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The value of waiting: Russia's integration into the international capital markets

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The Value of Waiting
— Russia's Integration into the International Capital Markets —

by

Claudia M. Buch, Ralph P. Heinrich, and Christian Pierdzioch

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Abstract

Capital flight has characterized the transformation process in Russia. Inflows of foreign direct investment have been minor and have been preceded by inflows of portfolio capital. The paper shows that uncertainty about macroeconomic stabilization exhibits a strong negative effect on the volume of capital inflows when investment decisions are irreversible. Reducing uncertainty may but must not necessarily lead to more investment. The fact that monetary stabilization policies have not been accompanied by comprehensive institutional reforms can explain the pattern of Russia's capital flows in general and the dismal performance in attracting foreign direct investment in particular.
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1. The Setting*

Until recently, Russia's gateway to the international capital markets were international financial institutions and official creditors. Private investors avoided Russia; capital flight both reflected unsound policies and obstructed the transformation process. The situation seemed to have changed conspicuously in the first half of 1997. For the first time since the beginning of economic transformation has a net inflow of capital been recorded. While Russia's entry into the private international capital markets marks an important success of its economic policy, increased inflows of capital have also exposed the country to the risk of a sudden reversal of capital and of a balance of payments crises. The turbulence on Russia's financial markets in autumn 1997 and the losses of foreign exchange reserves in response to the currency crises in Asia have already exemplified these risks.

A country with a large share of liquid, short-term capital inflows is exposed to greater risks of balance of payments crises than an economy with a high share of long-term, foreign direct investment (FDI). Short-term foreign capital can easily be withdrawn and oftentimes tends to finance consumption rather than investment. FDI, in contrast, signals a more permanent commitment of foreign investors and helps a country to improve on its productivity and export potential. This paper maps the road that Russia has taken so far in attracting foreign capital, it suggests an explanation for the structure and sequence of capital flows, and it analyses policy options for integrating into the international capital market in the future. The paper's main thrust is the notion that even sound domestic policies cannot fully shield an economy from negative international shocks. Yet, the structure of capital (in)flows and the degree to which the domestic economy is hurt by external shocks crucially depends on policies at the national level.

The following second part sketches the stylized facts of Russia's integration into the international capital markets. Until very recently, private capital fled the country, and in particular foreign direct investment in Russia was minor. At the same time, Russia received quite substantial amounts of official transfers. Capital flows seemed fairly unrelated to conventionally calculated return differentials, indicating substantial country risk premia, uncertainty about future investment conditions, and the presence of capital controls. Yet, traditional explanations fail to give a convincing explanation for the structure and in particular the sequence of capital flows. The third part thus presents a theoretical framework which highlights international investment decisions under conditions of irreversibility and of uncertainty. The model shows that the volume of capital inflows is negatively affected by

* This paper has been prepared in the context of a research project „Opening up for Foreign Capital – Risks and Benefits for Transition Economies“. Financial support of the Volkswagen Foundation is gratefully acknowledged.

uncertainty and by factors which increase the irreversibility of investment. It allows us to study the effects of both stabilization and liberalization on capital flows. The results of the analysis indicate that non-securitized capital flows such as most forms of foreign direct investment are particularly sensitive to these parameters because they cannot easily be withdrawn. The model also reveals that reducing uncertainty about monetary shocks may but need not necessarily lead to increased investment if other key investment conditions remain unchanged.

Part four discusses Russia's stabilization and liberalization policies in the light of our theoretical model. It is argued that Russian economic policy has influenced capital flows in at least two regards. On the one hand, Russia has recently *de facto* pursued a policy of real exchange rate stabilization which tended to promote foreign investment. On the other hand, the gradual removal of controls on portfolio capital, coupled with the maintenance of controls on foreign direct investment in key areas has biased capital inflows towards short-term, liquid investments. Also, due to a lack of institutional reforms, overall investment conditions have remained unsatisfactory. This explains why – despite the successes with stabilization – a stable pattern of positive capital inflows has not yet emerged. Part five concludes.

2. Russia's Integration into the International Capital Markets

Statistics on capital flows going in and out of Russia are plagued by numerous inconsistencies, inaccuracies, and omissions. Most importantly, strong incentives to export capital into safe havens, coupled with controls on capital outflows, have caused a substantial amount of capital flight which is *per definitionem* not fully covered in official statistics.¹ In addition, the necessary adjustment of statistics to the needs of a market economy has rendered existing reporting systems obsolete, and establishing new and reliable systems is taking time. The official statistics thus mainly cover capital flows which show up in official investment accounts. To the extent that investors bypass capital account regulations, their activities are not in the official records. Because it is our aim to present the stylized facts of Russia's integration into the international capital markets, we use internationally comparable data only.²

¹ According to a broad measure, capital flight equals the sum of registered net private capital outflows plus net errors and omissions in the balance of payments statistics. For a comprehensive review of the definition and measurement of capital flight see Chang et al. (1997).

² The analysis draws on balance of payments data which have been published in the IMF's International Financial Statistics and in the Russian Economic Trends' database.

In the years 1994 through 1996, private capital exports dominated the capital account of Russia's balance of payments (Table 1).³ Officially reported net capital outflows reached almost 72 billion US-Dollar or about 7 percent of GDP. If net errors and omissions as a measure of capital flight are added, net outflows of capital amounted to 8 percent of GDP. Capital outflows were also recorded for the first quarter of 1997, primarily because substantial inflows of portfolio capital were overbalanced by other capital outflows. At the same time, Russia received substantial amounts of official credits. Adding exceptional financing and IMF loans to the official capital flows shows that net exports of capital reached only 1 percent of GDP between 1994 and 1996. By the same definition, gross inflows even turn positive (4.5 percent of GDP).

