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Vladimir Sokolov

Bi-currency versus single-currency targeting: Lessons from the Russian experience

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Contents

Tiivistelmä .....

Abstract .....

1 Introduction 2

2 Russian exchange rate policies, 2001-2009 4

3 Theory, data description, and empirical strategy 5
3.1 Theory 5
3.2. Data description 6
3.3. Empirical strategy 9

4 Empirical results 11
4.1 US dollar as operating target 11
4.2. The "no crisis" period 12
4.3. The "decoupling" episode 14
4.4. The crisis episode 16
4.5. Post-estimation specification testing 17

5 Conclusions 18

References 20

Appendix A 22
Appendix B 25

All opinions expressed are those of the author and do not necessarily reflect the views of the Bank of Finland.

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Tiivistelmä

Tässä tutkimuksessa tarkastellaan Venäjän valuuttakurssipolitiikan muutoksen vaikutuksia kotimaisten korkojen ja valtionvelan riskilisien dynamiikkaan. Vuonna 2005 Venäjän valuuttakurssipolitiikka siirtyi yksittäisestä valuutasta kahden valuutan koriin perustuvaan tavoitteeseen. Politiikkamuutos johti siihen, että kotimaiset korot irtautuivat Yhdysvaltain dollarin määräisistä koroista ja alkoivat myötäillä lähemmin Venäjän keskuspankin seuraamaa kahden valuutan (dollari ja euro) koria ja synteettistä korkoa, joka koostuu dollari- ja euromääräisistä liborkoroista. Tutkimuksessa käsitellään myös, miten Venäjän valuuttakoritavoitteeseen perustuva politiikka auttoi suojaamaan maata viimeaikaisessa maailmanlaajuisessa likviditeettikriisissä. Havaitaan, että Venäjän mosiborkorko oli negatiivisesti sidoksissa Yhdysvaltain dollarin liborkorkoon ja positiivisesti yhteydessä synteettiseen dollari-eurokorkoon siinä vaiheessa kriisiä, kun taloudet vaikuttivat eriytyvän toisistaan kehitykseltään. Vaikka Yhdysvaltain keskuspankki toteutti tuolloin voimakasta määrällisen keventämisen (quantitative easing) rahapolitiikkaa, Venäjän rahamarkkinat olivat enemmän linjassa euroalueen rahapolitiikan kanssa. Keskeinen johtopäätös on, että ohjatun kellunnan (managed float) valuuttakurssiregiimin ja vapaiden pääomanliikkeiden oloissa kotimaisten ja ulkomaisten korkojen suhde riippuu kotimaan keskuspankin tosiasiallisesta operatiivisesta tavoitteesta, oli se sitten yksi valuutta tai valuuttakori.

Avainsanat: valuuttakurssipolitiikka, valuuttakoritavoite, valtionvelan luottoriskijohdannainen (CDS), eriytyminen

Bi-currency versus Single-Currency Targeting: Lessons from the Russian Experience

Vladimir Sokolov
ICEF, Higher School of Economics
vsokolov@hse.ru

Abstract

This paper examines the impacts of the 2005 shift in Russian exchange rate policies from single-currency to bi-currency basket targeting on domestic interest rates and sovereign risk premium dynamics. The policy shift disconnected domestic interest rates from US dollar-denominated interest rates, replacing them with a growing positive relationship with the dual-currency basket (USD-EUR) adopted by the Central Bank of Russia, as well as a synthetic interest rate composed of the US dollar LIBOR and the euro LIBOR. The paper also considers the insulating properties of Russian basket targeting policies during the recent global liquidity crisis. I present evidence that the Russian MosIBOR rate was negatively related to the US dollar LIBOR rate and positively related to the synthetic USD-EUR rate during the "decoupling" stage of the crisis. Even with the steep quantitative easing of the US Fed during this period, the finding suggests the Russian money market was more in sync with the monetary policies of the euro area. The central conclusion here is that, in conditions of managed floating exchange rate policies and liberalized capital accounts, the relationship between a country's domestic interest rates and their foreign counterparts depends on the *de facto* operating target of the central bank of this country, whether it is a single currency or a basket.

JEL classification: F31, F33

Keywords: exchange rate policy; basket targeting; sovereign CDS; decoupling

1 Introduction

With the collapse of the crawling peg exchange rate regimes in many emerging economies following the 1997 Asian financial crisis, a view characterizing the "hollowing out of the middle ground" for exchange rate regimes gained acceptance. Fischer (2001), for example, argued that intermediate exchange rate regimes were prone to crises and unsustainable over the long run. A number of countries, including Brazil, Korea, Mexico, the Philippines, and Turkey adopted *de jure* floating exchange rate policies. Calvo and Reinhart (2002) note that the central banks of these countries were driven by a "fear of floating" that led them to exchange-rate management regimes geared to accumulation of large war chests of foreign currency. In a subsequent survey article, Frankel (2003) found the vanishing-middle-ground proposition somewhat illusory as most of its feared consequences never materialized.

Unlike the Asian crisis, the initial shock from the recent global liquidity crisis originated in developed countries. The challenge for central banks in developing countries, which hold most of their reserves in currencies of developed countries, was to manage their exchange rates against these currencies. Among the many ideas of how to address global imbalances and reduce the risk of devaluations of major reserve currencies, the IMF recently suggested that central banks use a currency basket for reserve accumulation.[1] The proposal is essentially a rehash of the proposals of Dornbusch and Park (1999) and Williamson (2000), who argue that basket targeting suits float-averse countries still wanting to use exchange rates to absorb the brunt of external shocks. More recently, Habib and Strasky (2008) simulate a reduced-form model calibrated for oil-exporting countries that gives policymakers a choice of single-currency or basket peg. They find the basket peg preferable for countries focused on output stabilization.

Several countries that previously maintained a single-currency peg against the US dollar have in recent years adopted exchange rate policies involving basket targeting. In July 2005, for example, China and Malaysia switched from dollar pegging to managing their currencies against an undisclosed basket of currencies. In May 2007, Kuwait announced a shift to targeting its currency against an undisclosed basket.[2]

The Central Bank of Russia (CBR) adopted bi-currency basket targeting in February 2005. Unlike other countries using basket targeting, the CBR publicly announced the composition

[1] IMF Managing Director Dominique Strauss-Kahn proposed this idea at a November 2009 conference in Beijing.

