

Modeling the Management of International Reserves from the Perspective of Financial Stability

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Abstract

The paper explores the issues and international practices of the management of international reserves. The link is described between financial stability and international reserves. Emphasis is put on the specific significance of this subject for emerging economies. The main directions are charted for developing a systemic management approach in the domain and a case is made for applying modeling principles.

Key-words: International Reserves, Management, Exchange Rate, Modeling, World Economy, National Economy, Financial Stability.

1. Introduction

According to the International Monetary Fund's (IMF) underlying concept, a country's international reserves refer to "...those external assets that are readily available to and controlled by monetary authorities for meeting balance of payments financing needs, for intervention in exchange markets to affect the currency exchange rate, and for other related purposes (such as maintaining confidence in the currency and the economy, and serving as a basis for foreign borrowing)"¹. Therefore, international reserves serve as a source for servicing government debt, the government's guarantee investment reserves, an efficient tool of the official monetary policy and exchange rate

¹Balance of payments and international investment position manual. — Washington, D.C.: International Monetary Fund, 2009. <https://www.imf.org/external/pubs/ft/bop/2007/pdf/bpm6.pdf>

policies. Official reserve assets include foreign currency, monetary gold, special drawing rights (SDRs), reserve position in the IMF, and other reserve assets².

According to the IMF, the global volume of international reserves in Q2 2020 reached 12,013.13 trillion USD. The figure grew by almost 10% in five years and increased 2.34% over the past year (Figure 1).

Figure 1- Total Foreign Currency Reserves in the World



Source: developed by the authors based on data from the IMF³

[Official currency reserves in the world, million USD]

The management of international reserves should not be spontaneous. Common measures put in place from time to time will not be sufficient. A systemic understanding is needed of which management techniques should apply in which contexts for building and tapping into international reserves and their purpose should be mapped out.

Efficiently managing international reserves creates the conditions for maintaining financial stability as the foundation of economic growth. Given their special role in the world and national economies, international reserves are monitored by international financial organisations, potential investors and creditors, and international rating agencies. Worldwide, research is conducted into the methods, mechanisms, and toolkits of the management of international reserves.

²International reserves and foreign currency liquidity: guidelines for a data template – Washington, D.C.: International Monetary Fund, [2013] <https://www.imf.org/external/np/sta/ir/IRProcessWeb/pdf/guide2013.pdf>

³<https://data.imf.org/?sk=E6A5F467-C14B-4AA8-9F6D-5A09EC4E62A4>

2. Materials and Methods

Methodologically, this research is concerned with the issues of the management of official reserve assets and explores "mercantilist motives" (Dooley et al., 2005, 2009; Aizenman, Lee, 2008) and "precautionary motives" (Jeanne, Ranciere, 2011). They conceptualise the economic role of international reserves in the national economy and substantiate the principal approaches of their optimisation with a focus on efficiency in the management of national savings, considering the diversity of purposes depending on the stages of the economic cycle through assessments of indicators such as production and investment growth, exchange rate volatility, living standards, and others.

The statistical base of this research comprises data from the International Monetary Fund, the Bank of Russia, the Bank for International Settlements, and other national and international financial institutions.

3. Results

A priority in the management of international reserves is the principle of financial stability of the national economy. The references of management include the priority of preventing exchange rate volatility. Currency rate trends produce a significant impact on economic entities and behaviours and are thus associated with liquidity risks in the domestic market as a result of capital flight and instability of export revenues. A mega regulator could use international reserves to influence the exchange rates of the national currency by shifting the balance of demand for and supply of foreign currency in the domestic financial market to settle the existing and projected imbalances in this market environment. Keep in mind that a reverse effect can be also observed in terms of exchange rate impact on the development of international reserves. Sound development trends of the national economy reflected in the stability and predictability of the national currency rate contribute to the stronger investment attractiveness of national markets for non-residents, increase cross-border capital inflows, strengthen the country's balance of payments, and provide for international reserve growth.

In terms of stable financial development of the national economy, the system for managing international reserve should be structured around two types of management models, the model of decentralised management and the events-based management model. The former implies that the mega regulator assumes the role of a system manager by carrying out standard management procedures across the stages of the management algorithm and addressing specific objectives in the

development of reserve assets and charting the ways to use them. The latter model assumes reasonable response by the system manager to internal and external events, such as market conditions, behaviours of specific market agents, macroeconomic conditions, etc. E. g., in a crisis accompanied by booming demand in the currency market, a reasonable response would consider the activation of not only financial institutions, but also non-financial entities and households and would engage, as part of the regulatory mechanism, an appropriate toolkit for such circumstances. Alternatively, in selecting the methods to maintain currency liquidity in the domestic market depending on the external conditions, volumes and structure of currency reserves, actions, and expectations of market participants, macroeconomic indicators, etc., the mega regulator may pursue a policy of currency interventions in the domestic market or opt for currency repo transactions as tools to provide or absorb currency liquidity. Many event-based market alternatives require the use of international reserves or influencing their status, which implies the mega regulator has to identify new and modify existing ways of management in the field.