It is striking that capital flows were concentrated in the category „other investment“ which comprises bank deposits, bank loans, currency holdings, and trade credits (Table 2). Capital flows in this category were, in turn, dominated by capital exports of the government and of other sectors whereas the commercial banking system was a net importer of foreign capital. Officially recorded inflows of portfolio capital and of foreign direct investment were positive during the period 1994 through 1997. The stock of FDI accumulated in Russia between 1994 and the first quarter of 1997 reached about one third of the stock of portfolio investment. Still, by the end of 1996, the total stock of foreign direct investment in Russia (7.5 billion US-Dollar) was only the second largest of the transition economies and was exceeded by a substantial margin by that of Hungary (13.4 billion). The stock of FDI in the Czech Republic (7.4 billion) was only slightly less than that of Russia (UNECE 1997). With a stock of foreign investment per capita of 50 US-Dollar at the end of 1996, Russia ranked far behind all advanced transition economies of Central and Eastern Europe and scored better only than a handful smaller successor states of the Soviet Union.

The first nine months of 1997 witnessed a conspicuous turn-around of private capital flows (Table 2). Driven by inflows of portfolio capital of 15.5 billion US-Dollar – which is more than twice as much as the sum of the inflows of the previous three years – net capital inflows were positive for the first time since the beginning of reforms. Inflows of foreign direct investment were relatively modest instead (3.2 billion US-Dollar); other net capital flows remained negative. Yet, reaping the benefits of private capital inflows has been a short-lived episode. In autumn 1997, Russian financial markets came under pressure spilling over from Asia. Foreigners tried to repatriate their capital, forcing the CBR to raise interest rates and to sell 20 percent of its stock of foreign exchange reserves only in November 1997 to

³ According to statistics which are not fully compatible with those referred to above, official capital exports plus net errors and omissions (column d in Table 1) reached US-Dollar 7.6 and 16.6 billion in 1992 and 1993, respectively (IMF 1994).

support the Ruble. Between mid-1997 and the end of January 1998, foreign exchange reserves from 24.5 to 16 billion US-Dollar, i.e. by more than one third.

The traditional literature offers only limited explanations for these observations. Generally, international portfolio decisions depend upon the return and risk characteristics of different assets. Yet, for Russia, simple return differentials are unable to explain the pattern of capital flows. Between 1994 and 1997, the return that foreigners could have received by investing into Russian government bonds (GKOs) exceeded the return on Dollar assets abroad by a substantial margin (Graph 1). This would *ceteris paribus* lead to expect positive capital inflows and a reduction of return differentials. Yet, in the aggregate, capital left the country while the return differential has indeed narrowed. A simple correlation analysis shows that capital inflows are largely unrelated to changes in the interest rate differential. To some extent, capital controls may have prevented a response of capital flows to differences in expected rates of return. In fact, a gradual liberalization of the access of foreigners to the GKO market which has started in early 1996 (see Table 4) contributed to lower yield differentials.⁴ However, attributing sustained return differentials to capital controls alone is not fully convincing because these controls have largely been ineffective in preventing massive capital outflows. Anecdotal evidence furthermore suggests that foreigners have invested in the GKO market despite the restrictions being in place.

Differences in the riskiness of various assets are taken into account by the capital asset pricing model.⁵ However, portfolio decisions in this model are static in the sense that risk and return characteristics are taken as given at a certain point in time. Changes in the underlying risk and return characteristics would trigger changes in the optimal market portfolio but the induced adjustment would be instantaneous. Thus this model cannot adequately explain the timing of capital flows.

In the next section we use an option pricing model to study both the timing and the structure of capital flows. The model enables us to distinguish between investments of different degrees of irreversibility and which hence vary in their responsiveness to changes in macroeconomic volatility and other systemic risks.

⁴ An exception is the hike in interest rates surrounding the presidential elections in mid-1996.

⁵ Burgtorf (1997) essentially uses this model to calculate the optimal portfolio allocation for equities, Eurobonds, and T-bills for a number of transition economies in Central and Eastern Europe. She finds that compared to a given historic portfolio holdings of Russian T-bills should be reduced and holdings of Russian equities should be increased.

3. The Option to Invest in Russia: Long-Term Investment, Short-Term Investment, No Investment

Simple arbitrage conditions which do not take account of uncertainty and of the irreversibility of investment are ill-suited to explain the pattern of Russia's capital flows. Therefore, this section presents a theoretical framework which explicitly incorporates these factors. We show how the optimization problem of a foreign investor who has the right to undertake an irreversible investment project in Russia can be integrated into a full-fledged stochastic macroeconomic framework. Our modeling strategy allows us to shed light on the impact of monetary stabilization policy on the attraction of the Russian economy for investors located abroad. The model helps to explain the facts that net private inflows of capital have been negative and that foreign direct investment has made such a low contribution to Russia's transformation process so far. Our analysis extends the ideas presented by Moretto and Valbonesi (1997). They used the option valuation approach to irreversible real investment decisions (see Dixit and Pindyck 1994) to model the impact of uncertainty about the introduction of capital controls on the evolution of FDI in the transition economies of Eastern Europe. The authors demonstrate that an increase in the probability of a reversal of capital market liberalization *via* the reintroduction of controls on cross border capital flows unfolds a depressing effect on the current inflow of FDI. A similar idea had first been formalized in Laban and Larrain (1993).

3.1. Monetary Policy, Sunk Costs, and Foreign Investment

Investment decisions in Russia are characterized by substantial uncertainty about practically all relevant aspects of business parameters. The tax system is opaque, the institutional framework is all but clearly defined, ownership rights are hard to enforce, and money supply remains volatile despite the notable successes that have been achieved with respect to monetary stabilization. To capture both the impact of uncertainty about the stance of economic policy as well as the implications of the recent restrictive monetary policy on a firm's investment decision, we employ a simple stochastic macroeconomic framework. Our macroeconomic model consists of the following set of logarithmic equations:⁶

$$\text{Money supply} \quad dm = \phi(\bar{m} - m)dt + \sigma dz \quad (1)$$

$$\text{Commodity market} \quad y = -\alpha s + \beta m \quad (2)$$

⁶ For the remainder of the paper, we fix the logarithms of the domestic price level, of the foreign price level, and of the target level of money supply at zero.

$$\text{Currency arbitrage} \quad E_t(ds) = (r^* - r)dt \quad (3)$$

$$\text{Money market} \quad m = \kappa y - \lambda r \quad (4)$$

where Greek letters are assumed to be strictly non-negative, and an asterisk indicating a foreign variable. Equation (1) states that the evolution of the stock of domestic money is governed by a simple Ornstein-Uhlenbeck-process. This process consists of two parts. The first term of the autoregressive process given in equation (1) indicates that the central bank tries to peg the money supply at the level \bar{m} and that every deviation of the money stock from this target level induces a „leaning against the wind policy“ of the monetary authorities. The second part of the stochastic money supply process is the increment of a standard Wiener process dz with an instantaneous standard deviation σ . This element indicates that the central bank is not capable of completely pegging the money stock at the target level \bar{m} .