[2] The appropriateness of abandoning the US dollar as the sole anchor currency has been a recurrent topic of discussion in many oil- exporting Gulf countries, especially after the dollar lost value against other major currencies in the lead-up to the global liquidity crisis.

and weights of the currencies in the basket. The central bank further featured a liberalized capital account that allowed domestic banks and firms to resort to external borrowing without regulatory constraints. Given the absence of developed sterilizing facilities, liquidity in Russia's domestic money market is highly dependent on funding conditions abroad.

The exchange rate policy shift in Russia provides an ideal natural experiment for investigating implications of the introduction of basket targeting policies on domestic money markets and risk premia dynamics. Two important issues are raised:

1) Does bi-currency targeting promote monetary policy independence by disconnecting domestic interest rates from their foreign counterparts?

2) What are the insulating properties of bi-currency basket targeting in the case of a large external shock?

Studies by Husain *et al.* (2005), Aghion *et al.* (2009) suggest that countries with underdeveloped financial markets enjoy better macroeconomic performance under less flexible exchange rate regimes. If this is so, answering the first question could provide evidence as to whether basket targeting is a viable alternative to fully flexible exchange rate regimes and whether it could be used by the central banks of developing countries in conducting counter-cyclical monetary policies.

The second question addresses the supposed lesson of the Asian crisis, i.e. that intermediate exchange rate regimes are crisis-prone. Like many emerging markets, Russia experienced both "decoupling" and "recoupling" in the course of the recent global liquidity crisis.[3] Thus, we are presented with an opportunity to evaluate the resilience of the basket-targeting regime to external shocks during both stages. Using daily data on interest rates, exchange rates, and sovereign CDS spreads, I examine different exchange rate regimes over different time periods with separately estimated models. Policy conclusions are drawn from comparison of estimation results across samples.

The paper proceeds as follows: Section 2 provides a description of the Russian exchange rate policy during the time period under investigation; Section 3 outlines the theoretical underpinnings of the paper and describes the empirical strategy used; the results of the estimation made are reported in Section 4; and Section 5 concludes.

[3]The term "decoupling" originally referred to the business cycle dynamics of developed and developing countries (Kose *et al.*, 2008). Decoupling here is slightly more specific, referring to the disconnect between financial market performance in developed and developing countries during the first stage of the recent global financial crisis. "Recoupling" here refers to the reaction of developing countries to the insecurity of global financial markets after the Lehman Brothers collapse.

2 Russian exchange rate policies, 2001-2009

From late 1998 to February 2005, the Central Bank of Russia (CBR) officially pursued a managed-float exchange rate policy. The CBR used the US dollar as an operating target and intervened on the foreign exchange market to smooth fluctuations in the ruble-dollar exchange rate. It then switched to bi-currency basket targeting. The initial weighing of the euro in the basket was small, but gradually the proportions were raised until the current ratio of 45% euro and 55% dollar was reached in February 2007. The shift to bi-currency basket targeting is widely seen as giving the ruble greater flexibility against both the dollar and the euro. In line with the observation of Meissner and Oomes (2009) that the choice of anchor currency needs to be based on fundamentals, Russia's bi-currency basket implicitly recognizes that the US dollar is Russia's main invoicing currency for exported goods and that the euro is the main invoicing currency for imported goods.

As noted above, most countries that switched to basket currency targeting (e.g. Malaysia, China, and Kuwait) do not disclose the currency weights in their baskets. This was due in part to the fact that their policy changes were motivated by maintaining competitiveness in relation to their main trading partners. The CBR, on the other hand, wants to be public about the weights in the bi-currency basket. In the short-term, the central bank wants to increase exchange rate flexibility of the ruble against the basket components.[4] It further wants to bolster the credibility of its longer-term commitments to implementing a free-floating exchange rate and an inflation targeting framework as outlined in the CBR's *Annual Monetary Policy Outlook 2007-2009*.

The 1998 financial crisis deeply affected Russian fiscal policy. Since the messy default on domestic government debt, Russia has exercised great restraint in issuing ruble-denominated government debt. From the standpoint of setting monetary policy, of course, this has severely limited the CBR's ability to conduct open market operations for the purpose of managing the domestic money supply. As a consequence, the Stabilization Fund, the repository for surplus tax revenues from oil and gas exports, has become the main instrument for absorbing foreign currency flows in Russia.[5] The CBR also began to issue its own bonds and interest-bearing deposits in order to sterilize foreign currency interventions. However, due to the small-scale use of such borrowing relative to the scope of foreign currency flows, the day-to-day impact of sterilization operations on liquidity of the domestic money market has been limited.

[4] See Appendix B for a rolling standard deviation measure of volatility for the RUB/EUR and RUB/USD exchange rates.

[5] In February 2008, the Stabilization Fund was divided into a Reserve Fund and National Welfare Fund.

3 Theory, data description, and empirical strategy

3.1 Theory

The opportunities for conducting independent and counter-cyclical monetary policies under alternative exchange rate regimes have been studied within the framework of the Mundell-Fleming model. Under the Mundell-Fleming policy trilemma, it is impossible to implement independent monetary policy under free capital mobility and exchange rate targeting. Recent cross-country studies by Frankel *et al.* (2004), Shambaugh (2004) and Obstfeld *et al.* (2005) provide evidence that domestic interest rates in countries that pursue exchange-rate targeting are more correlated with foreign interest rates of anchor countries than in countries with free-floating exchange-rate regimes.

Using this model to study the Russian case, I extend the Obstfeld *et al.* (2005) bi-variable analysis of domestic and foreign interest rates across exchange rate regimes to a vector of four variables that includes an exchange rate and a sovereign CDS risk premium series:

$$\mathbf{Y}_t = \begin{pmatrix} MosIBOR_t & LIBOR_t & USD/RUR_t & CDS5Y_t \end{pmatrix}'$$

This extension is motivated by the facts that the CBR pursued *de jure* managed floating exchange rate policies throughout the entire observation period of 2001-2009 and that capital flows were essentially unrestricted.