The proposed management model involves the development of a whole complex of management schemes for official reserve assets depending on the specific purpose and various fundamentals of national and global markets. It is based on multiple subprogrammes. Each subprogramme is unique, as it represents a specific international reserve management domain in specific market settings. Operating with the importance of positions under specific subprogrammes, their scope of impact and the number of repeated management stages, etc., help to arrive at numerous unconventional managerial combinations. Accordingly, the mega regulator's toolkit in the management of international reserves now accommodates a model transformer integrating both the historical experience of external and domestic markets and a new market toolkit to address the current problems. This model for managing international reserves has strong potential given the constant buildup of the database with new settings. It can be considered as an optimisation model or a model for developing international reserve management focused on financial stability in the domestic market.

The original modeling methodology for the management of international reserves as described above enables a more objective performance assessment. However, it is worth keeping in mind that the quality of analysis and assessment of the management of international reserves under the optimisation model depends on the degree of specificity and detail in structuring the management process. In our view, to ensure reliable performance assessments in the management of international reserves, the algorithm should include the following components:

- 1) Substantiation of the minimum required (sufficient) amount of international reserves;
- 2) Determining the composition and structure of international reserves;
- 3) Selecting the sources of international reserves;
- 4) Selecting the instruments for investing international reserves;
- 5) Purposeful spending of international reserves;
- 6) Assessment of performance in the management of international reserves (Figure 2).

Figure 2- Components in the Algorithm of the Management of International Reserves



Source: developed by the authors

[1. Substantiation (sufficiency) 2. Determining composition and structure 3. Identifying sources 4. Selecting instruments for investment 5. Purposeful spending 6. Assessment of management performance]

The aggregate assessment of performance in the management of international reserves will be a combination of assessments derived for each component of the set algorithm by individual indicators and criteria describing the effects of management in a specific field. The criteria of optimality for the assessment of performance in the management of international reserves will be the contribution of each component to the change of international reserves, the accompanying costs, and revenues compared to GDP growth rates. It can be formalised as follows:

$$\alpha_1 + \alpha_2 + \alpha_3 + \dots + \alpha_n = \sum \frac{RGGDP_n}{RGIR_n} \rightarrow \max, \quad (1)$$

where α_n is the assessment of the algorithm component performance in the management of international reserves,

$RGGDP_n$ is the GDP growth rate caused by n-th component,

RGIR_n is the international reserve growth rate caused by the n-th component.

The degree of relevance of any assessment criteria should be measured against global and domestic market conditions, economic cycles, etc. Such assessments cannot be uniform in all cases. E. g., such criteria of performance in the management of international reserves during a recession cannot be deemed appropriate for a revival or growth stage.

Assessments of performance in the management of international reserves should consider not only income earned from reserve investments or exchange rate differences but also lost incomes on potentially more profitable investments or, on the contrary, averted losses for the national economy as a result of international reserve management efforts.

4. Conclusion

The central problem in this research is the development of a system of management of international reserves and its assessment considering that the increasing asymmetry of financial markets in general and currency markets in particular increases the role of this component of the government's assets in maintaining the financial stability of the national economy, primarily by bringing down the amplitude of exchange rate fluctuations, maintaining currency liquidity and countering balance of payments shocks. The proposed optimisation model of the management of international reserves would rationalise and enhance the process through organisational and assessment transformations.

The problem of enhancing management performance is particularly important for developing countries, given the growth trend in international reserves observed in this group of countries having meaningful standing in the world economy.

Table 1- Currency Reserves by Country as of November 2020, Million USD USA

Country	Currency reserves, million USD USA
China	3,129,160.00
Russia	428,239.90
USA	44,529.00
Brazil	336,543.32
UK	151,661.32
Eurozone	314,715.80

Source: developed by the authors based on data from the IMF⁴.

⁴<https://data.imf.org/?sk=E6A5F467-C14B-4AA8-9F6D-5A09EC4E62A4>

Table 1 suggests China maintains the first place in the world by the level of reserves in foreign currency. Russia's and Brazil's currency reserves are, respectively, almost three times and two times the level of the UK and 9.6 and 7.6 times the level of the USA.

Considering that official external assets are a factor of economic growth for a majority of developing countries, there is the obvious objective of strengthening and developing the government's management of public assets in this field specifically for developing countries.

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