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Foreign Reserve Adequacy: Case of Russia

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1. Introduction

The recent severe financial crises in a number of countries have clearly manifested the importance of adequate level of reserves for reducing costs of foreign exchange liquidity shortage. The issue of reserve adequacy has been broadly discussed for a number of years. However, country approaches to this problem are not always transparent. Conceptually reserve adequacy is the level of reserves that ensures smooth balance of payments and macroeconomic adjustment in unpredictably changing economic environment, e.g. external price shocks, reversals in short-term foreign capital flows. However, there is no common approach for estimation of reserve benchmark level. The most versatile approach proposed by Alan Greenspan several years ago is to identify all balance of payments risks and to develop stochastic tests (stress-tests) measuring balance of payments losses with a given probability. However, the implementation of this approach is extremely difficult and countries continue to use conventional indicators of reserve adequacy. They are ratios of reserves to imports, to money aggregates and to measures of external debt. Essentially all these indicators are rules of thumb with certain economic interpretation.

Until recently the most widely spread indicator of reserve adequacy was reserves expressed in months of imports of goods and services. In this context the level of reserves covering three months of imports was deemed as the appropriate one. Three months earlier were considered sufficient for adjusting imports without shocks to the economy. But as financial crises proved this indicator itself is insufficient to avoid problems and it should be augmented with other criteria.

It has been realized that in present conditions the appropriate level of reserves more and more depends on the size and structure of the external debt rather than on current balance of payments transactions. There are evidences that countries with significant but uncertain access to international capital markets tend to use so called Guidotti rule for assessing adequate level of their reserves. According to this rule the reserves must cover all short - term debt with the remaining maturity one year or less or, if to put it differently, all external debt payments scheduled in the coming year.

In some emerging markets the confidence of resident investors in the domestic currency is not very high or financial markets are underdeveloped. This creates risks of resident capital flight. For these countries important indicators of reserve adequacy are ratios of reserves to base money or other money aggregates. These indicators are also relevant for countries with hard exchange rate arrangements, especially a currency board. However if financial markets are well tuned, money-based indicators seem to be not very important.

Below it is analyzed whether the aforementioned indicators are relevant in Russia's case and how optimal reserve adequacy indicator may be defined for Russia.

2. Reserve adequacy measures in Russia
2.1 Integral measure of reserve adequacy
Determining the appropriate level of reserves for a particular country, one should focus, on the one hand, on the most vulnerable items in the balance of payments and, on the other one, on main potential drains on reserves.

In Russia's case, the determinants of financial uncertainty in the balance of payments are well-known:

- tense external debt payments schedule within forthcoming years;
- limited access to international financial markets;
- high variability of export prices and low diversification of exports in conditions when they drive economic growth and ensure employment and budget revenues;
- limited capacity for imports substitution;
- unpredictable magnitude of permanent capital flight/capital outflow.

Main drains on Russia's international reserves are federal government external debt payments. The government can obtain foreign exchange for the payments buying it from the Bank of Russia for rubles at market rates. Other sources of foreign exchange that the government has, are rather limited presently. Russia's sovereign credit ratings have virtually recovered after the 1998 financial crisis. However, the government has not yet resumed borrowing on the international financial markets and there is no much need in it in conditions of budget surplus. Thus, the credit history is absent for almost 4 years and it is unclear what part of external debt is possible to refinance if necessary. This implies that reserves should hedge a predominant part of forthcoming external debt payments.

Under managed floating exchange rate regime that is in place in Russia the reserves should also ensure smooth balance of payments adjustment in case of potential internal or external shocks (e.g. drop in export prices) and to stabilize the exchange rates against speculative attacks of resident financial players. The Bank of Russia is ready to intervene the foreign exchange market when necessary. For these purposes reserves should cover correspondingly several months of imports of goods and services and a part of base money.

On the surface all the above mentioned drains on reserves seem to be rather independent and joint probability of their occurrence may be deemed as small. However, 1998 events showed that additional uncertainty induced by any balance of payments problem may trigger off another balance of payments problem (e.g. export shortfall may create more doubts on the economic growth perspectives that in turn may cause additional capital flight). This implies that in Russia's case reserve adequacy measure should be defined as the sum of different potential drains on foreign exchange liquidity rather than as a weighted combination of different criteria:

$$RA = D + I + M$$

where
RA - integral measure of reserve adequacy,
D - debt - based measure of reserve adequacy,
I - import - based measure of reserve adequacy,
M - money - based measure o reserve adequacy.