For analysis purposes, the Russian domestic money market is represented by the MosIBOR interest rate on 1-month interbank deposits. This key interest rate for the Russian money market is set according to quotes by principal Russian banks. Foreign rates are represented by 1-month LIBOR for deposits denominated in USD and EUR. Besides using the observed USD/RUR and EUR/RUR exchange rates, I synthetically compose a bi-currency basket using officially announced basket weights of the two currencies. The sovereign risk premium is measured by the price of 5-year sovereign CDS contracts on Russian external debt.[6]

As the sterilization capabilities of a central bank are limited, I assume the domestic money market is affected by external shocks caused by foreign currency flows through current and capital accounts. In such an environment, domestic interest rates are contemporaneously correlated with exchange rate as the central bank's foreign currency interventions lead to fluctuations in money supply. I further assume that a switch to basket targeting changes the way external

[6] 5-year CDS contracts not only are the most liquid segment of the market but also the most frequently used benchmark in other studies (Pan and Singleton, 2008).

shocks are transmitted to the domestic money market and the relationship between domestic and foreign interest rates.

The sovereign risk premium is a good indicator of capital mobility in terms of capital accessibility; it reflects both the actual costs of external borrowing for the private sector and foreign investors' perception of sovereign risk. The premium affects capital account flows and the dynamics of the domestic money market as the central bank sterilization abilities are limited. Most of the existing literature on the relationship between country risk premium and the degree of capital mobility tries to identify the premium either by decomposing cross-country interest rate differentials or by comparing yields on domestic debt and yields on foreign-currency-denominated debt (Domovitz *et al.*, 1998). The tradable sovereign CDS contract, in contrast, allows us to trace the relationship directly. An increase in the CDS premium is associated with less capital inflow (which, in Russia's case, results in a decrease in liquidity of the domestic money market). Recent work by Ammer and Cai (2007) on the relationship between observed CDS spreads finds that, with respect to sovereign issues, CDS spreads often move ahead of bond yields. Karolyi and Stultz (2003) also note that a country's risk premium depends on its covariance with the world market portfolio. In the context of this study, the CDS premium measures the risk appetite of foreign investors for Russian assets (possibly an exogenous factor with respect to domestic macroeconomic performance).

3.2 Data description

The data set here includes daily observations over the 2001-2009 period. The starting point of the data has been determined by the availability of the MosIBOR daily series. All data were obtained from Bloomberg. The sample is divided into four parts. The first sample covers the September 2001 to January 2005 episode of USD targeting policies by the CBR. The second sample, February 2005 to July 2007, covers the period of basket targeting prior to the beginning of the onset of the global liquidity crisis. The third sample runs from August 2007 to August 2008, a period of decoupling when Russian performance had yet to be affected by the financial crisis in the developed world. The fourth sample goes from September 2008 to November 2009, the recoupling period when Russian financial and economic performance collapsed due to sharp declines in capital flows and devaluation pressures.

Figures 1, 2, and 3 illustrate the dynamics of the series used in the study. Figure 1 shows short-term volatility of the USD/RUR increased after the introduction of basket targeting. Up

to September 2008, the CBR maintained the bi-currency basket at a constant level.[7]

Dynamics of the USD/RUR exchange rate and of the bi-currency basket/ruble

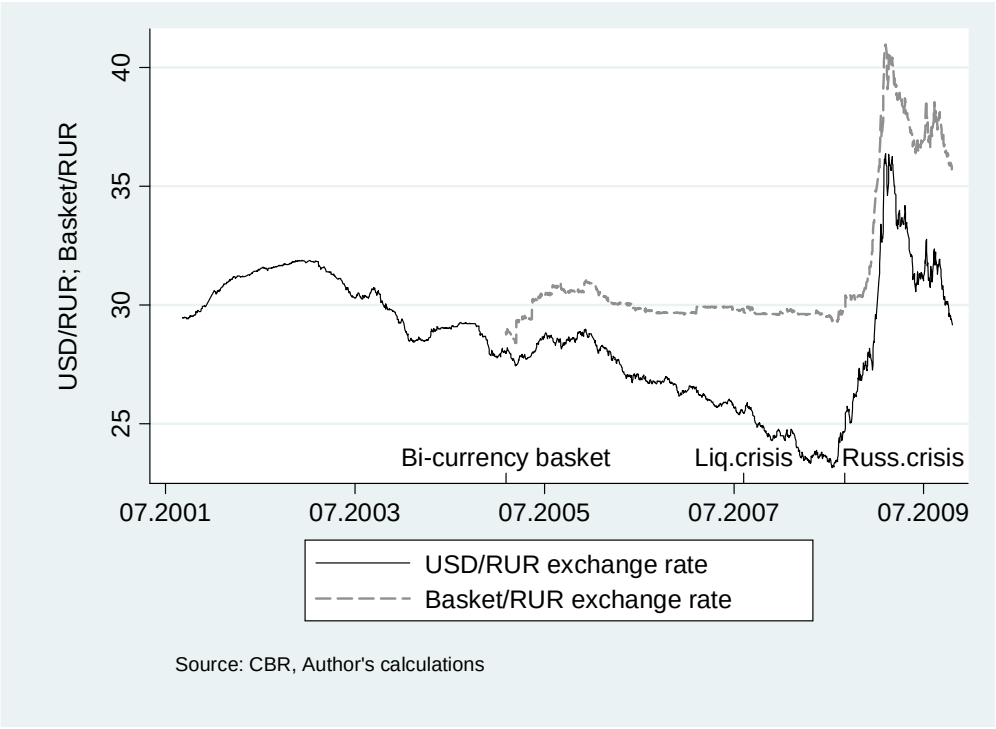

Fig.1

Figure 2 implies that the introduction of basket targeting in February 2005 reduced MosIBOR volatility. The arrival of the global liquidity crisis in September 2007 and the Fed's timely accommodation do not appear to affect the Russian money market until September 2008.

[7]The intial jumps after adoption of the bi-currency basket reflect the graduated increases in the euro component.

