight of reserves, too. Hence there was a 6.3% share from the proven global oil reserves in 2008 (OPEC: 76%, OECD: 7.1%), and it's extraction was almost the highest in the world at 9.9 million barrels a day with a 12.4% share on the global market (BP 2009).

This "efficiency", or the lack of new capacities, also has structural grounds. The recombination of production factors through privatization was not enough to establish a market economy – as Dabrowsky et al (2000) and Stiglitz–Ellerman (2001) argued – due to the oligopolistic structure of the strategic branches (such as the extractive and heavy industry, or the defence sector), whose holdings include the entire production chain. Classic market competition works only in the case of retail, wholesale, financial services, food processing and the manufacturing industry, whose companies were partially hosted by foreign direct investors or privatized by the former management during the transition (Dabrowsky et al 2000). This duality[2] in the different competition levels in the economy resulted in a rivalry between private and state (or more precisely, siloviki) actors after the end of nineties and has reached its peak during the current crisis. The major goals of managing state property (or stakes) were defined in the "Concept for the Management of State Property and Privatization in the Russian Federation[3]", and are, among others, to increase the non-tax revenues in the federal budget, while dividing economic societies between strategic open-end joint-stock companies (OJSCs) with an absolute majority of the treasury, and other organizational-legal forms (as CJSCs, LPs, LLCs) (Maliginov–Radygin 2008). To improve companies' performance, professional managerial skills are required, which is difficult to achieve in a country where the Communist Party infiltrated into the social networks and created strange shortcuts between the state and the economy[4]. The current crisis had a strong impact on state-oligarch relations due to the loan-coverage shortage and bankruptcies of the oligarchs.

[1] For example the case of Sakhalin 2 where Shell, Mitsui and Mitsubishi were squeezed out in 2006, and rows with ExxonMobil about Sakhalin 1 production sharing agreements in 2008–2009 (BP Medium Term Oil Market Report 2009).

[2] Or triangle of market, *siloviki* and oligarchic capitalism of Russian state-managed network capitalism, as Puffer–McCarthy (2007) suggest.

[3] approved by Decree of the RF Government, No. 1024, of 9 September 1999.

[4] The phenomenon of communist state party's hub role to influence developments in the society, economy and state was analyzed by Csanádi (2007).

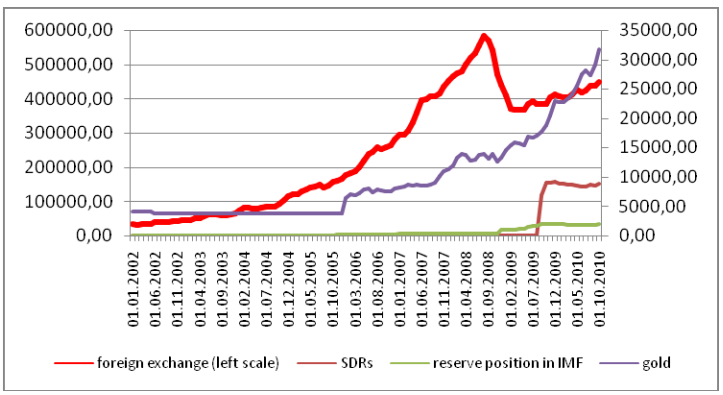
3. Tools of financial stability

Russia mainly depends on the volatility of energy resources, which underlines the necessity of building financial buffers to support the stability of the currency and the domestic liability (including the federal bond market). Traditional currency reserves focus on external balance, while SWFs could have both domestic and external goals. The funded part of the second pension pillar was aimed to stabilize the government bond market.

4. Traditional foreign exchange and gold reserves

The international reserves, according to the definitions of the Central Bank of Russia (CBR), consist of foreign exchange, SDR holdings, reserve position in the IMF, and monetary gold (see figure 1). Foreign exchange includes foreign currency; balances on nostro accounts including unallocated gold accounts; deposits with the initial maturity of 1 year and less, including gold deposits, loans arising from a reverse repo agreements with foreign central banks, the BIS, and other non-resident deposit-taking corporations, having the long-term creditability ratings of at least "A" by "Fitch Ratings" and "Standard & Poor's", or "A2" by "Moody's"; debt securities issued by non-residents, having an issuer rating of at least "AA-" by "Fitch Ratings" and "Standard & Poor's", or "Aa3" by "Moody's", and other financial claims on non-residents with the initial maturity of 1 year and less. The CBR wants to hold 10% of its long-term reserves in gold (WGC 2007). In October 2010 it remained 6.5%, while securities in convertible currencies reached 91%. SDR and reserve positions in the IMF have had an increased role since the December 2008 and September 2009, currently with 1.8% and 0.4%.