The main problem is how to define each component of the integral reserve adequacy criterion. The approaches used by the Bank of Russia are described below.

2.2 Debt - based measure of reserve adequacy
The main drawback of Guidotti rule is that reserves are allocated to cover external debt payments in the coming year irrespective of the remaining external debt repayment profile. If the external debt repayment profile has considerable fluctuations, as this is the case in Russia, Guidotti rule will produce highly volatile estimates of reserve adequacy over time. Such estimates are not

convenient for policy-making purposes. Besides, unstable estimates of reserve adequacy create an impression that they are not based on economic fundamentals.

Consider the following hypothetical example.

	External debt payments in			Allocation of reserves according to Guidotti rule in	
	Month 1	months 2-12	month 13	month 1	month 2
	(1)	(2)	(3)	(4)=(1)+(2)	(5)=(2)+(3)
Debt repayment profile 1	1	11	1	12	12
Debt repayment profile 2	1	11	3.5	12	14.5

The table shows that just in 1 month the debt - based measure of reserve adequacy may be revised upwards by more than 20%. In Russia's case the revisions may be even greater (see Chart 1).

Chart 1

Federal government monthly external debt payments scheduled in 2000-2002
(percentage change over January 2000)
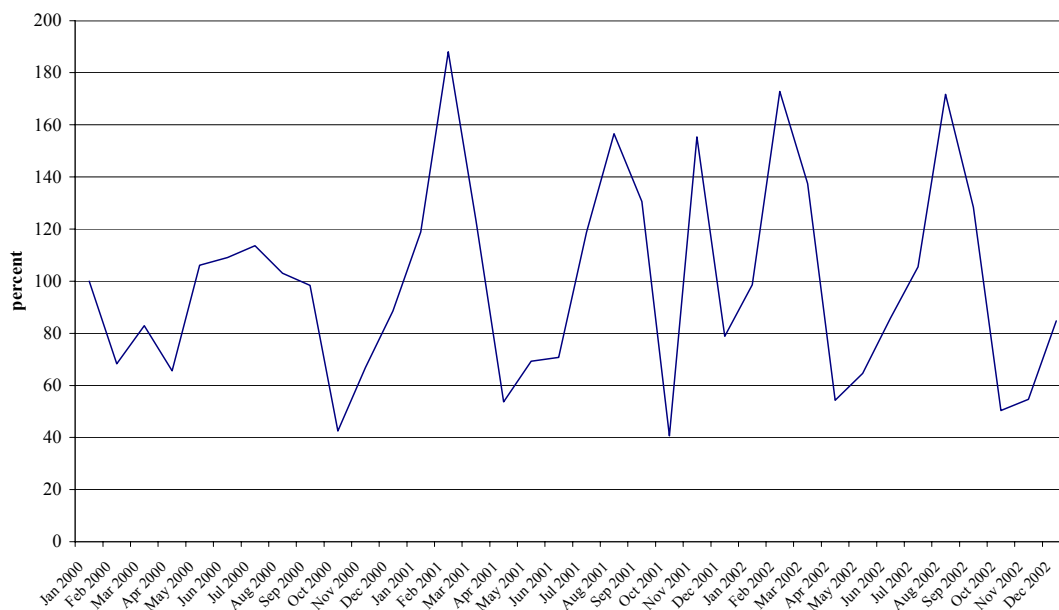
In order to smooth the estimates the Bank of Russia uses the following modification of the Guidotti rule:

$$D(t_0) = \max_{\tau \geq t_0} \sum_{t=\tau}^{\tau+365} P(t)$$

where
D(t) - debt - based measure of reserve adequacy on day t,
P(t) - external debt payments scheduled in day t,
t_0 - reporting date.

Thus, the debt - based measure of reserve adequacy is defined as the maximum amount of forthcoming external debt payments, scheduled during any yearly period (but not necessarily calendar year).

If the debt repayment schedule is more intensive at the end than at the beginning then a part of reserves will be allocated for payments due in the long run. As a result, this method will overestimate reserves subject to allocation for debt service purposes. But, as a rule, the debt repayment profile is more intensive at the beginning, as this is the case for Russia, and the estimates of reserve adequacy with respect to debt servicing remain unbiased.