Dynamics of 1-month MosIBOR and LIBOR interest rates

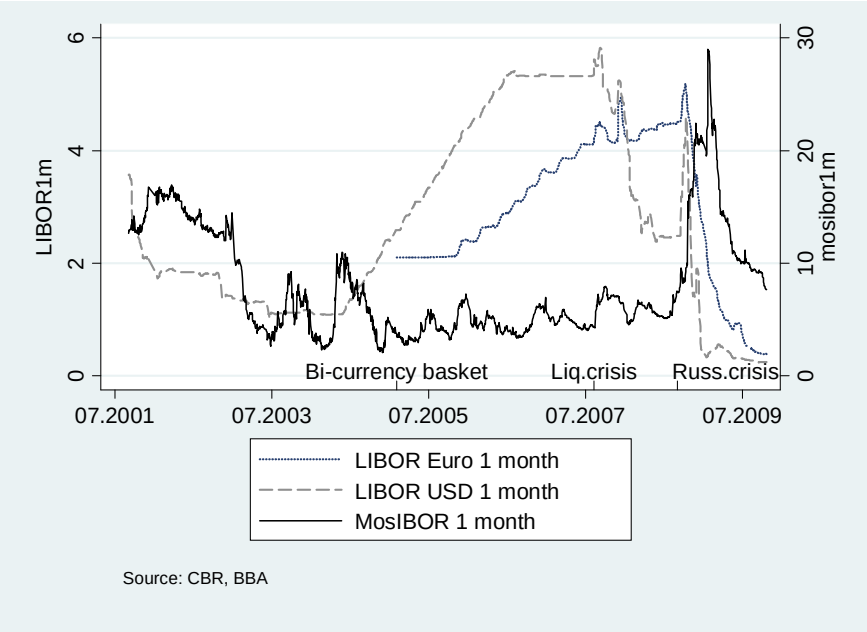

Fig.2

Figure 3 shows that the sovereign risk premium on Russian debt moved in sync with the risk premiums of other emerging economies, which suggests the dynamics were largely determined by external factors. The CDS spread significantly widens in September 2008 as investors realize that the emerging economies are facing a sudden cut-off in capital flows due to the Lehman Brothers collapse. Although Russia held the third largest foreign currency reserves in the world, the CDS spreads on Russian debt increased significantly more than spreads on Mexican or Brazilian foreign debt.

Dynamics of Russian and Mexican Sovereign CDS spreads

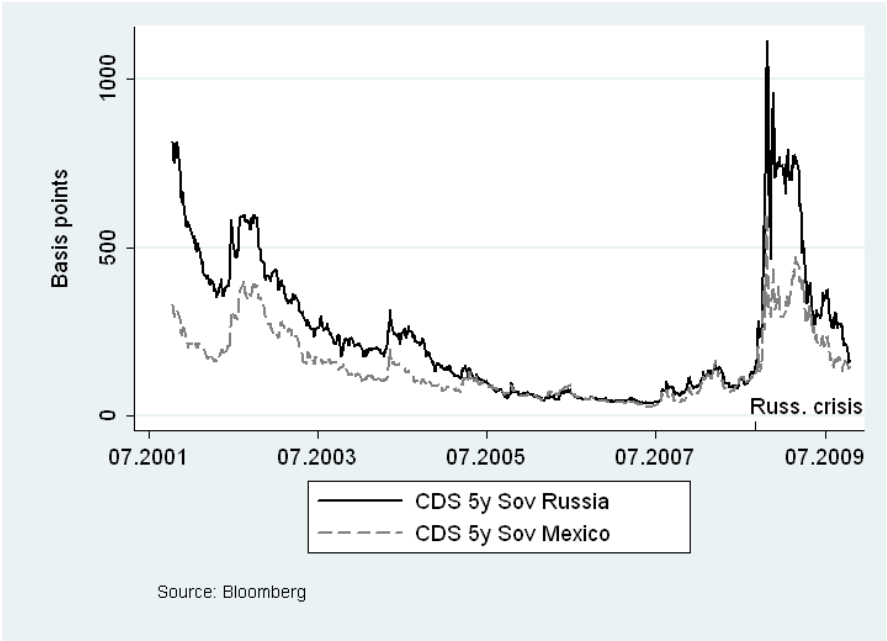

Fig.3

3.3 Empirical strategy

The ADF tests reported in Table A1 of Appendix A do not reject the unit root hypothesis at conventional significance level. These results are consistent with a large number of studies that use interest rate and exchange rate data (e.g. Blanco *et al.*, 2005; Clarida *et al.*, 2006). The test statistics for the differenced data indicate a rejection of non-stationarity. Altogether the ADF test indicates that the data series are realizations of the stochastic process integrated of order one. To specify how many lags to include to test for cointegration, I apply standard AIC, HQIC, and SBIC tests. These suggest two lags for this four-variable model.

Following Obstfeld *et al.* (2005), I estimate the Vector Error Correction (VEC) model on sub-samples representing different exchange rate policy regimes in Russia. Tables A2-A3 in Appendix A reports the trace statistics of the Johansen's cointegrating rank test for four variables in vector $\mathbf{Y}_t$. While we can strongly reject the rank of cointegration to be equal to one, it is not possible to rule out the hypothesis of exactly two cointegrating vectors. I conclude that there are two cointegrating relationships between the four variables in the study. Although the "decoupling" sample is an exception, I apply the same VEC methodology used for the other periods. Although we cannot interpret the identified cointegrating vectors as a long-run equilibrium relationship, it seems reasonable to view the estimated coefficients as partial correlations between variables of the system.

The next logical step is to estimate the just-identified VEC model with Johansen's normalization procedure. The restrictions on the two cointegrating vectors are intended to capture the relationship between the domestic money market rate MosIBOR and the USD/RUR exchange rate, on the one side, and externally determined factors such as the LIBOR rate and the CDS spread, on the other.

$$\begin{bmatrix} \Delta MIBOR_t \\ \Delta LIBOR_t \\ \Delta USD/RUR_t \\ \Delta CDS5Y_t \end{bmatrix} = \begin{bmatrix} \alpha_{11} & \alpha_{12} \\ 0 & 0 \\ \alpha_{31} & \alpha_{32} \\ \alpha_{41} & \alpha_{42} \end{bmatrix} \begin{bmatrix} (MIBOR_{t-1} + \beta_{11} LIBOR_{t-1} + \beta_{12} USD/RUR_{t-1}) \\ (USD/RUR_{t-1} + \beta_{21} LIBOR_{t-1} + \beta_{22} CDS5Y_{t-1}) \end{bmatrix} +$$

$$+\boldsymbol{\gamma} + \sum_{k=1}^{2} \boldsymbol{\Gamma}_k \Delta \mathbf{y}_{t-k} + \epsilon_t, \qquad (1)$$

where α measures the *speed of adjustment* to the equilibrium relationship and β is the long-run slope coefficient or the *levels relationship*. I use a specification with an unrestricted vector of constants $\boldsymbol{\gamma}$ to allow for a linear trend in the undifferenced data.

