The Impact of Exchange Rate Policy on Interest Rates and Sovereign CDS Spreads Dynamics: Lessons from the Russian Experience

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Introduction

After the collapse of the crawling peg exchange rate regimes during the Emerging markets crisis in the late 90's, the so-called "hollowing out of the middle ground" view of exchange rate regimes gained ground. For example, Fischer (2001) argued that intermediate exchange rate regimes are crisis-prone and not viable over long periods of time. In accordance with this intellectual trend, a number of countries (Brazil, Korea, Mexico, the Philippines and Turkey) *de jure* adopted floating exchange rate policies. Nevertheless, Calvo and Reinhart (2002) have pointed out that the central banks of these countries often *de facto* manage their exchange rates and accumulate a large "war chest" of foreign currency reserves, a phenomenon they call "fear of floating".

Unlike during the crisis of the 90s, the initial shock wave during the recent World liquidity crisis came from developed countries and presented a challenge for central banks in developing countries, which keep reserves in the currencies of developed countries and manage exchange rates against these currencies. As one idea among many on how to address global imbalances and reduce the risk of devaluations of major reserve currencies, the IMF recently suggested that central banks could use a currency basket for reserve accumulation[1]. A related idea was popularized in the late 90s by Dornbusch and Park (1999) and Williamson (2000). They argued that basket targeting is a suitable policy for countries that are reluctant to float but still would like to use exchange rates as an absorber of external shocks.

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

[1] This idea was put forward in a statement by IMF Managing Director Dominique Strauss-Kahn at a November 2009 conference in Beijing.

[2] Whether to abandon the US dollar as a single anchor currency has been a recurrent topic of discussion also among other oil exporting Gulf countries, especially after the significant weakening of the US dollar against other major currencies prior to the 2007 World liquidity crisis.

The Central Bank of Russia (CBR) adopted a bi-currency basket targeting policy in February 2005 and, unlike other countries pursuing this type of policy, it publicly announced the composition and the weights of the currencies in the basket. Another significant difference of the Russian policy from that of other basket targeting countries is that it features a liberalized capital account, which allows domestic banks and firms to resort to external borrowing without regulatory constraints. In the absence of developed sterilizing facilities, the liquidity of the domestic money market in Russia is highly dependent on funding conditions abroad.

The main objective of this study is to use the exchange rate policy shift in Russia as a natural experiment for investigating implications of the introduction of basket targeting policies on domestic money markets and on the risk premium dynamics of a country. I attempt to answer two questions: 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) have found that countries with underdeveloped financial markets demonstrate better macroeconomic performance under less flexible exchange rate regimes. In view of this, an examination of the first of my questions could help provide evidence 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 to conduct a counter-cyclical monetary policy.

The second question addresses the issue of whether intermediate exchange rate regimes are crisis-prone, as was argued after the financial crisis in the late 90s. In the course of the recent World liquidity crisis, Russia and other emerging markets went through a "decoupling" and a "recoupling" stage[3]. Thus, we are presented with an opportunity to evaluate how resilient the basket targeting regime was to external shocks during these two different stages.

1. Empirical strategy

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, which also includes an exchange rate and a sovereign CDS risk premium series:

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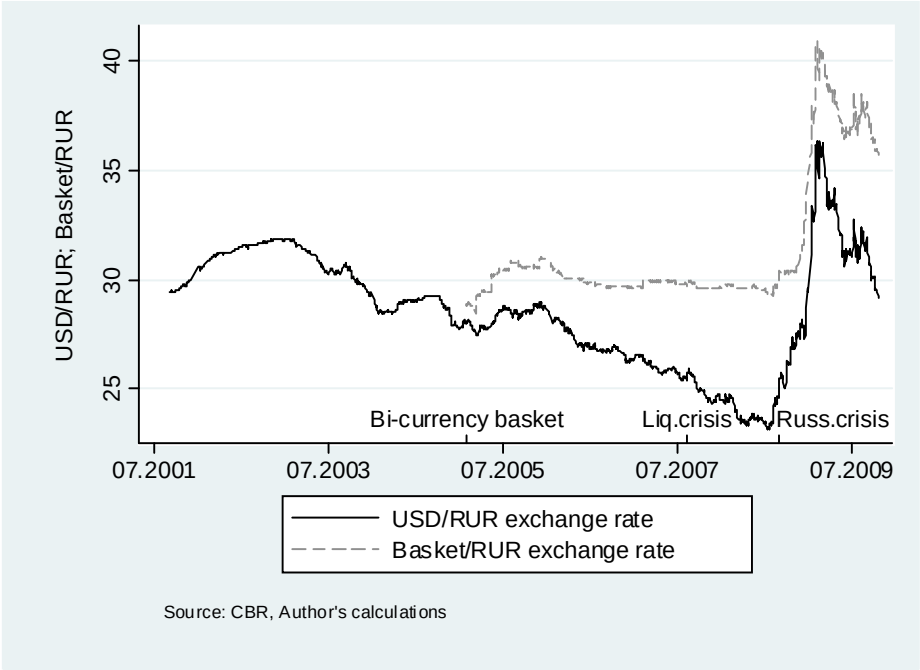
[3] The original idea of "decoupling" refers to the business cycle dynamics of developed and developing countries [Kose et al. (2008)]. In this study, "decoupling" refers to the disconnect between financial market performance in developed and developing countries during the first stage of the recent world crisis. "Recoupling" refers to the period of collapsing global financial markets that took place after the bankruptcy of Lehman Brothers.

$$Y_t = \left(MosIBOR_t \quad LIBOR_t \quad USD/RUR_t \quad CDS5Y_t \right)'$$

Fig.1 Exchange rate dynamics



The ADF tests indicate that the data series are realizations of the stochastic process integrated of order one. In order to test for cointegration, we must specify how many lags to include. The standard AIC, HQIC, SBIC tests indicate two lags for our four variables model.

I estimate the Vector Error Correction (VEC) model on sub-samples representing different exchange rate policy regimes in Russia. The Johansen's cointegrating rank tests strongly reject the rank of cointegration to be equal to one. I was not able to reject the hypothesis of exactly two cointegrating vectors. I conclude that there are two cointegrating relationships between the four variables in the study.

Next, I 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 side.