Figure 1. The composition and changes of Russian international reserves (in million USD)



Source: own construction on the basis of CBR (http://www.cbr.ru/eng/statistics)

5. Sovereign funds

The former Stabilization Fund as a quasi sovereign[5] fund was formed in 2004 as a part of the federal budget to balance it at such time when the price of oil falls below a cut-off price, currently set up at $27 per barrel[6] and to ensure the redemption of the loans[7] of the Paris Club, IMF, and was based on the revenues of oil export duties and extraction taxes. Russia's external debt fell to 5% of GDP in 2006, therefore Vladimir Putin has proposed maintaining the reserve function fixed as a percentage of GDP, and a "future generations' fund" is being formed from the excess of this level (IET 2006).

Subdividing the Stabilization Fund was accomplished in 2008 with the introduction of the Reserve Fund (with 141 billion USD) and the National Wealth Fund (with 48.7 billion USD). The Reserve Fund, which is limited to 10% of the Russian Federation GDP[8], accumulates federal budget revenues (production taxes and export duties) from the production and export of oil, natural gas and oil products. The Fund follows strict rules to reach capital preservation and a stable level of return in the long-term through the purchasing of foreign currencies (USD, EUR, GBP) and financial assets denominated in foreign currencies[9]. Assets are invested by the Bank of Russia after the allocation to the Federal Treasury's accounts. The peak point of the Fund's assets was in September 2008 with 142.6 billion USD (9.7% of GDP), then a linear decrease started according to the Federal law No.58-FZ dated 9 April 2009[10]. Only 17.2 billion USD remained at the Reserve Fund on 12 July 2010 – as 5.3% of GDP (MFRF 2010, IET 2010).

The National Wealth Fund aims at capital preservation and a stable level of return in the long-term, with a possibility of a negative return in the short-term,

[5] "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).

[6] The budget code of the Russian Federation, Chapter 13.1, Article 96.1, 96.2.

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

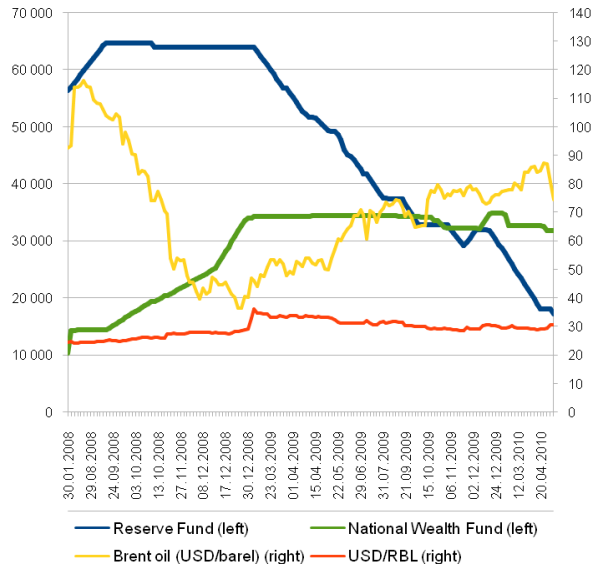
[8] Forecasted for the corresponding fiscal year (MFRF 2010).

[9] The Ministry of Finance constituted the following rules in compliance with the authority vested in it 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 adedicated list of foreign government agencies. http://www1.minfin.ru/en/reservefund/management/

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

through the purchase of foreign currencies[11] (USD, EUR, GBP or financial assets denominated in Russian rubles and eligible foreign currencies. The Fund's capital fluctuated around 32–34 billion USD (7.1% of GDP) in 2009 after the 10.4 billion USD initial transfer from the Stabilization Fund in January 2008. Vnesheconombank act as the domestic investor of the fund: 2 billion USD was allocated in "not regulated" deposits after the end of 2009, while 434 billion RBL was allocated in deposits to finance subordinated loans to Russian banks (404 billion RBL until 2019 and 2020), loans to small and medium-sized enterprises (30 billion RBL until 2017), and loans to the Open joint-stock company "The Agency for Housing Mortgage Lending" (in the range of 40 billion rubles until 2015)[12] (MFRF 2010, IET 2010).