I impose the Johansen normalization procedure and identify two cointegrating vectors. The first is a level relationship of the MosIBOR, LIBOR, and USD/RUR rates within the uncovered interest rate parity (UIP) framework. The second cointegrating vector captures the relationship between the USD/RUR exchange rate and external factors.

In addition to the long-run just identifying restrictions on β coefficients, I also impose a restriction on the adjustment coefficients α for the row of LIBOR rates because we do not expect the LIBOR rates to adjust to an equilibrium relationship with the Russia-specific variables of the system.

First cointegrating equation

The relationship between domestic and foreign interest rates depends on the degree of exchange rate regime flexibility as defined by Mundell-Fleming's policy trilemma.

The relationship between domestic interest rate and exchange rate depends on the sterilization capabilities of the central bank, which, as previously noted, are limited in the CBR's case. Consider, for example, a current account shock due to the positive dynamics of commodity prices. Under a *de jure* managed float, the dollar inflow should result in ruble strengthening against the dollar (USD/RUR goes down). However, in the absence of a proper sterilizing mechanism, the dollar inflow leads to domestic money supply expansion and downward pressure on domestic MosIBOR interest rates. As a result, external terms-of-trade shocks result in a positive relationship between the exchange rate and domestic interest rate.

Second cointegrating equation

The second cointegrating equation captures the relationship between exchange rate and external factors. The sovereign risk premium literature points out that the factors that determine the premium could be of internal and external origin. Baek *et al.* (2005) state that investor perceptions of risks in emerging markets result in a global increase of sovereign CDS spreads, leading to capital flight and devaluation pressures. Berganza *et al.* (2004), in contrast, identify domestic factors such as balance sheet effects as the main drivers of the sovereign risk premium. In any case, the direction of the capital flows should show a positive relation between the CDS premium and the exchange rate.

The sign of the contemporaneous relationship between the LIBOR rate and the USD/RUR exchange rate in the second cointegrating equation should match the sign of the long-run correlation coefficient in the first cointegrating equation.

4 Empirical results

4.1 US dollar as operating target

The first sample period runs from September 4, 2001 to February 2, 2005. During this period, the CBR used the USD/RUR exchange rate as an operating target. The estimation results for different time periods are reported in Table 1. All beta coefficients are statistically significant and have an expected sign. The signs of the short-run adjustment coefficients indicate that the variables of the system returned to identified long-run equilibrium relationships.

Table 1. Managed float with US dollar as operating target

Sample: Sept. 4, 2001 – Feb. 2, 2005 (764 obs.)

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBOR1m	LIBOR1m	USD/RUR	CDS5Y
ΔMIBOR1m	-0.010**	-0.032***	$\beta_{1,j}$	1	-2.398**	-1.758***	0
	(0.005)	(0.014)			(1.268)	(0.504)	
ΔLIBOR1m	0	0	$\beta_{2,j}$	0	2.045**	1	-1.139***
					(0.855)		(0.246)
ΔUSD/RUR	0.003***	-0.002**					
	(0.000)	(0.001)					
ΔCDS5Y	0.000	0.007*					
	(0.001)	(0.004)					

Note: ** Denotes significance at 5% *** Significance at 1%

A negative sign of the estimated β coefficient indicates a positive relationship between a given variable and a variable whose coefficient was chosen by the Johansen's normalization procedure to be constrained to unity. On the opposite, a positive sign of the β coefficient indicates a negative relationship between the two variables.

As expected under the policy of USD targeting and free capital flows, we find a positive cointegrating relationship between the domestic interest rate and the LIBOR interest rate. Also in the absence of a sterilization mechanism, the exchange rate is positively related to the domestic money market rate and to the sovereign risk premium.

4.2 The "No Crisis" Period

The "no crisis" period runs from February 2005 to August 2007 and is characterized by a benign external macroeconomic environment. During this time, Russia posts large current account surpluses and has substantial inflows of foreign capital.

Assuming market actors consider viable the operating target of the new exchange rate policy, we should expect the introduction of bi-currency basket targeting in February 2005 to result in a new linkage between domestic and basket-determined variables that replaces the old linkage between domestic and USD-determined variables.

To determine if this actually occurred, I estimate the VEC specification (1) on two sets of variables. One set is represented by the USD/RUR exchange rate and the LIBOR interest rate for USD deposits; the other is based on synthetically composed exchange and interest rates. Since the weights of the bi-currency basket of EUR and USD are publicly announced, I can apply these weights to the observed time-series for the EUR/RUR and USD/RUR exchange rates, as well as to the LIBOR rates for deposits denominated in USD and EUR. The estimation results for the period are reported in the upper and lower panels of Table 2.

Table 2. Managed float with bi-currency basket as operating target

No crisis sample: Feb. 2, 2005 – Aug. 8, 2007 (608 obs.)

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBOR1m	LIBOR1m	USD/RUR	CDS5Y
ΔMIBOR1m	-0.023***	0.004	β_1	1	-0.253	-0.409	0
	(0.009)	(0.006)			(0.424)	(0.370)	
ΔLIBOR1m	0	0	β_2	0	2.751***	1	10.512***
					(0.675)		(2.267)
ΔUSD/RUR	-0.004	0.002					
	(0.003)	(0.002)					
ΔCDS5Y	-0.003***	-0.004***					
	(0.001)	(0.001)					

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBOR1m	Synthet1m	Basket	CDS5Y
ΔMIBOR1m	-0.001	0.020	β_1	1	-2.979***	-2.337***	0
	(0.004)	(0.018)			(0.488)	(0.692)	
ΔSynthet1m	0	0	β_2	0	1.385***	1	4.019***
					(0.234)		(0.646)
ΔBasket	0.006***	-0.002					
	(0.001)	(0.005)					
ΔCDS5Y	-0.001**	-0.012***					
	(0.000)	(0.002)					

Note: ** Denotes significance at 5% *** Significance at 1%

As can be seen from the first cointegrating equation of the upper panel, the domestic MosIBOR interest rate is not related to either the USD-denominated LIBOR rate or the USD/RUR exchange rate. However, from the lower panel of Table 2, we see that the MosIBOR interest rate is positively related to the bi-currency basket exchange rate and the synthetic interest rate composed of EUR- and USD-denominated LIBOR rates.