The other controversial point is whether all private external debt payments should be hedged with reserves. First, it is feasible to cover private sector external debt payments with reserves only if the private sector has a debtor net short-term external position vis-a-vis the rest of the world. Second, demand on foreign exchange may arise if banks have to repay their domestic liabilities in foreign currency. Therefore, reserves should also cover debtor net domestic short-term foreign currency position of the banks and non-financial enterprises. However, reserves can hedge only a part net foreign currency position of private sector. In the debt-based measure of reserve adequacy used by the Bank of Russia the hedged part is set to 50%.

2.3 Import - based measure of reserve adequacy

As Chart 2 shows, reserves presently cover more than six months of imports of goods and services and from the viewpoint of import-based measure alone the level of reserves is quite adequate.

Chart 2

**Internationl reserves of Russian Federation
in months of imports of goods and services**

The main drawback of the traditional reserve adequacy ratio with respect to imports is that the latter includes all goods and services irrespective of their impact on economic growth. For instance, it is clear that expenditure on travel abroad, imports of luxury items, etc. may be easily cut without any effect on the domestic production. However, it is difficult to constraint imports that are not essential for economic growth not affecting crucial imports. The only possible way to do this is to introduce certain import taxes and restrictions.

Crucial imports can be approximated by the minimum three month imports registered during a certain period of time:

$$I(t_0) = \min_{\tau \leq t_0} \sum_{t=\tau-3}^{\tau} IM(t)$$

where
I(t) - import - based measure of reserve adequacy in month t,
IM(t) - monthly imports of goods and services
t_0 - month corresponding to the reporting date.
In Russia minimum imports were registered in the first quarter, 1999, right after 1998 financial crises (see Chart 3). This level is used by the Bank of Russia as import-based measure of reserve-adequacy.

Chart 3

Quarterly imports of goods and services in 1994-2002
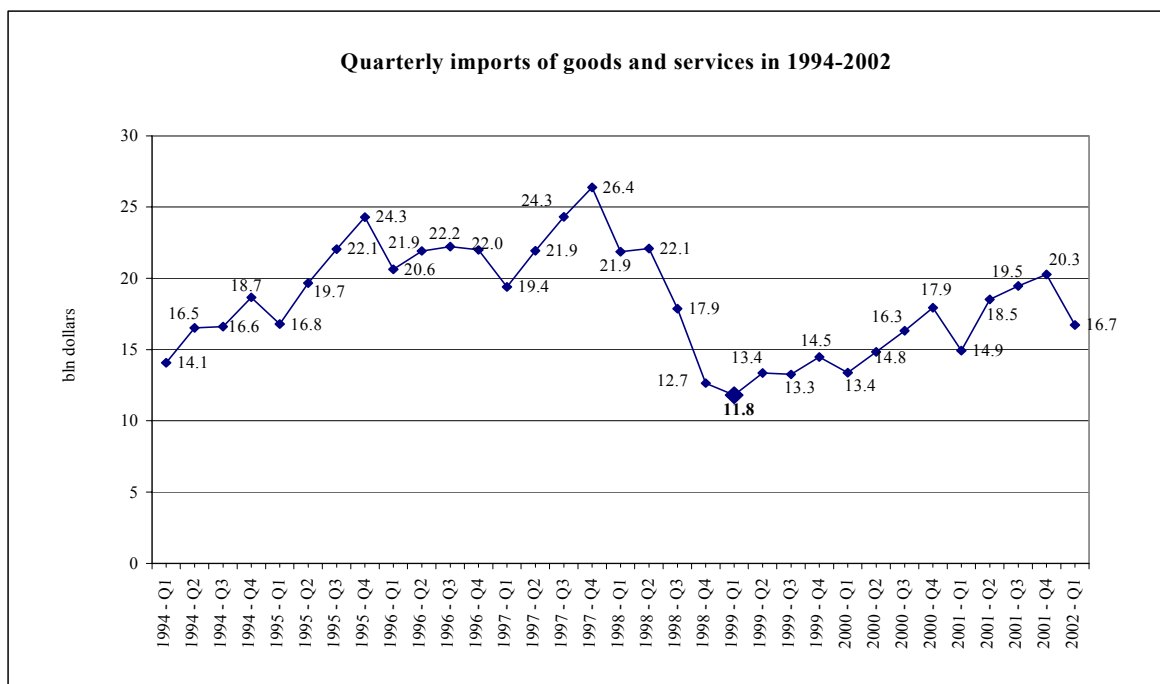
2.4 Money - based measure of reserve adequacy

As Chart 4 shows, reserves presently cover all base money issued by the Bank of Russia and from the viewpoint of the money-based measure alone the level of reserves is also quite adequate.