This specification is, of course, a fairly stylized characterization of Russian monetary policy.⁷ Up to 1995, monetary policy was largely guided by credit needs of the government and of state-owned enterprises. In 1995, an exchange rate corridor for the Ruble was announced which, at the beginning of 1998, has been widened substantially. At the same time, the CBR has announced monetary targets. As we will not discuss the problem of possible inconsistencies between monetary and exchange rate targets, we thus implicitly assume that the monetary target comes to dominate in the future. Hence, the stochastic element of the money supply process can be thought of as the influence of interventions on the foreign exchange market to defend the target. Following this interpretation, the „leaning against the wind“ parameter ϕ reflects sterilization policies of the Central Bank aimed at neutralizing the impact of exchange market intervention on the money stock.

Underlying the specification of the commodity market equilibrium in equation (2) is the assumption that the capacity is not fully utilized.⁸ This assumption may be questioned in view of the pronounced decline in investment that has taken place in recent years. We yet assume that at least some idle capacity is available. Hence, domestic output y is determined by aggregate demand which is a function of the exchange rate and of the domestic money stock. Notice that our framework does not allow us to analyze structural, long-run growth effects. Thus, possible positive output effects of an increase in money supply are purely cyclical.

⁷ See also Section 4. For a comprehensive analysis of the Russian monetary policy see Buch (1997).

⁸ The OECD even estimates that only about 50-60 percent of the capital stock are utilized (OECD 1997).

The nominal exchange rate s is defined as the foreign currency price of the domestic currency. Equation (3) is the uncovered interest rate parity (UIP). This currency arbitrage equation asserts that any difference between the instantaneous domestic (r) and the (exogenous) foreign (r^*) interest rate reflects corresponding exchange rate expectations. The expectations operator conditional on information available at time t is denoted as E_t . Equation (4) is the equilibrium condition for the domestic money market. Money demand is a function of the domestic interest rate r and the domestic output y . The saddlepath stability of the stochastic system of differential equations outlined in (1)-(4) follows from $-\phi\alpha\kappa\lambda^{-1} < 0$.⁹

In the deterministic case ($\sigma=0$), the stable linear saddlepath $s = \theta m$ can be established as the unique solution to the macroeconomic system by ruling out extrinsic bubbles. In the stochastic case, however, the stable saddlepath and an infinite number of locally stable nonlinear trajectories pass through the origin. This implies that the model possesses multiple solutions in the absence of additional boundary conditions (Miller and Weller 1990). A unique solution coinciding with the stable linear saddlepath can be obtained by imposing the requirement of global stability of the system.

We now consider the optimal investment strategy of a single, risk-neutral foreign firm which has the right to realize one investment project in Russia. The firm faces the choice of investing today or at some point in the future, i.e., the investment decision can be postponed. Yet, investment decisions are irreversible, and the foreign firm can only undertake the investment in Russia at a sunk cost c (measured in terms of foreign currency). For convenience, we assume that the investment yields one unit of domestic output and that production incurs no operating costs.¹⁰ It follows that the operating profits of the firm in terms of foreign currency π are simply given by the exchange rate s . Notice that the assumption of fixed domestic and foreign prices implies that changes of the nominal exchange rate translate proportionally into changes of the real exchange rate. Hence, the profitability of foreign investment hinges on the development of the real exchange rate. Using the solution for the adjustment path of the macroeconomic model, operating profits can also be expressed as a function of the Russian money stock: $\pi = \theta m$. Let capital letters denote antilogs. Then the operating profits are given by $\Pi = M^\theta$ and evolve according to the following stochastic differential equation:

$$d\Pi = \theta\Pi(-\phi m + 0.5\theta\sigma^2)dt + \theta\Pi dz \quad (5)$$

⁹ The LHS of this inequality is just the determinant of the coefficient matrix of the system.

¹⁰ Since the analysis is restricted to the case of a single foreign firm producing one unit of output, the effect of foreign investment on the path of the exchange rate can be neglected.

The foreign firm has the right to invest in Russia. Yet, at every moment in time, the management of the foreign firm can come up with the decision to defer its investment and thus to be able to observe further realizations of the time-path of the Russian money stock. Hence, the investment opportunity of the foreign firm is equivalent to a perpetual call option with strike price C . The value $F(\Pi)$ of this call option at time t is the expected present value of the payoff associated with the project:

$$F(\Pi) = \max E_t [(\Pi_T - C) \exp(-r * T)] \quad (6)$$

where T denotes the unknown future time at which the investment is made. The firm maximizes (8) subject to the following set of boundary conditions:

$$F(0) = 0 \quad (7)$$

$$F(\hat{\Pi}) = \hat{\Pi} - C \quad (8)$$

$$F_n(\hat{\Pi}) = 1 \quad (9)$$

The stochastic process driving operating profits implies that zero is an absorbing barrier for Π . Consequently, the option to invest will be worthless when the operating profits take on the value $\Pi = 0$. This is formalized in equation (6). Equation (7) is a value-matching condition and states that the operating profits have to cover the full costs of realizing the investment at the investment trigger $\hat{\Pi}$. The costs of investing consist of the sunk costs C , and of the option to invest $F(\Pi)$ (Dixit and Pindyck 1994). Equation (8) is known as the smooth-pasting condition and rules out arbitrage opportunities by stipulating that the option valuation function become tangent to $\Pi - C$ at the boundary $\hat{\Pi}$.¹¹

