Pavel Trunin

An Analysis of the Impact of the Balance of Payments` Capital Account on Macroeconomic Processes in Russian Federation[1]

Introduction

The influence the dynamics of the components of Russia's balance of payments exert on the country's economy can hardly be overestimated. It is common knowledge that a sizeable influx of foreign exchange revenues in the country by the current account, whose positive balance is formed chiefly by export of Russia's energy sources, has been a major factor behind the nation's economic advancement between 2000 and 2008. Sizeable foreign exchange revenues also enabled the government to form reserves whose use helps mitigate consequences of the global financial crisis. Meanwhile, in the period of high prices for minerals, the foreign exchange inflow caused acceleration of the money supply growth, inflation and the appreciation of the Rb in real terms.

Analysis of consequences of international capital flows has formed a central issue in the modern economics. The most popular viewpoint is that the foreign capital inflow in a country boosts economic growth by financing an increase in the volume of investments, and secures a greater level of consumption by households, due to their higher incomes[2]. Plus, capital cross-flows can help emerging economies diversify their asset portfolios. Meanwhile, a considerable capital inflow may bear unfavorable macroeconomic effects, such as a rapid rise of money supply, inflationary pressure, and a real appreciation of a national currency.

That said, all the factors that determine capital flows can be divided into two groups – external in relation to an economy wherein capital moves and domestic ones. The former group that encourages capital inflow comprises, in particular, global interest rates. In other words, low interest rates in developed economies make investment in emerging economies relatively more attractive. This effect intensifies in the event an emerging economy is in need for external borrowings, and low global interest rates secure its greater capacity to pay, thus diminishing the risk of default. In periods of recession in developed economies, investors find it more profitable to invest in emerging economies. So, international business cycles also affect directions of capital flows.

The domestic factors that influence international capital flows comprise a recipient country's monetary and fiscal policies, and the state of its economy as a whole. Additionally, the domestic factors can be classified into constant factors, which reflect the most important structural characteristics of a given economy, and variable factors associated with the economic policy and exposed to a short-term impact.

Capital flows are reflected in a country's balance of payments in the capital and financial account[3]. The account is broken into two sub-accounts, namely, the capital account and the financial account. It should be noted that negative values registered across components of the capital and financial account mean capital outflow from the country, while positive ones mirror capital inflow. As concerns the item "change in foreign exchange reserves", its negative values evidence accumulation of reserves, while positive ones – their decline.

In the present paper, the capital and financial account is considered less gold and foreign exchange reserves, which fall under an individual balancing item. Due to principles of compiling the nation's balance of payments, the balance of the current account, the capital and financial account, and the balance of gold and foreign exchange reserves equal zero. That is, by adjusting by the value of its gold and foreign exchange reserves, a country with a positive balance of the current account credits the rest of the world at the expense of its revenues from trade. On the other hand, once a deficit of the current account occurs, to stabilize its balance of payments a country has to borrow on international markets, which gives rise to a positive balance of the capital and financial account. Let us note that in practice blunders may arise, and to

---

[1] The main provisions of the paper were published in S. Drobyshevsky, P. Trunin. "Vzaimodeystviye potokov kapitala i osnovnykh makroekonomicheskikh pokazateley v Rossiyskoy Federatsii". Nauchnye trudy IEPP. M., 2006, №94

[2] See, for example: Obstfeld K., Rogoff M. Foundations of International Macroeconomics. The MIT Press, 1998.

[3] See: Balance of Payments Manual. IMF, 1996

balance a nation's balance of payments the item "net errors and omissions" is formally used, which equals the balance of the current account, the capital and financial account and reserve assets with an opposite sign. So, it is possible to single out four types of balance of payments depending on the sign of the capital and financial account and the current account.

The first group comprises countries with positive values of both the current account and the capital and financial account. That is to say, in this case there exists both a net capital inflow in the country resulting from trade relations and the purchasing of national assets by foreigners. Evidently, in this situation the equilibrium of the balance of payments is ensured at the expense of accumulation of gold and foreign exchange reserves. A typical representative of this group of nations is China.

The second group unites countries with a positive balance of the current account and a negative balance of the capital and financial account. In such a situation a country experiences net foreign exchange inflow as a result of trade operations and, at the same time, its investments overseas are in excess of investments into the country. Should an absolute value of the positive balance of its balance of payments is greater than a negative balance of the capital and financial account, there occurs accumulation of gold and foreign exchange reserves. If net sales of national financial assets are in excess of the balance of the current account, to maintain the equilibrium of its balance of payments the central bank has to sell reserves to finance the current account deficit. This group comprises such countries as Japan (until 2003) and – recently - Germany. Today, Russian Federation has fallen into this group, too.

The third group consists of countries running deficit of the current account of the balance of payments, which is financed at the expense of a positive balance of the capital and financial account. In the event the surplus of the capital and financial account appears insufficient to cover the current account deficit, the nation has to spend its reserve assets to equilibrate its balance of payments. It is the US with its recent record-breaking values of the current account deficit which is the most famous nation in the group. However, as foreigners so far have purchased huge amounts of the US's financial assets, the country was capable of financing its massive current account deficit at the expense of the surplus of the capital and financial account.