The exchange rate policy shift by the CBR has been described as a first step toward inflation targeting and a higher independence of domestic interest rates from foreign counterparts. With this in mind, I note that while the introduction of bi-currency basket targeting resulted in a disconnect of the domestic interest rate from the observed USD-related variables, the MosIBOR rate became increasingly dependent on the officially targeted currency basket and the foreign synthetic interest rate.

The second cointegrating equation in the upper panel exhibits a non-significant relationship between the risk premium and the USD/RUR exchange rate. However, the lower panel results indicate a significant negative relationship between the bi-currency basket and the sovereign risk premium. This may be due to investor concerns caused by the strengthening of the ruble against the basket, which was viewed at that time as fundamental currency overvaluation leading to higher macroeconomic risks.

4.3 The "Decoupling" Episode

The third sample covers the period August 2007-August 2008, a period of reprieve before the full impacts of the global liquidity crisis swept over Russia.

At the start of the crisis, we observe abnormal behavior in the LIBOR term rates with respect to overnight rates. For example, on August 8. 2007, the spread between the 1-month LIBOR and the overnight rate widens. Moreover the overnight rate fails to decline despite a series of interest rate cuts by the Fed. Taylor and Williams (2008) attribute the widening of the term spread to increased counter-party risk in the banking system.

An interesting feature of the crisis is the decoupling of financial market behaviors between emerging and developed economies. As seen in Figures 1-3, Russia's domestic interest rate, exchange rate and CDS premia exhibit scarcely any reaction to the liquidity crisis in the developed countries for about twelve months. During this time, several major investment banks even issued research reports assigning an "investment currency status" to the Russian ruble in a global carry-trade![8]

The estimates of the first equation in Table 3 clearly show the decoupling of Russian money market interest rates from the dollar-denominated LIBOR rates. In the upper panel, the contemporaneous relationship between the MosIBOR and the USD LIBOR rates is negative. In contrast, the relationship between the MosIBOR and the synthetically composed foreign interest rates in the lower panel is positive but marginally significant. In other words, Russian interest rates became inversely related to the dollar-denominated interest rate and more in sync with the monetary policy cycle of the European Central Bank, which clearly lagged the Fed's more aggressive easing.

A striking difference from the results reported in previous tables can be seen in the second equation. During the "decoupling" episode, both measures of exchange rate and domestic

[8] In May 2008, Bloomberg reported that Goldman Sachs, Merrill Lynch, and Deutsche Bank advised their customers that the Russian roble was becoming one of the most lucrative objects of investment amid the continuing world financial markets instability.

interest rate are strongly positively related. This could be due to the fact that the ruble had become an "investment currency," which made the exchange rate more dependent on capital account flows. During this time, the increase in the cost of external funding was associated with ruble weakening against the USD and the bi-currency basket as predicted by the UIP hypothesis for free floating currencies under free capital mobility.

The sovereign risk premium is not significantly related to either of the two exchange rate measures, which provides yet a further indicator of the divergence between the credit risk and the exchange rate dynamics during this period.

Table 3. Managed float with bi-currency basket as operating target

Decoupling sample: Aug. 8, 2007 – Sept. 1, 2008 (254 obs.)

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBOR1m	LIBOR1m	USD/RUR	CDS5Y
ΔMIBOR1m	-0.028**	-0.007	β_1	1	1.068**	-3.181***	0
	(0.012)	(0.039)			(0.480)	(0.766)	
ΔLIBOR1m	0	0	β_2	0	-0.292***	1	0.877
					(0.139)		(0.606)
ΔUSD/RUR	-0.010	-0.042**					
	(0.006)	(0.020)					
ΔCDS5Y	-0.008**	-0.018					
	(0.003)	(0.011)					

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBOR1m	Synthet1m	Basket	CDS5Y
ΔMIBOR1m	-0.036***	0.078	β_1	1	-0.719*	0.949	0
	(0.013)	(0.099)			(0.395)	(2.288)	
ΔSynthet1m	0	0	β_2	0	-0.124**	1	-0.293
					(0.061)		(0.186)
ΔBasket	-0.005	-0.073***					
	(0.004)	(0.027)					
ΔCDS5Y	-0.006	0.008					
	(0.004)	(0.028)					

Note: ** Denotes significance at 5% *** Significance at 1%

4.4 The Crisis Episode

This sample goes from September 2008 to November 2009, when Russia was hit full force by the global liquidity crisis. At the start of the period, we see a distinct widening of CDS spreads and the end of decoupling for most emerging market economies. As investors comprehend the changed circumstances, we see capital flows abruptly change direction. Despite its massive foreign exchange reserves, the CBR devalued the ruble against the bi-currency basket and conducted a series of key refinancing rate hikes.

As can be seen from both panels of Table 4, the long-run beta coefficients exhibit no qualitative difference in terms of signs and statistical significance for the measures of exchange and interest rates. An interesting feature of Table 4 is the similarity of the results to those reported for the USD-targeting sample in Table 1. While the CBR *de jure* maintained an adjustable basket pegging policy throughout the crisis episode, it appears the financial markets did not see this policy as particularly different from a managed float against the US dollar.

The short-term adjustment coefficients $\alpha_{i,j}$ for all variables in Table 4 are three to ten times higher than those during the USD-managed float reported in Table 1, suggesting that the financial variables adjusted faster to cointegrating relationships during the crisis episode.

Table 4. Managed float with bi-currency basket as operating target

Crisis sample: 1 Sept. 2008 - 16 Oct. 2009 (272 obs.)

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBOR1m	LIBOR1m	USD/RUR	CDS5Y
ΔMIBOR1m	-0.028**	-0.118***	β_1	1	-3.393**	-3.020***	0
	(0.014)	(0.045)			(1.404)	(0.273)	
ΔLIBOR1m	0	0	β_2	0	1.611***	1	-0.759***
					(0.409)		(0.078)
ΔUSD/RUR	0.023***	0.044**					
	(0.007)	(0.021)					
ΔCDS5Y	0.049***	0.174***					
	(0.017)	(0.053)					

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBOR1m	Synthet1m	Basket	CDS5Y
ΔMIBOR1m	-0.027**	-0.112***	β_1	1	-5.869**	-3.226***	0
	(0.014)	(0.046)			(1.155)	(0.302)	
ΔSynthet1m	0	0	β_2	0	2.142***	1	-0.724***
					(0.312)		(0.079)
ΔBasket	0.023***	0.044**					
	(0.006)	(0.019)					
ΔCDS5Y	0.042***	0.172***					
	(0.017)	(0.056)					

Note: ** Denotes significance at 5% *** Significance at 1%

4.5 Post-estimation specification testing

Inference on the estimated parameters depends on the stationarity of the cointegrated equations. As a check, we predict the cointegrating equations for all four subsamples and graph them over time.