3.2. *Economic Policy and Investment Decisions*

This section offers the results of a numerical simulation of the model which highlights the impact of the monetary stabilization policy of the CBR on foreign investors' readiness to

¹¹ The solution to the maximization problem stated in equations (5)-(7) can be obtained by applying a change of variable technique which transforms the problem at hand into a standard form for which a solution can be found by visual inspection. The technical details of this solution procedure are outlined in Pierdzioch (1997).

realize an irreversible investment project in Russia. Particularly, it is of interest to examine how the strike price C has to adjust in order to guarantee that a firm located abroad will find it optimal to exercise the option at a given level of the Russian money stock even though a change in the parameters of the money supply process has taken place. Therefore, we will focus attention on the impact of a change in the instantaneous standard deviation σ of the money supply process and in the level of the „leaning against the wind“ parameter ϕ on the value of the option to invest in Russia.

The numerical simulation of the model is based on the following set of parameter values: $\alpha = 0.25$, $\beta = 0.5$, $\kappa = 1$, $\lambda = 0.05$, and $r^* = 0.05$.¹² The smooth-pasting point has been fixed at $\hat{m} = 0.5$ for all options. Table 3 summarizes the results of the analysis. The second row of the table displays the realizations of C for the parameter values given in the first row of the table. The first column depicts selected values of the Russian money stock m , and the corresponding option values can be found on the right-hand side of this row.

A comparison of the third and the fourth column brings to light that a decrease of the instantaneous standard deviation of the Russian money supply process from $\sigma = 0.2$ to $\sigma = 0.15$ increases the sunk costs C related to $\hat{m} = 0.5$ from 1.75 to 1.99. The realizations of the Russian money stock given in the first column of the table produce lower values of the option to invest and this entails lower opportunity costs of undertaking the investment. Thus, a decline in the volatility of the Russian money supply process puts downward pressure on the investment trigger point of the money stock for any given level of sunk costs.

The fifth column of the table displays the sunk costs and the option values for $\sigma = 0.15$ for a „leaning against the wind“ coefficient of $\phi = 0.4$. A comparison with the results plotted in the fourth column shows that an increase in the degree of mean-reversion enhances the sunk costs required for a smooth-pasting point of $\hat{m} = 0.5$ and reduces the premium of the option to invest. A higher degree of mean-reversion has two effects. *First*, the slope of the stable trajectory θ decreases. This implies that any deviation of the money stock from the announced target level entails a smaller effect on the operating profits Π . The lower volatility of the underlying Π translates into a reduced premium of the option to invest in Russia. *Second*, enhancing the degree of mean reversion fosters expectations of convergence of the domestic money stock to its long-run target level \bar{m} . This lowers (raises) the option premium for $m > \bar{m}$ ($m < \bar{m}$). The impact of both effects on the value of the option to invest can be identified by comparing the figures plotted in the fourth and fifth column of Table 3. The results of the numerical simulation reveal that an increase of the mean reversion parameter from $\phi = 0.4$ to $\phi = 0.5$ lowers the option premium for all m . Moreover, the

¹² This constellation of parameters implies $\kappa\beta\lambda^{-1} > 1$. It follows that the adjustment path of the macroeconomic model has a positive slope (i.e., $\theta > 0$).

difference between the values of the option to invest in Russia for the alternative mean reversion parameters increases as the domestic money stock takes on higher realizations. These results indicate that the first effect of a change in mean reversion on the value of the option to invest dominates over the second effect.

Our numerical simulation has revealed that a tighter "leaning against the wind" policy lowers the value of an option on an irreversible investment project in Russia. This, in turn, corresponds to lower opportunity costs of investment and thus enhances the attraction of the Russian market for firms located abroad. Yet, the Russian experience with a refractory small amount of long-term capital inflows suggests that foreign firms are still too reserved to be investors in Russia although the CBR has started to carry out a monetary stabilization strategy from the beginning of 1995 on. This indicates that successful monetary stabilization is not the only factor which is taken into consideration by foreign investors. Our model captures these parameters through the sunk costs C . The sunk cost parameter may, for example, reflect the impact of illiquid markets for financial assets and firms, of a weak protection of ownership rights, and of other adverse aspects of the economic and institutional framework. This interpretation suggests that a reduction in the uncertainty about the money supply has reduced the value of the option to invest but that foreign investors will not exercise this option until economic policy will have pushed on with reforms in other important areas of the institutional environment.

Moreover, the sunk costs C are not identical for all kinds of investment projects. For example, the amount of sunk costs related to foreign direct investment are typically higher than the sunk costs of portfolio investment.¹³ In fact, sunk costs of portfolio investment become marginal in developed financial markets. Lower sunk costs imply a higher sensitivity of portfolio investment to the recent success of Russian monetary stabilization policy. This theoretical argument suggests that in the aftermath of a successfully implemented monetary stabilization policy, a rise in the amount of FDI is preceded by an increase in the inflow of portfolio investment. Hence, our theoretical model confirms the observations presented in Section 2.¹⁴

¹³ Notice that the gradual liberalization of the access of foreigners to the GKO market which has started in 1996 (see section 2) may account for an enlargement of the difference in the sunk cost parameter related to foreign direct investment and portfolio investment projects in Russia.

¹⁴ Note that we abstract from portfolio diversification effects which likewise have an impact on the structure of capital flows.

4. Policy Responses

This section analyses the economic policy of Russia in light of the theoretical framework above. The theoretical model of section 3 is based on the fact that the profitability of investments in Russia depends on the the volatility of the real exchange rate. Policies which stabilize the real exchange rate tend to lower the premium of the option to invest in Russia and thus tend to increase foreign investment. Yet, stabilization is not the only variable affecting investment decisions. Likewise, policies which reduce the degree of irreversibility of investments tend to increase foreign investment. Such policies consist of the liberalization of capital account transactions and improvements in the legal environment which reduce sunk costs. If stabilization is not accompanied by structural reforms and/or if the sustainability of stabilization is in doubt, it may not serve to move firms out of their range of inaction. We look at these policies in turn.