Finally, the fourth group comprises countries with deficit of both the current account and the capital and financial account. In this particular case a nation's balance of payments can be balanced only by selling its reserve assets. Clearly, this situation cannot last for long, which is why such a balance of payments was noted in some countries, such as Germany and Italy, over relatively short periods of time – in 1999 and 2001, respectively.

The capital account reflects an economy's transactions with non-residents[4] that cover non-produced non-financial assets (e.g. patents, rights and licenses) and capital transfers (unrequited provision of capital assets or financial assets associated with the purchase, sale, transfer or use of capital assets). Transactions settled by this account are not directly related to the production and consumption processes, which is why this account is separated from the current account.

In Russia, between1999-2005 the balance of the capital and financial account practically constantly had negative values (see *Fig. 1*), which testifies to a steady tendency of capital outflow. The situation reversed in 2006-2007 and a considerable growth of the balance of the account was noted.

The balance of the capital account has been insignificantly fluctuating around zero, thus reflecting an insignificant level of capital transfers. More or less considerable deviations took place once the nation undertook its foreign debt restructuring. Thus, in 2000 a fraction of Russia's foreign debt was written off due to the restructuring of the former USSR debt before the London Club. In 2001, Russia forgave the poorest countries' debt worth a total of USD 10.6bn in the framework of the Paris Club and restructured its obligations before the Czech Republic and Slovakia, one of results of which became a partial write-off (forgiveness) of its USD 1.7bn-worth debt. A huge negative balance of the capital account in 2002 also was to a significant degree determined by transactions associated with regulation of debt relationship with regard to liabilities and assets of the former USSR. The 2005 negative balance of the country's balance of capital transfers emerged because of the write-off of Syria and Iraq's debts to Russia. Finally, in 2007, Russia wrote off Afghanistan's debt.

---

[4] See: Balance of Payments Manual. IMF, 1996

As to the nation's gold and foreign exchange reserves, they have been steadily and substantially on the rise since 1999. Because of insignificant fluctuations of the capital account, the balance of the financial account has generally practically copied the dynamic of the capital and financial account (capital outflow since 1999 and capital inflow since 2006).
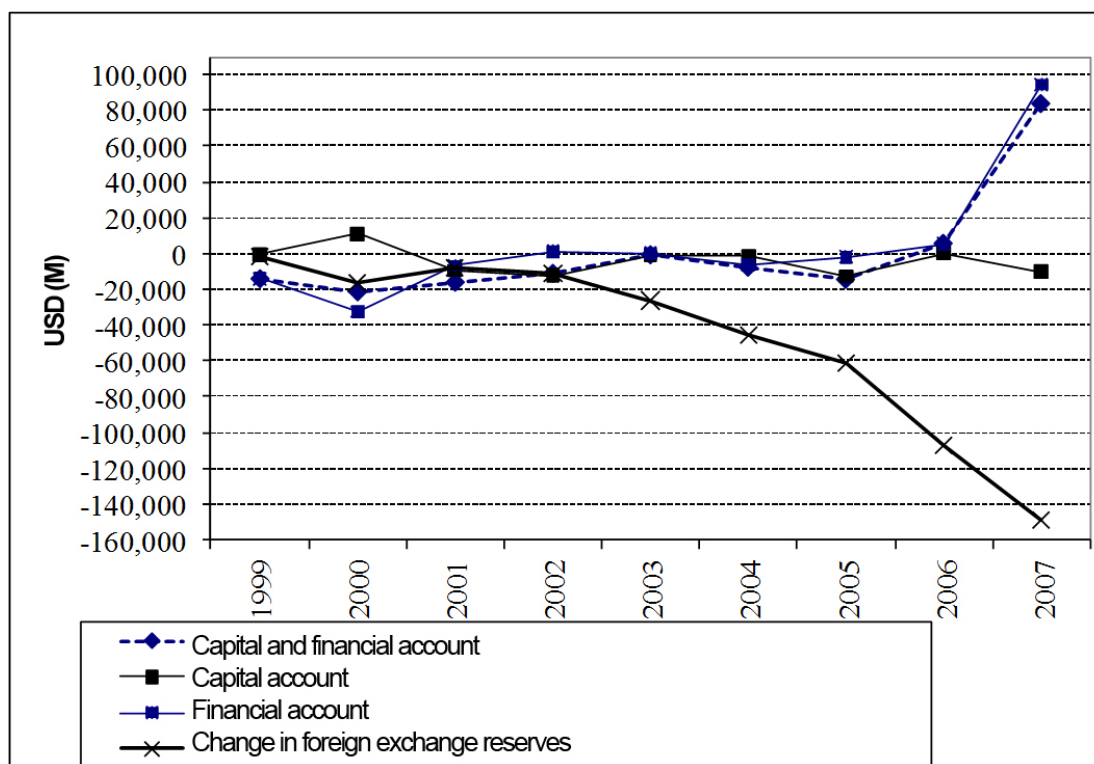

Fig. 1. The Dynamic of the Capital and Financial Account in 1999–2007

Of all the components of the financial account it is the private capital flows in and out of the country that are of a particular interest to a researcher. Capital outflow (and capital flight in particular) constitutes one of critical indicators computed on the basis of the balance-of-payments data, as it is associated with serious macroeconomic effects. A significant capital outflow is capable of considerably reducing the effect of increase in a nation's trade balance and diminishing the currency revenues inflow, which in turn, under certain circumstances, may result in a depreciation of the national currency.