Fig. 2 Dynamics of MosIBOR and LIBOR

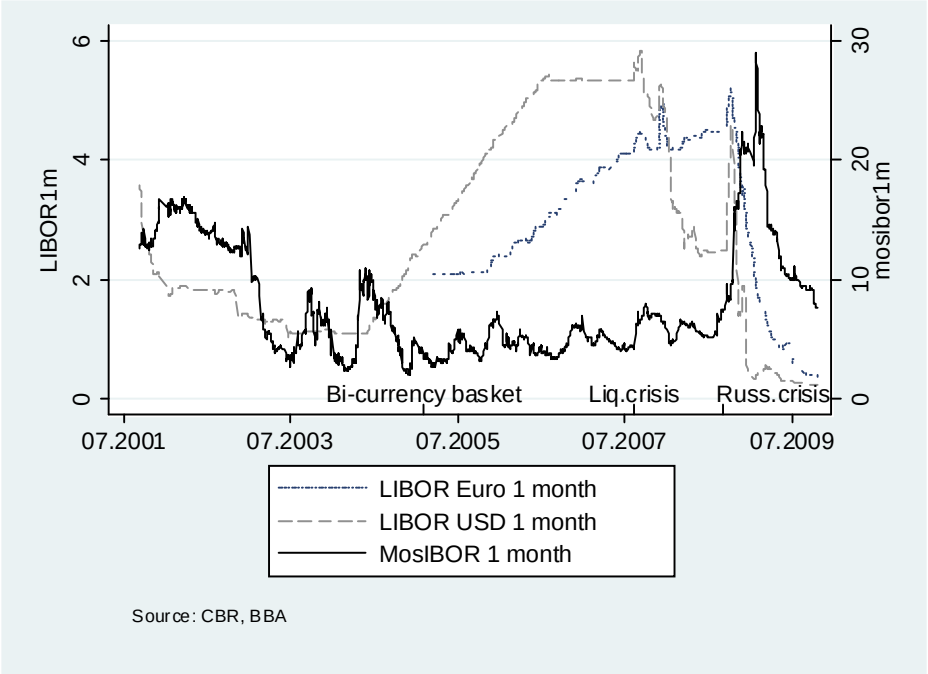
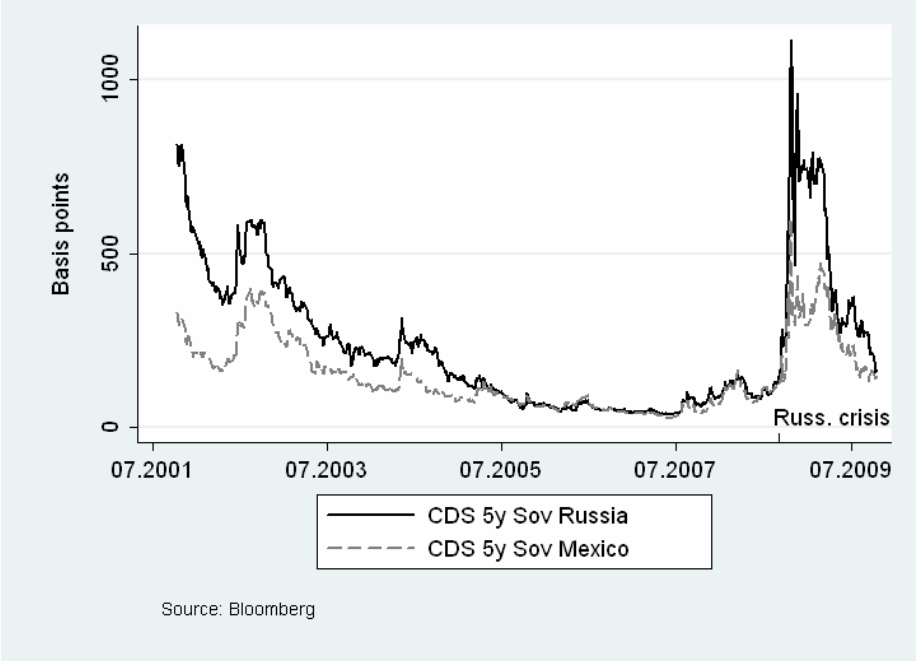


Fig. 3 Dynamics of Russian and Mexican Sovereign CDS spreads



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

$$+\gamma + \sum_{k=1}^{2} \Gamma_k \Delta \mathbf{y}_{t-k} + \varepsilon_t \qquad (1)$$

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 specification with an unrestricted vector of constants γ, which allows 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 between MosIBOR, LIBOR and the 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 because we do not expect the LIBOR 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 Russian case. Consider, for example, a current account shock due to the positive dynamics of commodity prices. Under *de jure* managed floating exchange rate policies, the dollar inflow should result in ruble strengthening against the dollar (USD/RUR goes down). At the same time, in the absence of a proper sterilizing mechanism, the dollar inflow would lead to domestic money supply expansion and downward pressure on MosIBOR. In this case, external terms of trade shocks result in a positive relationship between 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. In any case, the direction of the capital flows should establish a positive relation between the CDS premium and the exchange rate.

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

2. Empirical results

USD as an operating target

The first sample period spans 4.09.2001 to 2.02.2005, when the CBR used the USD/RUR as an operating target. All β coefficients in Table 1 are statistically significant and have an expected sign. The signs of the α coefficients indicate that the variables of the system returned to long-run equilibrium relationships.

Table 1. Managed floating with US dollar as an operating target

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

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBORlm	LIBORlm	RUR/USD	CDS5Y
ΔMIBORlm	-0.010**	-0.032***	$\beta_{1,j}$	1	-2.398**[b]	-1.758***	0
	(0.005)	(0.014)		(0.000)	(1.268)	(0.504)	(0.000)
ΔLIBORlm	0	0	$\beta_{2,j}$	0	2.045**	1	-1.139***
	(0.000)	(0.000)		(0.000)	(0.855)	(0.000)	(0.246)
ΔRUR/USD	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. 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.