4.1. Stabilization

During the transition period, the CBR has specified monetary and nominal exchange rate targets at the same time. In the terminology of Section 3, monetary targeting is represented by the „leaning against the wind“ parameter while exchange rate targeting causes (stochastic) fluctuations of money supply. By stabilizing prices and the exchange rate, respectively, monetary and exchange rate policies have the potential to stabilize the real exchange rate which matters for the volatility of an investment project's cash flow.

Up to mid-1992, Russia had in principle maintained the Soviet multiple exchange rate regime with differentiated exchange rates for tourism, foreign trade, or capital account transactions.¹⁵ After the unification of the exchange rate between the Russian Ruble and the US-Dollar in July 1992, the CBR frequently intervened in the foreign exchange market, but at first volatility of the ruble remained high. In January 1995, the maximum daily variation of the exchange rate was set at 10 percent. Since then, the volatility of the nominal exchange rate has been brought down substantially. An exchange rate band of 4,300-4,900 Ruble per US-Dollar was announced for the first time in July 1995 and remained unchanged until the end of that year. In January 1996, the corridor was adjusted to 4,550-5,150 Ruble for the first six months of that year. In July 1996, the CBR moved to a „crawling“ exchange rate corridor which shifts regularly while maintaining a width of 600 Rubles (RET 1996b). As of late 1997, the CBR

¹⁵ For details on the exchange rate policy of Russia and other successor states of the Soviet Union see Buch et al. (1995).

announced a widening of the corridor to +/- 15 percent around a central parity of 6.1 for 1998 and 6.2 for the years 1999 and 2000.¹⁶

The scope of monetary targets has varied over time. In 1993, targets for credits to commercial banks, to the budget, and to the other successor states of the Soviet Union were set. Since late 1993, floor levels for international reserves have been specified, and ceilings for the CBR's net domestic assets and net credit to the government have been announced. In 1994, target levels for M2 and for the monetary base were added.

At first, targets were missed and revised routinely, reflecting and adding to the high degree of monetary volatility in Russia. As a result, the volatility of domestic prices and of the real exchange rate remained high (Table 5). The track record of monetary policy has improved substantially since 1995, though. The CBR has been relatively successful in meeting its targets for credits to the domestic economy. Between the first quarter of 1995 and the end of 1996, actual levels of net credit to the enlarged government and net domestic assets were below their ceilings.¹⁷ Conflicts between the exchange rate regime and the monetary targets have become evident since the exchange rate has been pegged in mid-1995. While in 1995 and in 1997 the CBR faced capital inflows which – if not sterilized – would have endangered compliance with targets for overall money growth, the Bank lost substantial amounts of foreign exchange reserves in 1996 and late 1997. Despite these occasional conflicts, overall monetary and exchange rate targets have been relatively consistent since mid-1995 and thus served to stabilize the real exchange rate (Table 5).

Key to the successful management of simultaneous monetary and exchange rate targets is the sterilization of the effects of interventions in the foreign exchange markets on the money supply. In the short-run, sterilization allows to weaken the constraints that an exchange rate target imposes on monetary policy. According to a *narrow definition* of sterilization, inflows of foreign exchange lead to upward pressure on money supply which the central bank prevents by reducing its net domestic assets. Usually, the reduction in net domestic assets is achieved by selling government bonds from the central bank's portfolio. Yet, these sales of government bonds (or the issuance of central bank bonds) tend to raise the interest rate level, hereby triggering additional capital imports. The speed of this adjustment process crucially depends on the mobility of capital – the less mobile capital is, the longer can the sterilization policy be pursued. Sterilization is also costly because relatively high-yield domestic assets are sold in exchange for low-yield foreign assets. Yet, because of a small money stock and a

¹⁶ At the beginning of 1998, the Ruble was re-denominated by dividing all nominal values by a factor of 1000.

¹⁷ The second quarter of 1996 is an exception because of the large increase in domestic credit prior to the presidential election.

narrowing yield differential vis-à-vis abroad, these costs relative to GDP are relatively small in Russia. The impact of capital inflows on broader monetary aggregates can, according to a *broader definition* of sterilization, also be neutralized by reducing the money multiplier by, for example, raising reserve requirements.

The experience of Russia with the sterilization of capital inflows is quite illustrative with regard to the instruments that a central bank has at its disposal and with regard to their effectiveness. In 1995, the CBR tried to sterilize inflows of foreign capital mainly by reducing credit to commercial banks. (Net) credit to the government may have been below the level that would have been feasible in the absence of capital inflows but it increased nevertheless quite substantially. Because the reduction in lending to banks could not offset the increase in net international reserves and in credit to the government, base money expanded relatively rapidly in 1995. In 1996, the CBR was facing a quite different set of problems as international reserves contracted. The government's demand for credit was again high and, as the CBR bought GKO's on the market, credit supply increased as well. Credit to banks, in contrast, continued to decline.

In the first half of 1997, the CBR shifted gears with regard to its domestic credit policy. Facing inflows of foreign exchange which replenished reserves up to the level targeted for December 1996, the CBR had to contain money growth. By the end of June 1997, growth of Ruble M2 exceeded the lower bound of the 22-30 percent growth range envisaged for the entire year. In contrast to the two previous years, sterilization of capital inflows has not only come at the expense of lending to banks. Rather, (net) lending to the government was – at least in the second quarter of the year – reduced as well. The CBR sold GKO's in April and June 1997. Because the bank had bought GKO's in March and May, its gross claims on the government actually increased during the first half of the year. Net claims of the CBR on the government were reduced primarily because of an increase in the deposits of the government with the Bank. Overall, sterilization has not had the adverse impact of pushing up interest rates while it has certainly slowed down the decline in interest rates. This is because sales of GKO's have been limited, because Russian financial markets are less than perfectly integrated with international financial markets, and because capital inflows have been quite strong through the second quarter of 1997.