The streak noted in Russia's economy between 1994 and 2004 was a constant and steady capital outflow, with its rate gradually contracting in 2000-2003, which was a positive trend. However, it was interrupted in 2004, when the pace of capital outflow accelerated. Nonetheless, the year of 2005 saw the emergence of the trend to capital inflow, which drastically intensified in 2006-2007 (see *Fig.1*).

Interestingly, in contrast to the capital inflow indicator, capital flight has remained significant over the whole period in question. More than this, by results of 2007 when the country reported a peak net capital inflow in Russia's modern history, capital flight has been growing rapidly, too. The trend highlights an explosive growth of the magnitude of Russia's foreign trade transactions and, at the same time, evidences that economic and political risks are still considerable in the country, which compels economic agents to disinvest.

In the circumstances it is particularly important to focus on studying into the impact the components of the capital and financial account have on the country's main macroeconomic indicators. Exposing some steady interconnections between capital inflow/outflow and the macroeconomic indicators would allow one to enhance the quality of the macroeconomic policy and the forecasting of advancement of processes unfolding in Russia's economy.

The Literature Review

The literature on the issue usually identifies[5] two classes of factors that affect capital flows. The first class comprises factors domestic in relation to an individual country (pull factors). They mirror its current economic state and, accordingly, risks influencing capital flows. In particular, one of the key factors of attraction of foreign capital is the country's capacity to pay. Another substantial factor that determines directions of capital flows is the rate of return, which is very high on the emerging economies' financial markets vis-à-vis most markets in developed economies, thus reflecting concomitant high risks. Indicators of a general economic situation in the country appear equally significant – a country experiencing economic boom will most likely become more attractive to foreign investments that a nation whose economy struggles through recession. Furthermore, the volume of capital outflows should also be affected by the volume of national savings, which form sources of financing the said investments. Let us also note yet another factor, that is, political risks in the country – their high level undoubtedly diminishes capital inflow and increase capital outflow.

The other class of factors that affect capital flows encompasses the so-called global factors, which are external relative to a given country (push factors) and global interest rates, in particular. It is assumed that a notable decline in interest rates, for instance, in the US, can form a key factor which would determine a greater influx of capital into emerging economies. Plus, whenever developed economies find themselves in the period of recession, their attractiveness to international investors lowers and they are in search of alternative directions for investing. Meanwhile, the macroeconomic and exchange rate policies in many emerging economies may become relatively favorable for investing, thus triggering capital inflow[6]. So, growth rates in emerging economies should be included in the list of critical global factors, too.

Let us note that capital inflow (outflow) in turn exerts a significant influence on the state of emerging economies. First, as indicated by Calvo, Leiderman and Reinhart[7], a great fraction of capital inflow is accumulated in the form of gold and foreign exchange reserves. That is to say, in the event the current account deficit does not exceed the surplus of the capital and financial account, capital inflow should result in an increase in gold and foreign exchange reserves. Secondly, as demonstrated by the aforementioned authors, as a result of capital inflow, most emerging economies experience a rapid rise in money supply both in real and nominal terms. On the one hand, this can be caused by a growing economic activity in the economy-recipient of foreign investment, which enables it to boost up money supply without escalating inflation. On the other hand, the central bank increases the monetary base while buying the pouring in the country foreign exchange to maintain a stable exchange rate. At the same time, the central bank may preclude money supply from a rapid growth by letting the national currency appreciate and thus it may not bolster reserves or undertake measures on sterilizing an excessive money supply. Finally, the impact of capital inflow on the real exchange rate appears ambiguous and to a significant degree determined by the central bank's willingness to support a stable foreign exchange rate.

In addition, standard models of economic growth prove that surge in investment results in a greater potential output in an economy. So, having assumed that capital inflow from abroad is spent, at least partially, on financing national investments, we get a hypothesis of a positive correlation between the capital inflow in the country and economic growth rates. The hypothesis suggests of course validity of a great number of premises, such as efficient stock markets, a considerable proportion of direct investment, among others. It should be understood that in some cases capital inflow can just fuel inflation, rather than encourage advancement of the real sector.

---

[5] See: Chuhan P., Claessens S. Mamingi N. Equity and Bond Flows to Latin America and Asia: The Role of Global and Country Factors // Journal of Development Economics, 55, 1998. P. 439–463.

[6] Calvo G., Leiderman L., Reinhart C. Capital Inflows and Real Exchange Rate Appreciation in Latin America. IMF Staff Papers, 40(1), 1993. P. 108–152; Calvo G., Leiderman L., Reinhart C. Inflows of Capital to Developing Countries in the 1990s // Journal of Economic Perspectives 10(2), 1996. P. 123–139.