Chart 4

Ratio of international reserves of Russian Federation to base money (wide definition)

However, since Russia does not have a currency board, there is no need to cover all base money with reserves. Apparently, a part of base money issued by the Bank of Russia will never be exchanged for foreign assets because there always exists some demand for rubles as means of transactions. In order to define a money - based measure of reserve adequacy, it is necessary to determine what part of base money will be exchanged for foreign assets if residents loose their confidence in the domestic currency. If a country has ever experienced a currency crisis a possible solution is to look at the monetary contraction at that period. Money - based measure of reserve adequacy may be then estimated by comparing the ratios of M_2 to GDP in the crisis and the reporting periods:

$$M(t_0) = \frac{B(t_0)}{M_2(t_0)} [M_2(t_0) - \frac{M_2(t_c)}{GDP(t_c)} GDP(t_0)]$$

where

M(t) - money - based measure of reserve adequacy in day t,
B(t) - base money on day t,
M_2(t) - M_2 money aggregate on day t,
GDP(t) - nominal GDP in the last quarter preceding day t,
t_0 - reporting date
t_c - reference date in the currency crisis.

A different approach is to identify the most liquid part of the base money. In Russia's case this part consists of (i) balances on banks' correspondent accounts in the Bank of Russia (excessive

reserves), (ii) short-term deposits of banks in the Bank of Russia and (iii) cash in circulation. A part of the latter may be exchanged for cash foreign currency by households. The share of household incomes spent on acquisition of cash foreign currency can be derived from national statistics data. According to this approach the measure of reserve adequacy with respect to money supply will be as follows:

$$M(t_0) = CA(t_0) + SD(t_0) + \delta C(t_0),$$

where
CA(t) - banks' correspondent accounts in the Bank of Russia on day t,
SD(t) - short-term deposits of banks in the Bank of Russia on day t,
C(t) - cash in circulation on day t,
δ - share of purchases of cash foreign currency in household income.
The latter formula is used by the bank of Russia as money-based measure of reserve adequacy.

3. Overall appraisal of the reserve adequacy in Russia
Reserve adequacy level is estimated by the Bank of Russia on the quarterly basis. They are presented on Chart 5. Since the level of reserves is always a result of different macroeconomic policies and is a compromise among different policy objectives these estimates are not deemed as independent policy targets.

Chart 5

International reserves of the Russian Federation and their estimated adequate level
January 1,1998 - July 1, 2002

☐ International reserves of the Russian Federation   ▨ Estimated adequate level of reserves
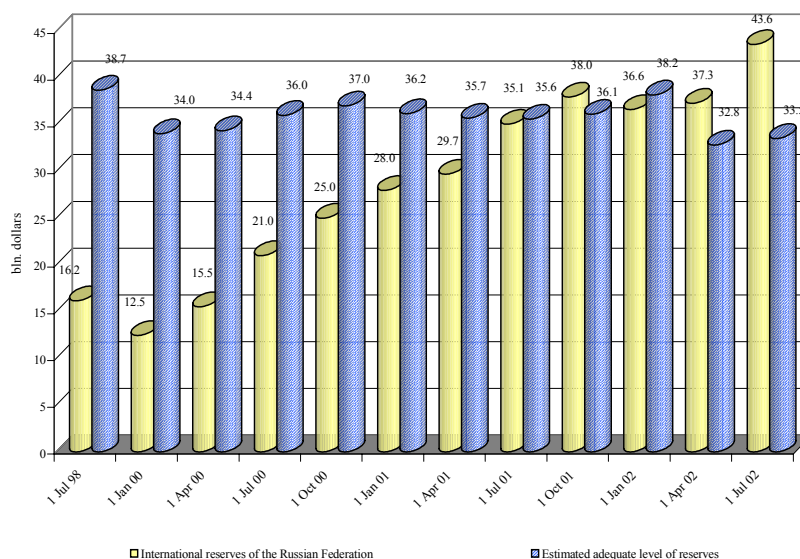
As Chart 5 shows, on the brink of the 1998 financial crises the level of reserves was far from sufficient. The lack of reserves was one of the main reasons that had predetermined the depth of the financial crisis. After the financial turmoil Russian authorities considerably revised their perceptions on the reserve adequacy level. From that time Russia has been persistently accumulating reserves and presently they surpass their estimated adequacy level. Russian authorities are of the view that the current level of reserves is sufficient to cope with any potential balance of payments problems that may arise in the middle run.

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