APPROACHES TO ASSESSING SUSTAINABILITY OF KAZAKHSTAN'S EXTERNAL SECTOR

Balance of Payments Department

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Approaches to assessing sustainability of Kazakhstan's external sector

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Annotation

The NBK continues the series of studies devoted to the analysis of the external sector of Kazakhstan's economy. International reserves are one of the main indicators of a country's external stability. The level of reserves that can cover the risks associated with sharp exchange rate fluctuations and capital outflows from the country is considered adequate. However, the definition of an adequate level of reserves and the risk factors differ from country to country.

This study analyses the sources of sudden capital outflow risk and considers different approaches to assessing an "adequate" level of reserves for Kazakhstan.

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1. Introduction

The frequency and impact of crises in countries around the world have stimulated interest in methods for diagnosing external vulnerability and assessing countries' resilience to external shocks. In practice, determining the sustainability of a country's external position requires an assessment of the current sustainability of the balance of payments, the real exchange rate, the external debt, the adequacy of international reserves, the net foreign asset position, as well as the expected dynamics of these variables over the medium term under a given set of macroeconomic policy parameters (Figure 1).

Figure 1. System of assessing the external sector of the economy
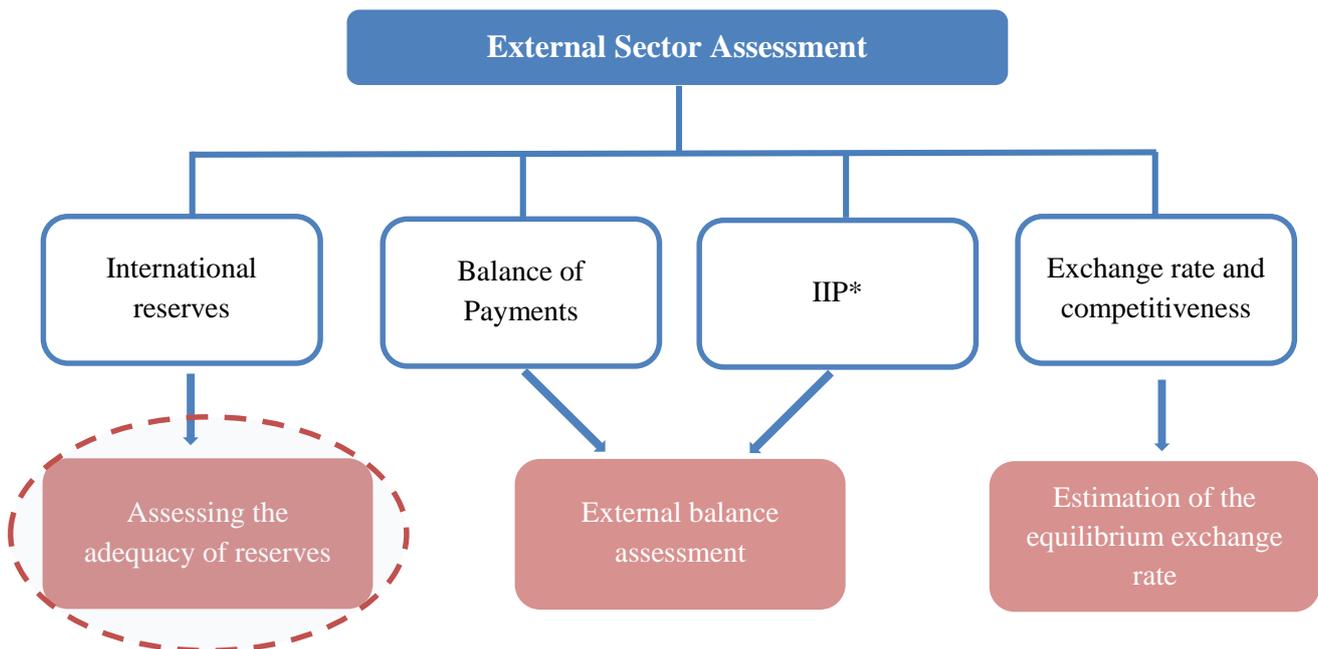
Source: IMF.
Note: IIP – International Investment Position.

The experience of global crises shows the importance of adequate reserves as a buffer against crises and as part of a country's defence against shocks. For example, reserves helped to prevent episodes of turbulence in the foreign exchange market from affecting the volatility of economic agents' consumption. During periods of pressure on the foreign exchange market, countries with developing economies and relatively high reserves were able to maintain more stable demand growth and cope more effectively with large capital outflows. Such countries also had room to expand fiscal support to the economy to offset the impact of the crisis, while countries with low levels of reserves showed a pro-cyclical fiscal contraction. In both cases, however, the effect was more pronounced when moving from a low to a moderate level of reserves than when moving from a moderate to a high level.

However, in many countries there is a strong perception of the importance of maintaining high levels of reserves. These countries do not take into account the costs associated with holding such a level of reserves. Thus, determining an appropriate level of reserves that does not distort the economy is an important task.

The objective of this study is to identify relevant approaches to assess the sustainability of Kazakhstan's external sector by analyzing the adequacy of reserves to various shocks.

The further structure of the paper is represented by a review of relevant literature, consideration of existing reserve adequacy assessment metrics and their calculations for Kazakhstan, development of reserve adequacy assessment approaches, construction of a model of reserve demand determinants and conclusions.

2. Literature review

J.Nugee and G. Smith (2018) have noted that one of the most difficult issues for policymakers has been to define the optimum size for the international reserves. This can be compared to the problem faced by commercial banks in determining the optimal proportion of funds to be held as reserves to meet obligations to creditors. In both cases, the dilemma is that to hold too much can be expensive but to hold too little can be disastrous.