Figure 2. Value of Sovereign Wealth Funds in Russia (in million USD) and external impacts (January 2008- April 2010)



Source: own construction on the basis of MFRF (www.minfin.ru)

Consequently, figure 2. summarizes the amount of the two SWFs in comparison with the oil price and ruble rate. Oil prices had no direct impact on other variables: only a 4 month lag delay could be identified between them.

There is a discussion in the literature according to the rate of traditional reserves and SWFs. Theoretically, 3 months of import should be covered by

[11] Additional investment requirements by The Ministry of Finance: the maximum amount of NWF assets in Russian rubles are 40%, while in foreign currency it is 100%; the currency composition of the NWF for assets and the period to maturity of debt securities have the same rules as the Reserve Fund. http://www1.minfin.ru/en/nationalwealthfund/management/

[12] http://www1.minfin.ru/en/nationalwealthfund/statistics/vnesheconombank/

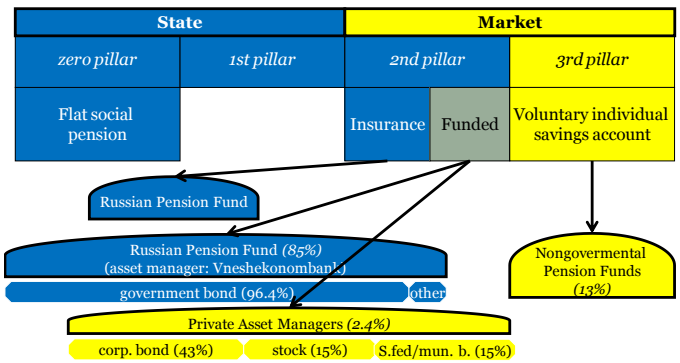
currency reserves, but Beck and Fidora (2008) identified two groups of countries on the basis of preferring SWFs or traditional reserves. The first category is formed by raw material exporter countries, and the second covers the manufacturing exporters. While first group has to prepare for the post-oil era and volatile raw material prices, the second group maintains pegged currency regimes. As figure 1 and figure 2 suggest, at the peak of the accumulation period (4Q 2008) Russia preferred traditional reserves too – the two SWFs reached only 20% on an aggregate level, which is the inverse of the Norwegian level.

6. The funded part of the second pillar in the pension system

A multipillar pension system was introduced in Russia after 2001, but this study deals only with the mandatory funded part of this structure according to its special institutional environment.

The Russian mandatory second pillar is interesting because of its de facto state monopoly in asset management. State-owned asset manager, Vnesheconom-bank, has a monopolistic role, while Private Asset Managers (PAM) in the second pillar and Non Governmental Pension Funds or Independent Pension Funds in the third pillar together had only a 4% share of the entire pension asset in January 2006, but IPFs increased to 12.8% in Q2 2009, while PAMs remained at 2.4% (Gajdar–Mau 2008, Gurvich 2008, IET 2009).

Figure 3. De facto state monopoly in the funded pillar



Source: own construction on the basis of Kovrova (2007), Konshin (2005), Krivoshchekova et al (2007), Gajdar–Mau (2008), Gurvich (2008) and IET (2009)

State-managed portfolios remained very conservative, comprised of 88.4% government bonds at the end of 2007 (see figure 3). This is inspite of 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 ruble-denomin-

ated government securities made up 96.4% at the end of 2008, but were reduced to 72.6% due to the transfer of the pension contributions for the year 2007 from the PFR, thus a 24.9% share of deposits indicates only that managers had no time to invest these monies in securities. Much more diversified investment strategies 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%). The value of the assets in the case of Vnesheconombank fell back in April 2009 to the level of October 2007 (325 billion RBL), but historical returns became 'positive' in July 2009 (446.6 billion RBL) due to the higher level of global liquidity. PAM assets were less volatile, significant decline existing only for three quartile years (3Q 2008–1Q2009) (IET 2009).

The Russian state budget is in a comfortable position: the introduction of the multipillar pension system allowed the reduction of future financial liabilities, and the de facto state monopoly in the mandatory funded pillar maintained a stable demand on the public debt market.