[7] Calvo G., Leiderman L., Reinhart C. Inflows of Capital to Developing Countries in the 1990s // Journal of Economic Perspectives 10(2), 1996. P. 123–139.

There exist numerous papers that examine importance of various exogenous and endogenous factors in determining capital flows. The respective findings can be found in a recapped form in *Table 1* below.

Table 1

Major Findings of Empirical Research into the Correlation between the Capital and Financial Account and Main Macroeconomic Indicators

Authors and date of the publication	Countries	Endogenous variable	Exogenous variables	Major findings
Calvo, Leiderman, Reinhart (1993,1994)[8]	Latin American economies	Various capital flows	Mostly external factors (with the US interest rates as the most significant factor and international risk premium, and trade conditions)	Increase in interest rates in the US diminishes capital inflow, while improving terms of trade and a greater risk premium result in a greater capital inflow
Chuhan, Claessens, Mamingi (1993)[9]	Asian and Latin American economies	Various capital flows	Mostly domestic factors	Domestic factors play a greater role in explaining capital flows than external ones. In addition a significant role can be played by specific for a given economy factors
World Bank (1997)[10], *Montiel, Reinhart (1999)*[11]	Asian and Latin American economies	The private sector's capital inflows	Mostly domestic factors	It is economic reforms that play a leading part. Even temporary changes can cause capital inflow
Kim (2000)[12]	Emerging economies	Balance of the capital and financial account	Domestic (the aggregate demand shocks, specific offer shocks, inflationary shocks, monetary shocks, rate of return in the country, liberalization of the capital account and the country's ability to pay) and external (rate of return on investment in the creditor country and level of country-wise diversification of international investors' portfolios	Correlations between the variables meet those predicted by the theory, with external factors playing a key role nonetheless
Fernandez-Arias (1996)[13]	Latin American and Asian emerging economies	Balance of the capital and financial account	Domestic and external factors	External factors play a key role
Agenor, Hoffmaister	Asian countries	Various capital flows	Domestic and external factors	Falling global interest rates fuel rising capital

[8] Calvo G., Leiderman L., Reinhart C. Capital Inflows and Real Exchange rate Appreciation in Latin America. IMF Staff Papers, 40(1), 1993. P. 108–152; Calvo G., Leiderman L., Reinhart C. The Capital Inflows Problem: Concepts and Issues // Contemporary Economic Policy, 12(3), 1994. P. 54–66.

[9] Chuhan P., Claessens S., Mamingi N. Equity and Bond Flows to Latin America and Asia: The Role of Global and Country Factors // Journal of Development Economics, 55, 1998. P. 439–463.

[10] World Bank, World Development Report, 1997.

[11] Montiel P., Reinhart C. Do Capital Controls and Macroeconomic Policies Influence the Volume and Composition of Capital Flows? Evidence from the 1990s // Journal of International Money and Finance, 18, 1999. P. 619–635.

[12] Kim Y. Causes of Capital Flows in Developing Countries // Journal of International Money and Finance, 19, 2000. P. 235–253.

[13] Fernandez-Arias E. The New Wave of Private capital inflows: Push or Pull? // Journal of Development Economics, 48(2), 1996. P. 389–418.

				inflow
Edwards (1991)[15]	59 nations	Foreign direct investment	Domestic factors	A greater openness of the economy and international competition have a positive effect on direct investments. The smaller the state is, the more attractive it is to foreign capital
Claessens, Oks, Polastri (1998)[16]	25 nations of the Central and Eastern Europe and the former USSR	Various capital flows	Domestic and external factors	Along with the predicted by the theory correlations, the paper arrived at controversial results: positive changes in external factors play appositive role in increase of capital inflow
Garibaldi, Mora, Sahay, Zettelmeyer (2001)[17]	26 transitional economies экономикой	Direct and portfolio investment inflow	Domestic and external factors	The dynamic of direct investment is adequately described by fundamental variables, while for portfolio investment the "good" variables became only the presence of the financial market infrastructure and the property rights protection indicator
Loungani, Mauro (2000)[18]	Russia	Capital flight	Domestic factors	A great intensity of capital outflow is caused by accelerating inflation rates, a huge size of the budget deficit and a low quality of reforms.

Impact of Capital Flows on Russia's Macroeconomic Indicators

In this section, we examine the impact of the dynamic of capital flows on Russia's main macroeconomic indicators. While making such calculations, as a rule, one employs the methodology analogous to that used by Kim and Calvo, Leiderman, Reinhart[19]. That is, a VAR model is built as follows:

$$X_t = A_0 + \sum_{i=1}^{k} A_i X_{i-1} + \varepsilon_t,$$

---

[14] Agenor P. Hoffmaister A. Capital Inflows and the Real Exchange Rate: Analytical Framework and Econometric Evidence. IMF Working Papers 96/137. International Monetary Fund, 1996.

[15] Edwards S. Capital Flows, Foreign Direct Investment, and Debt-Equity Swaps in Developing Countries. In Siebert, Horst, ed., Capital Flows in the World Economy. Tubingen: Mohr, 1991. P. 3–28.