Conditions for monetary policy changed again in the second half of 1997. The loss of foreign exchange reserves that has been precipitated by the spill-over effects from the Asian financial crises allowed the CBR to expand both lending to the government and – for the first time in three years – also lending to commercial banks.

In summary, the CBR has hardly tried to adopt the broad concept of sterilization. In an effort to align reserve requirements on domestic and foreign currency deposits, the CBR lowered reserve requirements on ruble deposits and increased those on foreign currency deposits between 1995 and 1997 (Graph 3). Hence, the combined effect on the money multiplier is unclear. With regard to the domestic credit policies, sterilization has mainly affected the supply of credit to banks over which, arguably, the Central Bank had greater control than over credit to the government.

In the future, an increased mobility of capital will make the coordination of monetary and exchange rate targets more costly, and this will make a clearer choice necessary. Monetary targeting is likely to become more important for two reasons: *First*, the exchange rate band has been widened substantially, thus widening the degree of freedom for monetary policy. *Second*, money demand is becoming more predictable, thus improving the preconditions for a policy of monetary targeting.

De facto then, the CBR has followed a policy of real exchange rate targeting. The relative stability of the real exchange rate that has been achieved since mid-1995 has reduced the uncertainty about future investment conditions and should thus have promoted foreign investment.¹⁸ That massive inflows of private capital did not start in 1996 already can be explained by the added uncertainty introduced by the presidential elections in the summer of 1996, in which opponents of economic reform mounted a credible threat to Boris Yeltsin, and by his serious illness after his electoral victory.

4.2. Capital Account Liberalization and Institutional Reforms

While a reduction in the volatility of the real exchange rate should improve conditions for all kinds of investment, our model implies that its initial impact will be largest for those types of investment which can more easily be reversed, notably portfolio capital. As has been argued in section 2, this is indeed the kind of capital inflows which rose most in Russia. But economic policy can also reduce the degree of irreversibility of investment projects. It can do so by liberalizing the capital account, removing barriers to the repatriation of capital, and by

¹⁸ Notice that we assess the optimality of this strategy only with reference to our above framework. A comprehensive analysis of exchange rate and monetary policies would have to take into account at least two additional aspects. *First*, the response of market participants to regime shifts crucially depends on the credibility of the monetary authorities. This, in turn, is to a substantial degree affected by the consistency of other economic policies – notably fiscal policy – with a monetary and/or an exchange rate target. *Second*, our model does not allow us to capture effects of possible exchange rate misalignment which would negatively affect the current account.

reducing the costs of investing in Russia. On this count, Russian policy has been biased against FDI and in favor of portfolio investment.

Convertibility of the Russian ruble has progressed only sequentially, and cross-border transactions remain restricted in a number of key areas of the balance of payments. In June 1996, current account convertibility of the Ruble as required under the IMF's Article VIII has been introduced while restrictions on the capital account are being maintained (Table 4). Market access of foreign investors to the government bond (GKO) market has been eased gradually since early 1996. Until the end of 1997, investors who wanted to repatriate profits from GKO operations had to acquire a forward contract from the CBR which determined the exchange rate at which the conversion was made. These rules obviously added a measure of irreversibility to investments in the GKO market. However, the minimum term of these forward contracts was lowered from two to one month in autumn 1997. From the beginning of 1998, no forward contracts are required for the repatriation of capital from the GKO market.

Other capital account transactions as well as foreign direct investment remain restricted and/or are subject to an official approval of the CBR. Restrictions on FDI in key areas are particularly striking. Foreign banks, for example, can only enter the Russian market after they have received a license from the CBR, and the maximum amount of foreign capital in the Russian banking system has been restricted to 12 percent. For those foreign banks which are already present in the market, this restriction does not seem to be binding as the actual share of foreign banks in the banking system's capital reached only 4.3 percent by the end of 1996 (Iwanow and Kiseljow 1997). Yet, as of late 1997, a number of applications of foreign banks for licences were pending with the CBR. Furthermore, investment of foreigners into the oil and gas industry has been excluded from the general liberalization of foreign direct investment. Recently, these restrictions have been eased with foreigners having taken stakes in some Russian energy firms and plans being underway for foreign participation in several key privatizations in the energy sector (PlanEcon 1997).

Not very surprisingly, the structure of capital flows into Russia mirrors the capital account restrictions which persist. (Unofficial) capital exports largely occur through the current account by underinvoicing exports or by overinvoicing imports, capital inflows are concentrated in the category of short-term portfolio investment and in particular GKO's rather than foreign direct investment.

Investment in Russia has been hampered greatly by a lack of institutional reforms as well (OECD 1997, Fischer 1998). Capital markets are poorly regulated not only compared to mature market economies but also in comparison to some of the more advanced transition

economies, notably Hungary and Poland. As a result, markets in Russia are illiquid, and pulling out of an investment project by selling one's stake is correspondingly difficult. This adds to the irreversibility of investments. Another prime obstacle is the tax system. There are roughly 200 separate taxes, legions of exemptions and loopholes, which are often granted on a discretionary basis, and frequent – sometimes retroactive – changes in the rules governing tax enforcement. The need to be familiar with this truly labyrinthine tax system imposes significant set-up costs on potential foreign investors. The opacity of the system and the large discretion it affords to officials at all levels of government is also a breeding ground for corruption, which further raises the costs of investment in Russia. Tax reform is under way, but has frequently been held up by political controversy.

In addition to the opacity of the tax system, there are at least two further areas in which substantial uncertainty about institutional constraints that affect foreign investors persists and where rigorous reforms are not in sight. First, various levels of government continue to be heavily involved in economic activity, going as far as unofficially participating in so-called financial industrial groups. Member enterprises of these groups enjoy various privileges which may tilt the playing field against their – domestic and foreign – competitors. Second, potential foreign investors have to contend with problems enforcing any claims they may have against Russian customers or suppliers as the legal system and particularly foreclosure and bankruptcy rules continue to be weak and weakly enforced. In addition, buying and registering ownership titles to land can be extremely difficult, time-consuming and costly.