After the definition of the external and internal sources of Russian oil dependence and the institutional background of reserve buffering, it is necessary to study how the Russian currency[13] (RBL/USD), interbank (MIBOR) and stock markets (RTS) are behaving under conjuncture and depression.

7. The financial market as an indicator of vulnerabilities

Contagions could be defined as a significant increase in market comovements 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 theorems: strong cross border relationships between the economies – as stands for the case of EU27 and Russia – 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).

From a statistical perspective, extreme events occur in the tails of probability distributions that define the occurrence of events of a given size (Albeverio et al 2005). They are more common on emerging capital markets due to the lower level of liquidity. A declaration of convertibility and allowance of free movement of capital could have adverse results during global depressions, when prices of resources are declining. Therefore, it is necessary to analyze Russian stock[14],

[13] The RBL is free floated, but against a 55% USD 45% EUR bicurrency basket since 8 February 2007, http://www.cbr.ru/eng/hd_base/BiCurBacket.asp.

[14] Logarithmic changes of the RTS Index were used as an indicator of the Russian Stock Exchange between 1 January 2002 and 1 September 2010, source of data: http://www.rts.ru/en/index/stat/dailyhistory.html?code=RTSI

interbank[15] and currency[16] markets in two event windows to compare market developments under "emerging" oil prices and reserves and under declining oil prices and reserves. The end of the first ("emerging") event window on 5 September 2008 was defined by the peak point of the Reserve Fund with 64,644 million USD according to the Regulation of the Government of the Russian Federation of 29.12.2007 № 955. The cumulated capital began to decline after 14 October 2008 for the purchase of Russian Federation currency. This step aimed to correct the Russian Federation's reserve position in the International Monetary Fund and to purchase Russian Federation currency for financing the federal budget deficit (Order of the Ministry of Finance of 10.03.2009 № 130).

8. Methodology

To describe market developments under "emerging" and "declining" conditions, the probability distribution of the selected market indicators were analyzed according to the following steps:

1. The normal distribution of logarithmic returns

$$x_t = [log(S_t) - log(S_{t-1})] * 100$$

$$f(x) = \frac{1}{\sigma\sqrt{2\pi}}^{[-\frac{1}{2}\frac{(x-\mu)^2}{\sigma^2}]}$$

(where μ and σ^2 are, respectively, the mean and variance of logarithmic return x – calculated from St daily prices) is the basic prerequisite for the efficient market hypothesis. To evaluate the existence of the efficient market hypothesis, a Shapiro–Wilks W test was used to diagnose that a set of logarithmic returns arise from a normal probability distribution (Molnár 2006, Everitt–Skrondal 2010).

2. In a normal distribution, tails (as extreme events) are exponentials as Albeverio et al (2005) suggest. In many cases, tails could be "heavy": for instance (algebraic) power laws with some fixed power, $p(x) \propto x^{-\alpha}, \alpha > 0.$ Power laws fall off much more slowly than exponential (Gaussian) distributions, indicating an enhanced probability of occurrence. Power laws (not exponentials) possess scale invariance, a property which can be expressed

[15] The interbank market was represented by logarithmic changes of the 1-day level MIBOR rate between 1 January 2002 and 1 September 2010, source of data: http://www.cbr.ru/eng/mkr_base

[16] The RBL/USD rate was used between 1 January 2002 and 1 September 2010, source of data: http://www.cbr.ru/eng/currency_base/dynamics.aspx.

mathematically as $p(bx) = b^{-\alpha}p(x)$, meaning that the change of a variable from x to bx results in a "scaling factor" independent of x, while the shape of p is conserved. Thus power laws represent "scale-free systems".