[16] Claessens S., Oks D., Polastri R. Capital Flows to Central and Eastern Europe and Former Soviet Union. World Bank Policy Research Working Paper No. 1976 (Washington: World Bank), 1998.

[17] Garibaldi P., Mora N., Sahay R., Zettelmeyer J. What Moves Capital to Transition Economies? IMF Staff Papers, Vol. 48, 2001. P. 109–145.

[18] Loungani P., Mauro P. Capital Flight from Russia. IMF Policy Discussion Paper 00/6, 2000.

[19] См. Kim Y. Causes of Capital Flows in Developing Countries // Journal of International Money and Finance, 19, 2000. P. 235–253; Calvo G. Leiderman L. Reinhart C. Capital Inflows and Real Exchange rate Appreciation in Latin America. IMF Staff Papers, 40(1), 1993. P. 108–152.

where X_t – the vector of the indicators we are interested in, A_0 presents $m \times 1$ vector of intercepts, A_i – $m \times m$ coefficients matrix and ε_t – $m \times 1$ vector of errors, where m equals the number of vector's lines X_t and k – the number of lags.

Unfortunately, the data series in RF appear too short to employ this approach. That is why it is necessary to build multifactor time series regression models that reflect behavior of various capital flows, as well as the correlation between macroeconomic indicators and capital flows.

The main source of original data is formed by the Bank of Russia's information on the nation's balance of payments over the period between 1995 and 2007. All data series have been tested for stationarity. Singling out a trend or taking first-order differences was completed, if needed[20]. To obtain stationary series of capital flows, they were considered as per cent of GDP. Seasonality was eliminated by transiting to consideration of balances from the regression of the series on dummy variables that mirror seasonality. In the event descriptions of capital flows series lack a reference to "balance" or "net" flows, we meant gross capital flows in or out of the country.

Besides, as we consider the mutual impact of capital flows and main macroeconomic indicators, in a number of cases the phenomenon of endogeneity, that is, dependence of the exogenous variable on the endogenous one, may arise. However we abstract ourselves from this problem, as in the tested models the inverse direction (relative to the assumed one) of the correlation between the exogenous variable and the endogenous one appears unobvious. Naturally, there always are some other factors that allow suggesting such an inverse relationship, but we will not assume their influence to be significant.

While building the regression equations, we employed models of forecasting some macroeconomic indicators from Ponomarenko et al.[21] Into equations for forecasting macroeconomic indicators made in that paper we added capital inflows according to the put forward hypotheses and attempted to find the added factors' significance. The equations were modified, if needed (to eliminate autocorrelation and multicollinearity).

Economic growth rate

Modeling the medium-term dynamic of GDP was carried out proceeding from premises of a positive influence by oil prices and real investment in capital assets on economic activity in Russia. Meanwhile, it was also assumed that surge in capital flows positively affects economic growth, as it serves as a source of investment in capital assets (with some lag). Let us note that correlation between various capital flows is relatively small, which is why no multicollinearity arises. The model, which reflects capital inflow in Russia component-wise, takes the following form (the fourth-order moving average term was added to the model to eliminate autocorrelation)[22]:

$$DGDP_t = a_0 + a_1 \cdot INV_t + a_2 \cdot DOIL_{t-1} + a_3 \cdot FDIRF_{t-2} + a_4 \cdot PIRF_t +$$
$$+ a_5 \cdot LOAN_{t-2} + a_6 \cdot \varepsilon_{t-4} + \varepsilon_t$$

(1)

Model (1) employs the following labelings:

$DGDP_t$ – growth rate in the physical volume of GDP over period t (%);

INV_t – increase rate in investment in capital assets over period t (%);

$DOIL_t$ – increase rate of the price for Brent over period t (%);

$PIRF_t$ – portfolio investment in RF over period t (% of GDP over period t);

---

[20] Let us note that we failed to identify co-integration between the series
[21] See: Ponomarenko S.S., Trounin P.V., Turuntseva M.Yu., Yudin A.D. Nekotorye podkhody k prognozirovaniyu ekonomicheskikh pokazateley. M:IEPP, 2004
[22] As in the previous section, we transited to increments in the event the series have appeared non-stationary and no cointegration has been found

FDIRF$_t$ – direct investment in RF over period *t* (%of GDP over period *t*);

LOAN$_t$ – volume of attracted credits and loans over period *t* (%of GDP over period *t*).