These and other institutional weaknesses add to the costs of entering the Russian market and therefore discriminate not only against capital inflows in general but particularly against foreign direct investment.

5. Outlook

In most transition economies, foreign direct investment has – overall – not made a dominant contribution to total capital inflows. Inflows of portfolio capital and other capital account items, notably, foreign loans, have, in the aggregate been larger than inflows of FDI. Russia, contrary to other economies, has not only seen disproportionately small inflows of FDI, it has also suffered from substantial capital flight. Moreover, the stabilization policies which have recently been implemented have stimulated capital inflows only with a substantial delay, and relatively short-term portfolio capital has taken the lead. This has made the country vulnerable to a foreign exchange crisis, as the recent developments have already evidenced.

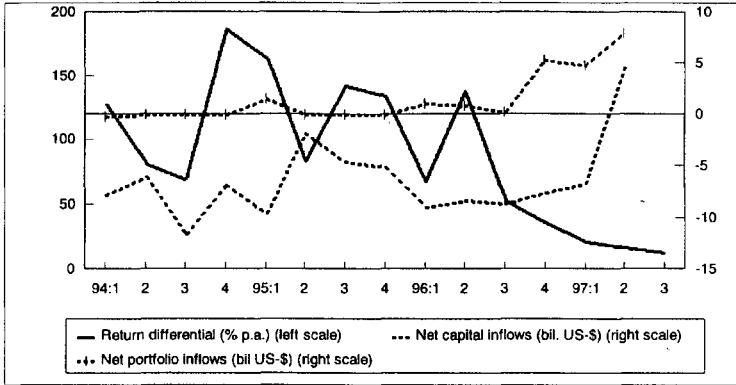
Our theoretical framework can explain both the delayed response of capital inflows and the sequential structure of portfolio investment and FDI. It demonstrates that a tighter

monetary policy lowers the value of an option on an irreversible investment project in Russia and thus enhances the attraction of the Russian market for firms located abroad. However, it has also been shown that the implementation of a monetary stabilization strategy by the CBR may not have been a sufficient condition for stimulating capital inflows. Although the stance of monetary policy has an important influence on the formation of expectations of foreign investors regarding the stability of the economic environment in Russia, other factors may play a crucial role, too. Our model captures these factors through a sunk cost parameter which reflects the impact of illiquid markets for financial assets and firms, of a weak protection of ownership rights, and of other adverse aspects of the economic and institutional framework. Since it can be expected that these sunk costs are less important for securitized portfolio investments than for long-term FDI, our model can explain why the tighter monetary stabilization policy implemented by the CBR in early 1996 has stimulated almost exclusively the inflow of portfolio investment.

With regard to the CBR's monetary and exchange rate policies, our main finding is that since mid-1995 the Bank has largely succeeded in following consistent monetary and exchange rate targets. Because money supply and thus prices were by and large in line with the change of the nominal exchange rate, the real exchange rate was kept fairly constant. This reduction in the volatility of the real exchange rate should *ceteris paribus* have made Russia a more attractive place for foreign investment. The fact that capital flows are still highly volatile shows the lack of reforms in other areas, notably with respect to the institutional framework and public finances.

Graphs and Tables

Graph 1 — Return Differentials and Capital Flows 1994–1997

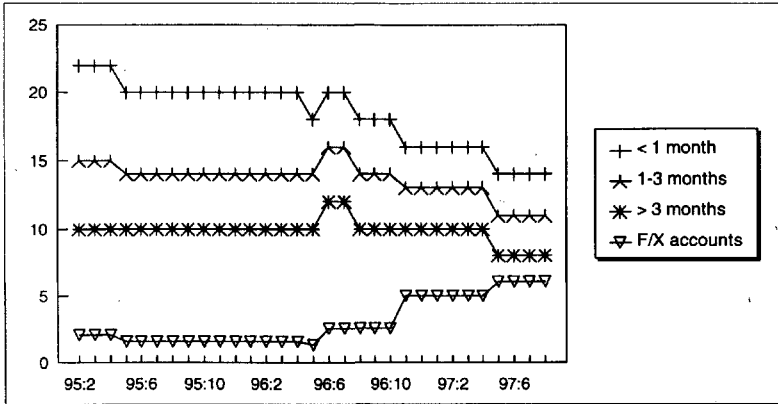


Return differential for foreigners: The return differential for foreigners between investment in GKO and Dollar-deposits abroad has been calculated based on the covered interest parity condition $\left[\left((1+i) \cdot \frac{F_{t,3}}{E_t} \right) - 1 \right] \cdot 100 - i^* \cdot 100$ where i = (compounded) average secondary market yield on GKOs, i^* = interest rate on 3-months deposits (London offer rate), F = three months forward rate of the Ruble vis-à-vis the US-Dollar, E = spot rate.

Net capital flows: Financial and capital account of the balance of payments, including net errors and omissions. Negative sign indicates net capital outflows.

Sources: IMF (IFS); Russian Economic Trends database; own calculations.

Graph 2 — Minimum Reserve Requirements in Russia 1995-1997



Source: Wypior (1997).