The upper part of Figure 4 plots the first predicted cointegrating equation using the estimated coefficients from Tables 1-4; the lower part of the figure uses coefficients for the second cointegrated equation. Our only concern is a slight upward trend for the first cointegrating equation by the end of the USD targeting period (upper-right part of Fig. 4). Both graphs for the crisis period exhibit large deviations from the mean level of the predicted cointegrating relationship, which quickly revert to the mean, allowing us to view the cointegrating equations

as stationary.

Restricted cointegrating relationships

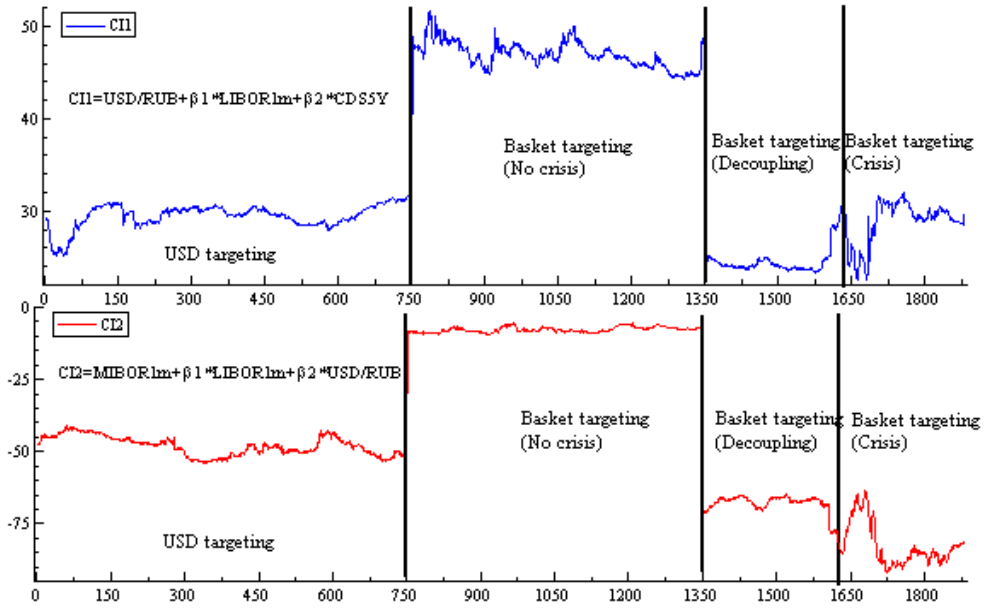

Fig. 4

The residual autocorrelation tests for single equations indicate the absence of serial correlation in the residuals for most samples. Test results, of course, are available upon request.

5 Conclusions

The CBR's policy shift from USD-targeting to bi-currency basket targeting in 2005 provides a useful case study on monetary policy independence as measured by the disconnect of domestic interest rates from their foreign counterparts.

This study started with an examination of whether adoption of exchange rate policies involving basket targeting improved the ability of the CBR to conduct independent monetary policy. I found that the domestic MosIBOR rate was positively related to the LIBOR and the USD/RUR exchange rate during the period of dollar targeting, which is consistent with the "impossible trinity" hypothesis formulated by Mundell-Fleming, as well as the results of the UIP hypothesis for testing the efficacy of managed float policies documented in Frankel and Poonawala (2009). The signs of adjustment coefficients suggest a transition of the MosIBOR and the USD/RUR rates toward equilibrium relationships with other variables of the system.

Following the adoption by the CBR of bi-currency basket targeting, the domestic MosIBOR rate has been disconnected from the USD-denominated LIBOR interest rate and the USD/RUR rate. However, it has been positively associated with the bi-currency USD and EUR basket

and with a synthetic interest rate made up of the euro and dollar LIBOR rates. This means that the domestic variables have assumed a new external anchor – the synthetic interest rate and the bi-currency basket.

Second, the study examined the insulating properties of the Russian basket targeting during the recent global liquidity crisis. I present evidence that the Russian MosIBOR rate was negatively related to the US-denominated LIBOR and positively related to the synthetically created rate composed of USD and EUR rates during the "decoupling" stage of the crisis. This suggests that the Russian money market grew more adjusted to the monetary policies of the euro area during this period and did not follow the steep quantitative easing of the US Fed. During the "recoupling" stage of the crisis, no distinction between dollar variables and synthetic variables could be discerned with respect to the MosIBOR and the USD/RUR. As the ruble depreciated against both basket components, this finding suggests that the market participants did not consider the bi-currency basket a viable operating target of the CBR. The estimated long-term coefficients for the "recoupling" episode of the crisis are in line with those reported for the sample for the period of USD targeting policies; however, the adjustment coefficients a are three to ten times larger, which indicates that the equilibrium correction was much quicker during the crisis.

The findings of the study likely apply to similar cases and provide the following general insights:

1) As a rule, multi-currency targeting policies offer a better alternative to ensure the absorption of external shocks.

2) In conditions of managed floating exchange rate policies and liberalized capital accounts, the relationship between domestic interest rates and their foreign counterparts depends on the *de facto* operating target of the central bank of a given country, irrespective of whether this target relates to a single currency or a currency basket.

3) Basket targeting policies allow the central bank of a small open economy to disconnect domestic interest rates from the monetary policy cycle of individual anchor countries of their basket peg when countries are at different stages of the monetary policy cycle. In Russia's case during the decoupling episode, the external shocks originating from the different anchor currency countries partially offset each other, thereby reducing the transmission of these shocks into domestic interest rates.

4) When anchor countries are all at the same stage of the monetary policy cycle, basket targeting policies does not insulate an economy from external shocks and there is no difference from single-currency targeting policies.