3. As the literature suggests (Molnár 2006, Gabaix et al 2003, Clauset et al 2009), probability distributions of logarithmic returns mostly follow power-law distributions. Power-law distributions are indicators of an extraordinarily diverse range of phenomena (Newman 2005). "Perfect storms" of capital markets are characterized by big falls in one equity price, which are accompanied by simultaneous big falls in other equity prices – and multivariate normal distributions are unfeasible tools for describing the heavy tail's "garden of improbable events". Estimated power-law properties were studied deeper by Clauset, Shalizi and Newman's (2009) improved quantile-based maximum likelihood estimation (MLE) method[17] estimating the scale parameter α. The size of the tails is determined by the scale parameter α – as the smaller the α, the fatter the tail is. 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 value is larger than the observed goodness-of-fit (the maximum distance between the tail probability or cumulative distribution function of the empirical data and the fitted power-law model), and in the $p \geq 0.05$ case, the power law distribution hypothesis on the examined side is accepted. (Clauset et al 2009, Quismorio 2009)

4. After the identification of the existence of extreme and low-probable events, logarithmic returns have to be cleaned from biases such as autoregression or heteroscedasticity processes. Fama and French (1988) modelled the natural logarithm of a stock price in t as a sum of a random walk (qt) and a first order autoregression process (z_t), $x_t = q_t + z_t$,

$$q_t = q_{t-1} + \mu + \eta_t,$$

$$z_t = \phi z_{t-1} + \epsilon_t,$$

where μ is expected drift, is close to but less than 1 while ε and η denotes a white noise. We have to concentrate on the unpredictable part of stock returns, as obtained through autoregressive regression which removes the predictable part of a return series as Kasch-Haroutounian and Price (2001) suggest. Multivariate Generalized Autoregressive Conditional Heteroskedasticity (MGARCH) models are representing a set of time series whose variances and

[17] Scripted in MATLAB, see http://www.santafe.edu/~aaronc/powerlaws/.

covariances change over time in order to consider the interdependence between conditional second moments of the selected return series from the emerging markets' European and US counterparts[18] starting in January 2002 and ending in September 2010, constituting a total of 1496 daily observations.

The GARCH(p, q) model is given by $$\sigma_t^2 = \alpha_0 + \sum_{i=1}^{q} \alpha_i \epsilon_{t-i}^2 + \sum_{i=1}^{p} \beta_i \sigma_{t-i}^2$$

where p is the lag length, σ^2 and q is the order of the ARCH terms ϵ^2, α_i is the impact of current news on the conditional variance process and β_i signifies the persistence of volatility to a shock impact of 'old' news on volatility.

5. Then Dynamic Conditional Correlations (DCCs) were defined on the basis of the GARCH residuals to study the comovements between Russian-European counterparts. Probability distributions of divided DCCs had to be compared to study what kind of differences occur under the two statuses. The existence of interdependence could underline the hypothesis that the Russian state has to prepare for sudden liquidity scarcity. There are several methods to measure how shocks are transmitted internationally. Co-integration techniques are useful only over long periods to measure the impact of trade integration 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 DCC methods represent the mainstream today[19]. This study used a DCC model[20] to analyze inter-temporal interacttions between Russian, European and US interbank, stock and currency markets. According to the lack of normal distribution, t-tests had to be rejected as a tool of comparing the similarity of market developments in both phases. This problem could be handled by data transformation as Osborne (2002) suggests, but the analyzed situation is too complex for any generalization – we have to face with the singularity and frequency dependency of these developments as Herrmann-Pillath (2000) suggests. Power-law fitting on DCCs for the comparison was applied because the power-law exponent describes exactly what we want: if α increases under "decline" phase, it signals the appearance of new and exotic improbable comovements.

[18] European indicators were preferred according to the main direction of Russian exports to satisfy the contagion hypothesis. O/N EONIA interbank rate, EUR/USD currency exchange rate, Brent type crude oil barrel price in USD are from (http://www.eia.gov/dnav/pet/pet_pri_spt_s1_d.htm), while DAX and DJI indexes represented the European and US stock exchanges on http://finance.yahoo.com data.