Results of the Testing of the Equation for Economic Growth Rates

Endogenous variable	GDP growth rates in real terms	
Period of testing	1999:3-2007:4	
Number of observations	34	
	Ratio	Probability
Intercept	0.061	
Increase rate of investment in capital assets	0.207	0,000
Brent price growth rate with a one-quarter lag	0.018	0,087
Direct investment in RF with a two-quarter lag	*0.165*	*0,01*
Portfolio investment in RF	*0.102*	*0,02*
Loans and credits attracted in RF with a two-quarter lag	*0.089*	*0,003*
The fourth-order moving average term	0.94	0,000
Adjusted R^2	0.81	
DW-statistics	2.11	
F-statistics (probability)	0.000	

As demonstrated by *Table 2*, the assessment of the equation for the GDP growth rates evidences that over the period concerned the foreign investment inflow in RF exerted a statistically significant influence on economic growth rates. In all likelihood the result mirrors the fact that post-crisis foreign investments began to play a fairly serious part in the country's economic development. It goes without saying, high economic growth rates by themselves can form a factor boosting a country's investment attractiveness. Meanwhile we consider dependence of economic growth rates on lagged values of capital flows in RF, which is why the rise of endogeneity in such a model seems less probable than in the event of assessment of the simultaneous dependence.

The testing of the model demonstrated that a 1 p.p. rise in flows of direct, portfolio investment in RF or loans and credits overseas corporations extend to the domestic ones results in the increase rate of GDP in real terms at 0.17; 0.1 and 0.09 p.p., respectively. It is interesting to note that in this respect it is direct investment that exert the greatest influence on economic growth rates. This result appears quite consistent with the traditional idea of direct investments being a means corporations employ for the sake of investing in capital assets. So, the capital inflow in RF over recent years has become a significant factor behind the country's economic growth. Accordingly, a drastic decline in capital inflow is capable of having an adverse impact on the country's economic development rates.

The Rb. real effective exchange rate

While building the model, we employed growth rates in Russian export (or balance of the current account of the balance of payments) and GDP, that estimated demand for Rb., as main factors that characterize the medium-term dynamic of the real effective exchange rate. Coupled with changes in the state of affairs in foreign trade, these indicators allow considering the impact productivity in the sector for tradables and across the economy as a whole has on the dynamic of the real effective exchange rate. Besides, to test the hypothesis on increase of capital inflow positively affecting growth of the Rb. real effective exchange rate, we include in the model the balance of the capital and financial account. It is assumed that capital inflow fuels offer of foreign exchange on the forex market, which leads to an appreciation of the nominal exchange rate. At the same time, capital inflow can contribute to escalation of inflation, which leads to an appreciation of the Rb. in real terms.

Below, we present a specification of the regression equation which allows making the most accurate assessments. In addition to the GDP growth rate indicators, there is a lagged endogenous variable and the seventh-order moving average component in the equation, for the sake of elimination of autocorrelation.

$$DREER_t = a_0 + a_1 \cdot DREER_{t-1} + a_2 \cdot DGDP_{t-2} + a_3 \cdot CA_{t-1} + a_4 \cdot \varepsilon_{t-7} + \varepsilon_t \qquad (2)$$

Model (2) employs the following labelings:

$DREER_t$ – increase rate in the Rb. Real effective rate over period t (%);

$DGDP_t$ – increase rate in the physical volume of GDP over period t (%);

CA_t – balance of the capital and financial account over period t (% of GDP over period t).

Table 3

Results of the Testing of the Equation for Growth in the Real Effective Exchange Rate of the Ruble

Endogenous variable	The growth rate of the Rb. real effective exchange rate	
Period of testing	1999:3–2007:4	
Number of observations	34	
	Ratio	Probability
Intercept	3.181	
Growth rate of the Rb. Real effective rate with one-quarter lag	–0.421	0.007
GDP growth rate in real terms with a 2-quarter lag	2.322	0.06
Balance of the capital and financial account with one-quarter lag	*1.05*	*0.003*
The seventh-order moving average component	–0.911	0.000
Adjusted R^2	0.4	
LM-statistics (probability)	0.424	
F-statistics (probability)	0.000	

So, we have exposed a significant correlation between capital inflow and the Rb. real exchange rate. The ratio under the indicator of the balance of the capital and financial account is statistically significant and positive – with the balance of the account growing at 1.p.p. GDP, the growth rate of the real effective exchange rate is up at 1.05 p.p. as a result of the Rb. appreciation in nominal terms and a price rise.

Consumer price index

The building of the consumer price index model was based upon a traditional approach to the definition of demand for money, according to which a surge in money supply and the velocity of money leads to a price rise, while with the real output expanding (which entails a rise in the traditional demand for money), given other conditions being equal, prices go down. In addition, we assumed that capital inflow (with the balance of payment posting a surplus) results in a situation in which the CBR purchases foreign exchange to maintain a given exchange rate, thus increasing money supply, which also fuels the price rise.

Plus, it is possible to consider the impact by direct, portfolio and other investment in RF (credits and loans) on the consumer prices growth rates.

In addition to the indicators of growth rates of money supply and GDP, to eliminate autocorrelation of balances, there is the lagged endogenous variable and the seventh-order moving average component in the equation[23]:

---

[23] The best specification of the equation was obtained under insertion in its right part of the increment in money supply less lags and the balance of the capital and financial account with the one-quarter lag. That is to say, an inclusion of the money

$$CPI_t = a_0 + a_1 \cdot CPI_{t-1} + a_2 \cdot DGDP_{t-2} + a_3 \cdot DM2_{t-1} + a_4 \cdot CA_{t-2} +$$
$$+a_5 \cdot \varepsilon_{t-7} + \varepsilon_t \tag{3}$$

Model (3) employs the following labelings:

CPI_t – CPI over period t (%);

$DGDP_t$ – growth rate in the physical volume of GDP over period t (%);

$DM2_t$ – growth rate of money supply M_2 over period t (%);

CA_t – balance of the capital and financial account over period t (% of GDP over period t).