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6 Appendix A

Table A1. ADF Unit Root Tests

Period	Variable	ADF test	Variable	ADF test
Dollar targeting	MIBOR1m	-1.253	ΔMIBOR1m	-31.080***
09.2001 – 02.2005	LIBOR1m	0.327	ΔLIBOR1m	-17.978***
	USD/RUR	0.594	ΔUSD/RUR	-26.991***
	CDS5Y	-1.532	ΔCDS5Y	-24.985***
Basket targeting	MIBOR1m	-2.622	ΔMIBOR1m	-24.512***
No crisis	LIBOR1m	1.012	ΔLIBOR1m	-22.440***
03.2005 – 08.2007	USD/RUR	0.223	ΔUSD/RUR	-23.764***
	CDS5Y	-2.406	ΔCDS5Y	-21.084***
	Synthet1m	0.442	ΔSynthet1m	-22.905***
	Basket	-2.484	ΔBasket	-26.355***
Basket targeting	MIBOR1m	-1.888	ΔMIBOR1m	-11.705***
Decoupling	LIBOR1m	-0.934	ΔLIBOR1m	-10.743***
09.2007 - 08.2008	USD/RUR	-1.600	ΔUSD/RUR	-14.632***
	CDS5Y	-1.648	ΔCDS5Y	-15.938***
	Synthet1m	-0.821	ΔSynthet1m	-12.313***
	Basket	-2.900**	ΔBasket	-16.077***
Basket targeting	MIBOR1m	-0.915	ΔMIBOR1m	-14.079***
Crisis	LIBOR1m	-1.148	ΔLIBOR1m	-9.207***
09.2008 - 10.2009	USD/RUR	-1.939	ΔUSD/RUR	-13.147***
	CDS5Y	-2.435	ΔCDS5Y	-21.909***
	Synthet1m	-1.540	ΔSynthet1m	-9.118***
	Basket	-1.863	ΔBasket	-12.928***

Note: ** Denotes significance at 5% level; *** Denotes significance at 1%

Model specification includes the constant term

Table A2. Johansen's Cointegration Tests

$Y_t = \left(\begin{array}{cccc} MosIBOR_t & LIBOR_t & USD/RUR_t & CDS5Y_t \end{array} \right)'$

		λ trace statistics	5% Critical value
Dollar targeting	rank=0	77.513**	47.21
09.2001 - 02.2005	rank≤1	30.477**	29.68
	rank≤2	8.638	15.41
	rank≤3	1.926	3.76
Basket targeting	rank=0	121.283**	47.21
No crisis	rank≤1	31.834**	29.68
03.2005 – 08.2007	rank≤2	14.196	15.41
	rank≤3	4.543**	3.76
Basket targeting	rank=0	28.194	47.21
Decoupling	rank≤1	11.091	29.68
09.2007 – 08.2008	rank≤2	4.938	15.41
	rank≤3	1.376	3.76
Basket targeting	rank=0	65.698**	47.21
Crisis	rank≤1	34.066**	29.68
09.2008 – 10.2009	rank≤2	13.968	15.41
	rank≤3	4.148**	3.76

Note : ** Denotes significance at 5% level

The model includes an unrestricted constant

Table A3. Johansen's Cointegration Tests

$Y_t = \left(\begin{array}{cccc} MosIBOR_t & Synthet_t & Basket/RUR_t & CDS5Y_t \end{array} \right)'$

		λ trace statistics	5% Critical value
Basket targeting	rank=0	76.453**	47.21
No crisis	rank≤1	41.774**	29.68
03.2005 – 08.2007	rank≤2	15.348	15.41
	rank≤3	5.362**	3.76
Basket targeting	rank=0	27.005	47.21
Decoupling	rank≤1	14.483	29.68
09.2007 – 08.2008	rank≤2	6.120	15.41
	rank≤3	2.434	3.76
Basket targeting	rank=0	77.262**	47.21
Crisis	rank≤1	42.798**	29.68
09.2008 – 10.2009	rank≤2	14.996	15.41
	rank≤3	2.748	3.76

Note : ** Denotes significance at 5% level

The model includes an unrestricted constant

7 Appendix B

Volatility of the spot exchange rates measured as 15-day rolling-window centered standard deviation

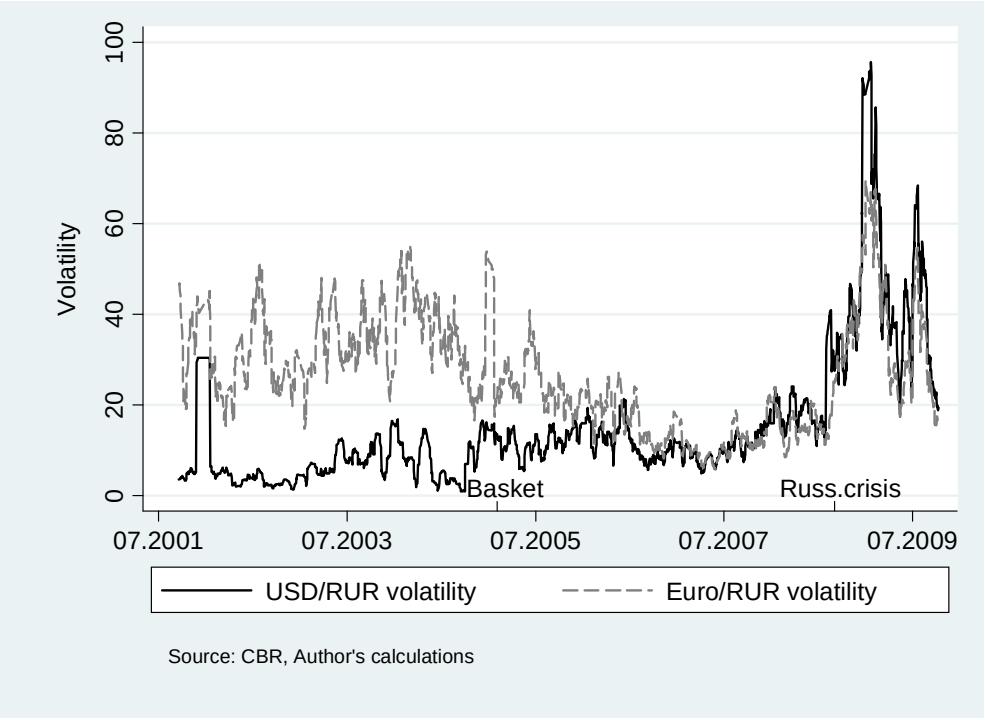

Fig. B1

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Bank of Finland
BOFIT – Institute for Economies in Transition
PO Box 160
FIN-00101 Helsinki

☎ + 358 10 831 2268
bofit@bof.fi
http://www.bof.fi/bofit