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

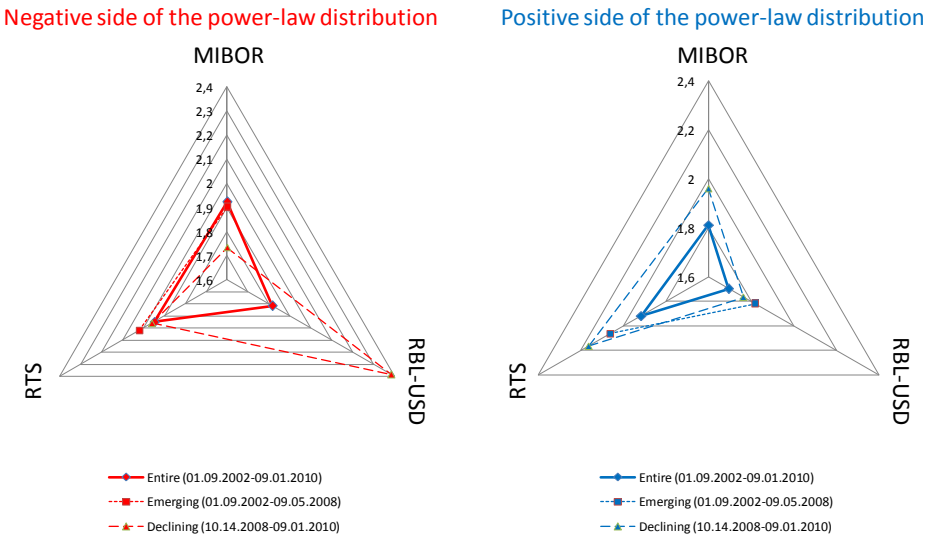
[20] This study used the following script for E-Views: http://forums.eviews.com/viewtopic.php?f=4&t=574.

9. Empirical results

There was a lack of normal distribution as the Shapiro–Wilks W test for normality suggested ($p=0$), so the observed markets do not behave as the efficient market hypothesis suggested.

Thus, there were many more individually improbable declines than increases – which means policy makers have to prepare for sudden and long interventions. As reported in the literature, 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 were characterized by shorter and thinner tails with an exponential decay close to 1 (Quismorio 2009).

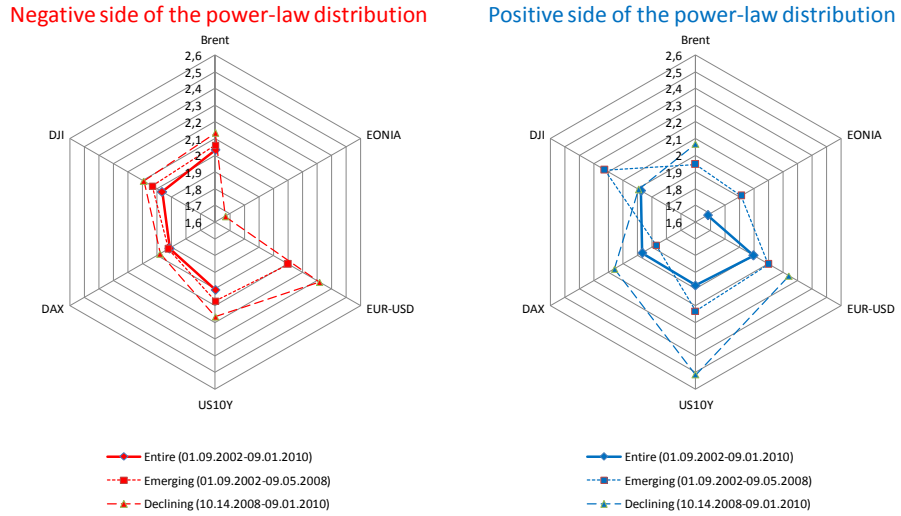
Figure 4. Level of fat-tailness depends on conjuncture in Russia



Source: own calculation on the basis of Clauset et al (2009)

The probability distributions of logarithmic returns were divided on negative and positive sides, and the entire period was compared to "emerging" and "declining" phases. Power-law exponents were far from 1, and the tails were fatter under the "declining" phase – except the case of the interbank market, where there were a weaker variety of interest rate declines. In the other cases, the variety and mass of low probable events with intensive movements increased under this "declining" environment. There were fewer significant differences between the entire period and the "emerging" interval (Figure 4).