Table 4

Results of Testing the First Equation for CPI

Endogenous variable	CPI	
Period of observations	1999:3–2007:4	
Number of observations	34	
	Ratio	Probability
Intercept	0.007	
CPI with one-quarter lag	0.751	0.000
GDP growth rate in real terms with 2-quarter lag	-0.368	0.001
Growth rate of money supply M_2 with 1-quarter lag	0.155	0.06
Balance of the capital and financial account with 2-quarter lag	*0.071*	*0.002*
The seventh-order moving average component	0.92	0.000
Adjusted R^2	0.73	
LM-statistics (probability)	0.424	
F-statistics (probability)	0.000	

As demonstrated by Table 4, a surge in capital inflow causes a rise in consumer prices, albeit with a 2-quarter lag; an expansion of the balance of capital and financial account at 1 p.p. of GDP entails a 0.07 rise in the consumer prices growth rate as a result of the impact of capital inflow on the growth in money supply with 1-quarter lag.

Let us evaluate the component-wise impact of capital flows on CPI (the seventh-order moving average component was introduced to the model to eliminate autocorrelation of balances):

$$CPI_t = a_0 + a_1 \cdot CPI_{t-1} + a_2 \cdot DGDP_{t-2} + a_3 \cdot FDIRF_{t-2} + a_4 \cdot PIRF_{t-2} +$$
$$+a_5 \cdot LOAN_{t-2} + a_6 \cdot DM2_{t-1} + a_7 \cdot \varepsilon_{t-7} + \varepsilon_t \tag{4}$$

Model (4) employs the following labelings of variables :

CPI_t – CPI over period t (%);

$DGDP_t$ – growth rate in the physical volume of GDP over period t (%);

$DM2_t$ – growth rate in money supply M_2 over period t (%);

---

supply increment and the capital inflow balance of at different moments of time allows to take into account the impact of capital inflow over prior periods on the current level of inflation.

$PIRF_t$ – portfolio investment in RF over period t (% of GDP over period t);

$FDIRF_t$ – direct investment in RF over period t (% of GDP over period t);

$LOAN_t$ – volume of attracted credits and loans over period t (% of GDP over period t).

<div align="right"><i>Table 5</i></div>

Results of Testing of the Second Equation for CPI

Endogenous variable	CPI	
Period of observations	1999:3-2007:4	
Number of observations	34	
	Ratio	Probability
Intercept	0.111	
CPI with one-quarter lag	0.779	0,000
GDP growth rate in real terms with 2-quarter lag	-0.344	0,002
Growth rate of money supply M_2 with 1-quarter lag	0.188	0,03
Direct investment in RF with 2-quarter lag	*0.054*	*0,511*
Portfolio investment in RF with 2-quarter lag	*0.147*	*0,012*
Loans and credits attracted to RF with 2-quarter lag	*0.053*	*0,041*
The seventh-order moving average component	0.922	0,000
Adjusted R^2	0.72	
LM-statistics (probability)	0.952	
F-statistics (probability)	0.000	

As demonstrated by *Table 5*, an increase in the portfolio investment inflow in RF, as well as attracted by Russian corporations credits and loans, fuels escalation of inflation: a 1. p.p. increase in portfolio investments or attracted credits and loans accelerates inflation at 0.15 and 0.05 p.p., respectively. Interestingly, a surge in direct investments does not exert a statistically significant influence on the price rise rates. As demonstrated above, corporations direct these investments to invest in capital assets, thus fueling growth in GDP and lowering inflation.

The RTS stock market index

We assume that a portfolio investment inflow should entail a rise in the RTS index, as a major component of the portfolio investment inflow is capital invested in the stock market. Let us note that our model is aimed at mirroring solely the interaction between capital flows and the stock market index with account just a sole additional factor. So, conclusions from this model should be interpreted only with regard just to the problem concerned- namely, interaction between capital flows and main macroeconomic indicators.

We considered portfolio investments as a factor influencing the dynamic of Russia's stock market index. In addition, we introduced in the model such a variable as savings in the form of deposits, which allows one to take into account the dependence of the stock market index from the fundamental economic characteristics. Adding to the equation the sixth-order moving average component to eliminate autocorrelation, we get the model:

$$DRTS_t = a_0 + a_1 \cdot PIRF_t + a_2 \cdot CUR_{t-1} + a_3 \cdot \varepsilon_{t-6} + \varepsilon_t \tag{5}$$

Model (5) employs the following labelings:

$DRTS_t$ – growth rate in the RTS stock index over period t;

CUR_t – growth rate in savings in the form of deposits in the national and foreign currency over period t (%);

$PIRF_t$ – portfolio investment in RF over period t (% of GDP over period t).