Bi-currency basket targeting "no crisis" sample

The time period covered by this sample is the so-called "no crisis" period from February 2005 to August 2007. On condition that market actors considered the operating target of the new exchange rate policy viable, the introduction of bi-currency basket targeting in February 2005

should have resulted in a new linkage between domestic and basket determined variables replacing the old linkage between domestic and USD determined variables.

In order to test this, I estimate the VEC specification (1) on two sets of variables. One set is represented by the USD/RUR exchange rate and the LIBOR for USD deposits; the other is based on synthetically composed exchange and interest rates.

Table 2. Managed floating with Bi-currency basket as an operating target

No crisis sample: 2 Fed. 2005 - 8 Aug. 2007 (608 obs.)

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBORlm	LIBORlm	RUR/USD	CDS5Y
ΔMIBORlm	-0.023***	0.004	$\beta_{1,j}$	1	-0.253	-0.409	0
	(0.009)	(0.006)		(0.000)	(0.424)	(0.370)	(0.000)
ΔLIBORlm	0	0	$\beta_{2,j}$	0	2.751***	1	-0.409
	(0.000)	(0.000)		(0.000)	(0.675)	(0.000)	(0.370)
ΔRUR/USD	-0.004	0.002					
	(0.003)	(0.002)					
ΔCDS5Y	-0.003***	-0.004***					
	(0.001)	(0.001)					
	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBORlm	Synthetlm	Basket	CDS5Y
ΔMIBORlm	-0.001	0.020	$\beta_{1,j}$	1	-2.979***	-2.337***	0
	(0.004)	(0.018)		(0.000)	(0.488)	(0.692)	(0.000)
ΔSynthetlm	0	0	$\beta_{2,j}$	0	1.385***	1	4.019***
	(0.000)	(0.000)		(0.000)	(0.234)	(0.000)	(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 MosIBOR is related neither to the USD-denominated LIBOR nor to the USD/RUR. However, from the lower panel of Table 2, we see that MosIBOR is positively related to the bi-currency basket exchange rate and the synthetic interest rate.

The 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. In view of this, it can be noted 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 grew 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. However, the lower panel results indicate a significant negative relationship between the bi-currency basket and the sovereign risk premium. This could be due to investor concerns caused by the strengthening of the ruble against the basket, which at that time was viewed as fundamental currency overvaluation leading to higher macroeconomic risks.

"Decoupling" episode

The third sample covers the period August 2007-August 2008, when Russia was not yet affected by the World liquidity crisis. An interesting feature of the crisis was the so-called "decoupling" phenomenon characterized by divergence in the behavior of financial markets in emerging and developed countries. In Figures 1-3, for about one year, the Russian domestic interest rate, the exchange rate and the CDS premium did not exhibit any reaction to the liquidity crisis in the developed countries. Moreover, major investment banks issued a number of research reports assigning an "investment currency status" to the Russian ruble in a global carry-trade[4].

In the upper panel in Table 3, the contemporaneous relationship between the MosIBOR and the USD LIBOR is negative. On the contrary, in the lower panel, the relationship between the MosIBOR and the synthetically composed foreign interest rates is positive but marginally significant. This means that Russian interest rates became inversely related to the dollar-denominated interest rate and more in sync with the monetary policy cycle of the ECB, which was lagging the Fed's aggressive policy 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 interest rate are strongly positively related. This could be due to the fact that the ruble became 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.

[4] In May 2008, Bloomberg reported that Goldman Sachs, Merrill Lynch and Deutsche Bank had advised its customers that the Russian rouble is becoming one of the most lucrative objects of investment amid the continuing world financial markets instability.