Table 1 — Capital Flows 1994–1997

	Gross capital inflows						
	[billion US-Dollar]				[% of GDP]		
	(a)	(b)	(c)	(d)	(a)	(c)	(d)
Financial account	(a) + capital account	(b) + exceptional financing + IMF credits	(b) + Net errors & omissions	Financial account	(b) + exceptional financing + IMF credits	(b) + Net errors & omissions	
1994	-12.7	-8.4	11.3	-9.7	-4.7	4.1	-3.5
1995	-15.0	-11.9	9.6	-19.3	-4.2	2.7	-5.4
1996	4.6	7.6	27.0	0.9	1.0	6.2	0.2
1994–1996	-23.2	-12.7	47.8	-28.1	-2.2	4.5	-2.6
1997 I–III	18.4	20.3	30.8	23.5
	Net capital inflows						
	[billion US-Dollar]				[% of GDP]		
	(a)	(b)	(c)	(d)	(a)	(c)	(d)
Financial account	(a) + capital account	(b) + exceptional financing + IMF credits	(b) + Net errors & omissions	Financial account	(b) + exceptional financing + IMF credits	(b) + Net errors & omissions	
1994	-31.9	-31.1	-11.4	-32.3	-11.6	-4.1	-11.8
1995	-13.3	-13.6	7.9	-21.1	-3.7	2.2	-5.9
1996	-26.4	-26.8	-7.5	-33.5	-6.0	-1.7	-7.7
1994–1996	-71.5	-71.5	-11.0	-86.9	-6.7	-1.0	-8.1
1997 I–III	1.7	1.5	12.0	4.7

All figures have been calculated on the basis of quarterly balance of payments data of the IMF (IFS on CD-ROM, November 1997). GDP-data have been converted into US-Dollars at average quarterly exchange rates.

Source: IMF (1997c), Russian Economic Trends database.

Table 2 — Structure of Capital Inflows 1994–1997 (bn US-Dollar)

	1994	1995	1996	1997				Total
				I	II	III	I-III	
<i>Gross capital inflows^a</i>								
FDI	0.6	2.0	2.5	0.9	2.0	2.2	5.0	10.1
Portfolio	-0.0	0.0	7.5	5.5	8.0	2.1	15.7	23.2
Other	-13.4	-17.1	-5.4	-10.1	3.7	4.1	-2.3	-38.2
<i>Net capital inflows^a</i>								
FDI	0.5	1.7	2.1	0.4	1.4	1.5	3.2	7.5
Portfolio	0.0	-1.4	7.3	5.7	8.0	1.8	15.5	21.4
Other	-32.5	-13.5	-35.8	-9.5	-3.2	-4.4	-17.1	-98.9
a) Financial account only.								

Source: IMF (1997c), Russian Economic Trends database.

Table 3 — Monetary Policy and the Option to Invest

m		$\sigma = 0.2; \phi = 0.5$	$\sigma = 0.15; \phi = 0.5$	$\sigma = 0.15; \phi = 0.4$
	C	1.74598	1.99156	1.94246
-0.5	$F(\Pi)$	0.0935859	0.0057943	0.0152809
-0.25		0.0989264	0.0061509	0.0164291
0		0.109467	0.0069541	0.0189229
0.25		0.142985	0.0111264	0.0295641
0.5		0.419688	0.1741030	0.234174

Table 4 — Market Access for Foreign Investors to the GKO-Market 1996–1998

until 1996	No market access.
since January 1996	Non-residents can buy government bonds and keep these in so-called S-accounts with selected commercial banks until maturity. The maximum rate of return on these accounts is fixed through foreign exchange contracts with the Central Bank at 19 percent p.a.
since August 1996	Non-residents are in principle treated in the same way as residents with the exception that Ruble revenues from selling bonds must be held in S-accounts and can only be repatriated after having concluded a forward contract with the Central Bank of Russia with a minimum maturity of three months. These contracts are concluded with the Central Bank through commercial banks, the yield being capped at 19 percent p.a.
April 10, 1997	<i>A four-stage plan for the liberalization of market access to the GKO-market is announced</i>
<i>1st stage:</i> May 1 - August 31, 1997	The maturity of forward contracts is lowered to 2 months, the effective yield in US-Dollar to 12.5 percent. The share of the Central Bank in the forward contracts is reduced to 50 percent. Commercial banks have the possibility to hedge foreign exchange exposure originating from forward contracts through voluntary forward or option contracts with the Central Bank. These contracts must have a minimum volume of 20 mil. US-Dollar and a maximum maturity of 6 months, and the underlying forward contract must expire in the year 1998.
June 1997	The effective yield is lowered to 11 percent.
<i>2nd stage:</i> September 1 - November 30, 1997	Maturity of the forward contracts is lowered to 1 month. Voluntary compensating transactions with the Central Bank can have a maturity of up to three months.
<i>3rd stage:</i> December 1 - 31, 1997	Forward contracts cannot expire in 1997.
<i>4th stage:</i> since January 1, 1998	Spot and forward transactions are unrestricted.
<i>Other foreign exchange controls</i>	
<i>Current account</i>	Article VIII (Section 2-4) of the International Monetary Fund has been signed on June 1, 1996. Residents can hold foreign exchange deposits with domestic banks for current account purposes. Non-residents can hold so-called T-accounts for current account transactions.
<i>Capital account</i>	
Residents	Capital account transactions generally need a permission of the Central Bank. Holding deposits abroad and receiving credits from abroad requires a permission.
Non-residents	Apart from S- and T- accounts, foreigners can hold I-accounts for direct investment. Foreign direct investment is (with the exception of certain sectors such as the financial and energy sector) not restricted.

Source: IMF (1997a, 1997b), CBR.

Table 5 — Average Monthly Growth Rates of Money, Prices and Exchange Rates 1992–1997 (%)

	1992	1993	1994	1995	1996	1997 ^a
Monetary Base	25.3 ^b	18.3	9.3	6.8	2.1	2.7
	(6.4) ^b	(3.6)	(4.7)	(6.1)	(4.1)	(4.9)
CPI	39.3	20.6	9.8	7.3	1.7	0.9
	(62.6)	(3.8)	(4.2)	(3.9)	(1.2)	(0.7)
Exchange Rate to the US-Dollar	10.9	10.3	9.3	2.4	1.8	0.6
	(25.2)	(12.5)	(6.8)	(6.1)	(1.0)	(1.3)
Real Exchange Rate	-8.6	-8.3	-0.2	-4.3	0.1	-0.2
	(23.4)	(10.0)	(5.0)	(5.8)	(1.3)	(0.6)

Standard deviations in parentheses. — a) Through October. — b) Second half of the year.

Source: Russian Economic Trends database.

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