<div align="right">Table 6</div>

Results of Testing the Equation for the RTS Index

Endogenous variable	Increase rate in the RTS index	
Period of observations	1999:2–2007:4	
Number of observations	35	
	Ratio	Probability
Intercept	16.463	
Growth rate in the RTS index with 1-quarter lag	–0.504	0.001
Growth rate in savings in the form of deposits with 1-quarter lag	2.287	0.044
Portfolio investment in RF	2.933	0.069
The sixth-order moving average component	–0.985	0.000
Adjusted R^2	0.61	
DW-statistics	0.234	
F-statistics (probability)	0.000	

As it can be noted from *Table 6,* growth in portfolio investments in RF at 1 p.p. of GDP engenders a 2.93 p.p. growth rate in the RTS stock market index (at the 7% level of significance). Plus, a 1 p.p. growth rate of deposits leads to a 2.29 p.p. growth rate in the stock market index, i.e. an increment in the available for investing capital gets to the stock market with practically no delays, thus fueling demand for assets.

Conclusions

The present research deals with the effect capital flows have on Russia's macroeconomic indicators. Numerous nations have recently completed the so-called liberalization of the capital and financial account, i.e. have lifted restrictions on capital flows. That is why looking into the impact capital flows have on an economy's development has formed a universal subject of economic research. Because of this, we have evaluated the impact of capital flows in and out of RF over the period between 1999 and 2007 against the background of the gradual liberalization of the capital and financial account of Russia's balance of payments on the country's macroeconomic indicators and arrived at main conclusions, as follows:

- In contrast to the period of 1995-2004[24], the 2005-2007 capital flow in RF began exerting influence on the national economy's growth rates – we have found statistically significant correlation between growth rates of Russia's GDP and investment inflow. More specifically, a 1 p.p. increase in the private capital inflow in RF by items " direct investment", "portfolio investment", as well as "attracted loans and credits", results in a 0.3-0.35 p.p. acceleration of growth rates of the nation's GDP. At this point, it should be noted that the impact by investment inflow on the country's economic development was cleared from the influence of oil prices, as this variable has been also included in the tested model. A key condition for stimulating direct investment inflow is improvement of the investment climate in Russia. With a view of this the RF government should accelerate implementation of institutional reforms aimed at alleviation of the administrative pressure on the economy, increase of efficiency of the law enforcement and judicial systems' performance, securing property rights and honoring contractual obligations.

- The role played by the public administration sector in capital flows declines steadily. Until the early 2000s this institutional sector determined most of capital flows, with the overwhelming majority of the respective transactions being related to the nation's public external debt management. Perhaps

---

[24] The analysis of this period was conducted in a paper by S. Drobyshevsky and P. Trunin "Vzaimodeystviye potokov kapitala i osnovnykh makroekonomicheskykh pokazateley v Rossiyskoy Federatsii". Nauchnye trudy № 94P. Moskva, IEPP

that is why at the time changes in the value of capital inflow did not result in an acceleration of the economy's growth. With high oil prices and the federal budget enjoying a stable surplus, the volume of the public external debt was being steadily in decline. Notwithstanding the fact, it is worth paying attention to the mounting external debts of the quasi-public corporations (Gazprom, Rosneft, etc.) Their economic and financial performance indicators have fallen behind those of the private sector corporations. So, should the aforementioned corporations' debt continue to dominate the aggregate volumes of the corporate debt, the possibility for a positive impact by the formally non-public sector's external borrowings can be questioned.

- It is portfolio investment flows and attracted by the national corporations credits and loans that have had the greatest effect on the situation in the monetary sphere in the country. The monetized capital inflow in Russia fuels the surge in the consumer prices growth rates. In this respect, the problem of regulation of capital flows in the conditions of high inflation and a considerable influx of foreign exchange-denominated export revenues has become a very important one. Clearly, in the conditions of high oil prices, a sizeable inflow of "hot" money into the country appears quite probable for large oil exporters that enjoy relatively mature financial markets. So, The Central Bank and the RF government face the challenge of crafting a set of measures for the sake of shielding the country's financial system and economy both from an additional inflow of foreign currency in favorable periods and a possible drastic capital outflow, should prices for oil tumble or a financial crisis emerge (particularly, should there occur a dramatic surge in interest rates on developed markets). A solution to this challenge in the Russian conditions has posed yet a more complex issue due to an actual complete liberalization of the foreign exchange regulation and transactions by the capital account since 2007.

- Capital inflow in RF entails appreciation of the national currency in real terms at the expense of the Rb. appreciation in nominal terms and because of escalation of inflation. So, once the restrictions on conduct of capital transactions have been lifted, it has complicated the job of maintaining a stable nominal exchange rate of the national currency. Under the circumstances, in the period of high mineral prices Russia's Central Bank needs to extend its set of instruments of sterilization of the Rb. issuance on the forex market to secure decline in growth rates of monetary aggregates under a high positive balance by current and capital transactions and, thus, inflation rates in the country vis-à-vis retaining and even increasing the volume of hard currency purchases in order to preclude an intense nominal revaluation of the Rb. from happening.