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

Table 3. Managed floating with Bi-currency basket as an operating target

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

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBORlm	LIBORlm	RUR/USD	CDS5Y
ΔMIBORlm	-0.028**	-0.007	$\beta_{1,j}$	1	1.068**	-3.181***	0
	(0.012)	(0.039)		(0.000)	(0.480)	(0.766)	(0.000)
ΔLIBORlm	0	0	$\beta_{2,j}$	0	-0.292***	1	0.877
	(0.000)	(0.000)		(0.000)	(0.139)	(0.000)	(0.606)
ΔRUR/USD	-0.010	-0.042**					
	(0.006)	(0.020)					
ΔCDS5Y	-0.008**	-0.018					
	(0.003)	(0.011)					
	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBORlm	Synthetlm	Basket	CDS5Y
ΔMIBORlm	-0.036***	0.078	$\beta_{1,j}$	1	-0.719*	0.949	0
	(0.013)	(0.099)		(0.000)	(0.395)	(2.288)	(0.000)
ΔSynthetlm	0	0	$\beta_{2,j}$	0	-0.124**	1	-0.293
	(0.000)	(0.000)		(0.000)	(0.061)	(0.000)	(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%

The crisis episode

This sample spans from September 2008 to November 2009, when Russia was hit by the World liquidity crisis. β coefficients in both panels of Table 4 exhibit no qualitative difference in terms of signs and statistical significance for the measures of exchange and interest rates. Another feature of Table 4 is the similarity of the results to those reported for the USD-targeting sample in Table 1. This demonstrates that while the CBR *de jure* maintained an adjustable basket pegging policy throughout the crisis episode, the financial markets did not perceive this policy differently from the policy of managed floating against the US dollar.

The $\alpha_{i,j}$ coefficients for all variables in Table 4 are higher than those during the USD managed floating episode reported in Table 1, which suggests that the financial variables adjusted faster to cointegrating relationships during the crisis episode.

Table 4. Managed floating with Bi-currency basket as an operating target
Crisis sample: 1 Sept. 2008 - 16 Oct. 2009 (272 obs.)

	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBORlm	LIBORlm	RUR/USD	CDS5Y
ΔMIBORlm	-0.028**	-0.118***	$\beta_{1,j}$	1	-3.393**	-3.020***	0
	(0.014)	(0.045)		(0.000)	(1.404)	(0.273)	(0.000)
ΔLIBORlm	0	0	$\beta_{2,j}$	0	1.611***	1	-0.759***
	(0.000)	(0.000)		(0.000)	(0.409)	(0.000)	(0.078)
ΔRUR/USD	0.023***	0.044**					
	(0.007)	(0.021)					
ΔCDS5Y	0.049***	0.174***					
	(0.017)	(0.053)					
	$\alpha_{i,1}$	$\alpha_{i,2}$		MIBORlm	Synthetlm	Basket	CDS5Y
ΔMIBORlm	-0.027**	-0.112***	$\beta_{1,j}$	1	-5.869**	-3.226***	0
	(0.014)	(0.046)		(0.000)	(1.155)	(0.302)	(0.000)
ΔSynthetlm	0	0	$\beta_{2,j}$	0	2.142***	1	-0.724***
	(0.000)	(0.000)		(0.000)	(0.312)	(0.000)	(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%

Conclusions

The policy shift from USD targeting to bi-currency basket targeting, which the CBR undertook in 2005, presents an interesting case study of the degree of monetary policy independence as measured by the disconnect of domestic interest rates from their foreign counterparts.

The study first looked at whether the adoption of exchange rate policies involving basket targeting improved the ability of the CBR to conduct independent monetary policies. I found that the MosIBOR was positively related to the LIBOR and the USD/RUR exchange rate during the

period of USD targeting. This finding is consistent with the "impossible trinity" hypothesis formulated by Mundell-Fleming.

Following the adoption of bi-currency basket targeting, the MosIBOR has been disconnected from the LIBOR and from the USD/RUR. However, it has instead been positively associated with the bi-currency USD and EUR basket and with a synthetic interest rate composed of the US LIBOR and the Euro LIBOR. This means that the domestic variables have assumed a new external anchors - the synthetic interest rate and the bi-currency basket.

Second, the study examined the insulating properties of the Russian basket targeting policy during the World liquidity crisis. I present evidence that the MosIBOR rate was negatively related to the US-denominated LIBOR and positively 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 are larger, which indicates that the equilibrium correction was much quicker during the crisis.

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