Figure 5. Level of fat-tailness depends on conjuncture in Europe and the US

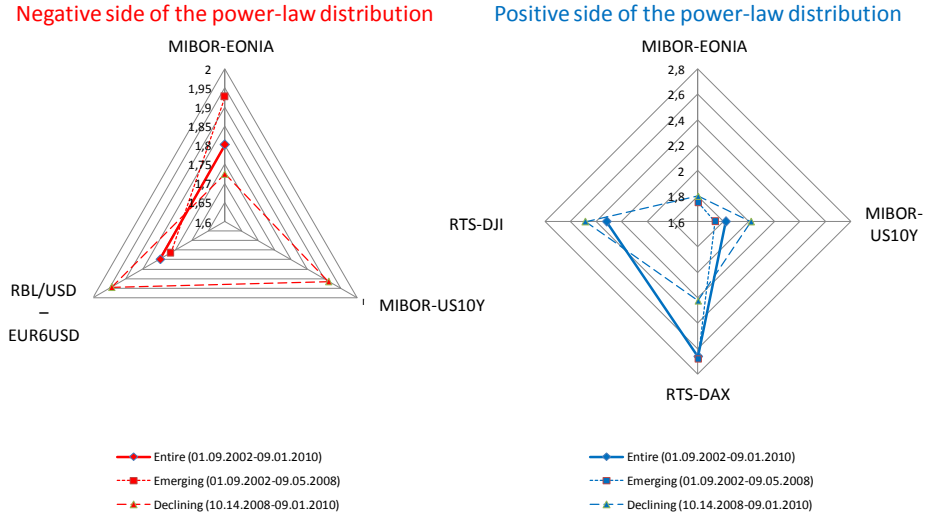


Source: own calculation on the basis of Clauset et al (2009)

The same developments occurred in the control group too: the power-law exponent appeared on the negative side – except EOINA, where the power-law distribution was not significant in the general case (Figure 5).

Then it is necessary to study, how markets influence each other under different circumstances.

Figure 6. Conjuncture affects market comovement probabilities



Source: own calculation on the basis of Clauset et al (2009)

According to the constant negative value of DCC rho in RBL/USD and RBL/EUR relations, and same constant positive range of RTS-DAX and RTS-DJI compositions, a structural difference occurred between the numbers of items between the negative and positive sides, which was enhanced with a lack of power-law distribution in several cases (see figure 6). But these results have an important message: it is quite difficult to manage a well diversified portfolio if markets behave so differently under "emerging" and "declining" circumstances. Risk management depends mostly on time-varying correlations. The benefits of diversification are eroded by increasing correlation on the tails of return probability distributions – especially on bear markets, as Campbell et al (2002) suggested, too.

Vulnerability is indicated by financial markets according to the garden of improbable events on the dropping side of probability distributions. This phenomenon underlines the necessity of public managed financial buffers.

10. Conclusion

Taxes and duties are the main sources of treasuring up capital into the Reserve Fund and National Welfare Fund, thus the country belongs to the first (raw material exporter) group of sovereign fund user countries – while manufacturer exporter sovereign wealth funds (SWFs) are supplied by fixed currency regimes. The funded part of the second pillar in the pension system acts as a general stabilizer, too, due to its federal bond allocations. SWFs are used only under external depressions as a supplementary source of the federal budget and Vnesheconombank, while liquidation of the foreign securities creates an additional demand for RBL.

The connection between sovereign wealth funds and the pension system is mainly indirect because the federal budget is able to use the assets of the Reserve Fund under critical circumstances, as Order of the Ministry of Finance of 10.03.2009 № 130 indicates, for the purchase of Russian Federation currency for financing the federal budget deficit. Resources of the National Wealth Fund were used only once (23 April 2010) for the purchase of Russian Federation currency for co-financing the voluntary pension savings of Russian citizens according to the Order of the Ministry of Finance of 14.02.2008 № 25n.

Russian sovereign wealth funds are not typical, as Vladimir Putin mentioned, for example due to their strictly conservative behaviour. But the Reserve Fund acted as an explicit tool of crisis management in 2009, and supported the federal budget directly, while the National Wealth Fund remained as an implicit tool according to its refinancing role for the economy.

Russia has to face with external turmoil in the future due to the structure of its economy, thus the strategy of forming sovereign wealth funds and the de facto monopoly in the second pillar is a logical strategy to smooth external shocks. But

the market-based management of the human life cycle means that market risks – and the flow of global liquidity – will influence not only the active years but inactive years too, while these risks were transferred from the state to the individual trough the introduction of the multipillar pension system. Therefore the introduction of the multipillar system cannot exactly solve the problems of ageing, but establish a stable demand for government bonds. Bottleneck effects on the capital markets were parallel with macroeconomic imbalances – a significant share of government bonds is necessary in the second pillars. The behaviour of government bonds converges to the stock markets in the emerging economies under extreme circumstances – so their mathematical role in portfolio building is weakened, but the allocation ensures the stability on the macro level.

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