In general, the world literature devoted to the accumulation of international reserves and the assessment of their adequacy can be roughly divided into three groups.

The first group includes many publications where the "traditional" approach to assessing reserve adequacy is widely used. It includes criteria for reserve coverage of imports (at least 3 months), money (at least 20%) and short-term external debt (at least 100%).

The advantage of such measures is that they are simple to calculate and easy to replicate. However, they assess the adequacy of reserves for individual sources of risk rather than for a combination of them. In her analytical note, Skripchenko Z.V. (2017) points out that the coverage of imports and money supply by reserves in Kazakhstan has historically significantly exceeded the benchmark values, while the ratio of short-term external debt (remaining maturity basis) is close to the threshold and can be considered an important indicator in the early warning system of crisis situations.

A number of sources, both in the current and financial accounts, can have a negative impact on the balance of payments. However, the relatively small number of crises in history limits the ability to estimate the amount of liquidity required to meet each potential source of outflows and the correlation may exist between these sources.

Researchers have developed a metric approach similar to that used for bank capital requirements, where requirements are estimated as a percentage of risk-weighted assets.

For example, one of the most widely used measures of reserve adequacy is the ARA (Assessing Reserve Adequacy) metric developed by the IMF (2011), particularly for the group of developing countries. The ARA parameter is designed to assess the vulnerabilities that could arise in an emerging market country's balance of payments if it came under pressure from the foreign exchange market, including from declining export earnings, volatility in short- and long-term debt, and capital flight.

According to this metric, an adequate level of reserves to finance outflows in the event of a combination of risks is considered to be between 100% and 150% of the

ARA. An indicator below 100% signals insufficient reserves, while an indicator above 150% indicates the presence of an additional buffer, which is particularly necessary for countries with a high exposure to commodity price fluctuations.

Although the ARA calculation is designed to capture multiple potential channels of market pressures, not all developing countries are equally affected by the four indicators: exports, broad money, short-term external debt and other external liabilities. Moreover, the weights in the ARA metric are static. IMF (2015) emphasises that no single indicator or model can capture the complex set of factors that determine reserve adequacy in an individual country, and therefore reserve adequacy indicators should be applied flexibly and take into account the multiple trade-offs involved in decisions on reserve accumulation and reserve adequacy.

The second strand of research in this area is devoted to modelling optimal levels of reserves. Researchers note the need to distinguish between the concepts of "adequacy" and "optimality" of reserves. The adequacy of a country's international reserves indicates the level of reserves that is considered sufficient to ensure the stability of the national currency and protection against external shocks. This level is determined on the basis of various factors such as the volume of international trade, the level of external debt, the balance of payments and the economy's need for emergency financial assistance. Optimality of a country's international reserves, on the other hand, means achieving the most favorable balance between the level of reserves and the cost of holding them. This may involve minimizing the cost of holding reserves, maximizing the return on reserves and ensuring that reserves are available for rapid mobilization when needed.

Ishola W. Oyeniran et al. (2020) adopt the "buffer stock model" by applying the Autoregressive Distributed Lag Approach (ARDL) method to estimate the optimal level of reserves for Nigeria. Buffer Stock model of the demand for foreign reserves developed by Frenkel and Jovanovic (1981) sees optimal level of reserve holdings as that which minimizes two costs: the opportunity cost of holding high level of reserve and adjustment cost which emanates from cost of adjusting the current level of reserves to the optimal level when keeping too low foreign reserves.

The results show that the Nigeria's optimal reserves level responses to adjustment cost of holding reserves and exchange rate volatility and that import and opportunity cost of reserves holding have insignificant impact on Nigeria's optimal foreign reserves. The short run and long run estimates of the buffer stock model support the theory that foreign reserves holding in Nigeria is more sensitive to the precautionary than mercantilist motives of holding reserves.

Jovanovikj and D.Andonova (2017) estimated the optimal level of the official foreign reserves in Macedonia based on cost-benefit welfare model as in Jeanne and Ranciere (2011), in which reserves serve as an insurance for the economy and have two roles – to mitigate the negative effects of a capital account crisis (sudden stop) and to prevent future crisis.

In the case of Macedonia, the model results showed that Macedonia's official reserves are higher than would be optimal from a welfare perspective and above the level needed to mitigate the crisis.

The results of the calculation of the optimization model of Jeanne and Ranciere (2011) for Kazakhstan are given in the work of Skripchenko Z.V. (2017). In 2017, the volume of the country's international reserves exceeded the benchmark value. This means that, if the adequacy criterion is met, the reserves exceeded the optimal level in terms of profitability: funds exceeding the "adequate" volume are invested more rationally in riskier assets in order to increase investment income.

The third group of studies in this area is devoted to the study of the factors that determine the volume of foreign exchange reserves. The determinants of reserve demand include exchange rate volatility, current and financial account vulnerabilities, reserve volatility, alternative costs, and others. Ghosh et al. (2012, 2013) raise the question of the motives for reserve accumulation in emerging market economies. The authors found that the motives for reserve accumulation have varied over time – vulnerability to current account shocks was relatively important in the 1980s but, as EMEs have become more financially integrated, factors related to the magnitude of potential capital outflows have gained in importance.

### 3. Assessing reserve adequacy using the traditional approach and the IMF ARA metric

In analyzing a country's external stability, traditional and metric approaches to assessing reserve adequacy are widely used by investors, international financial and rating agencies and investment banks. The results of these assessments are presented in Graphs 1 to 4.

Graph 1. Adequacy of Kazakhstan's foreign exchange reserves in months of import
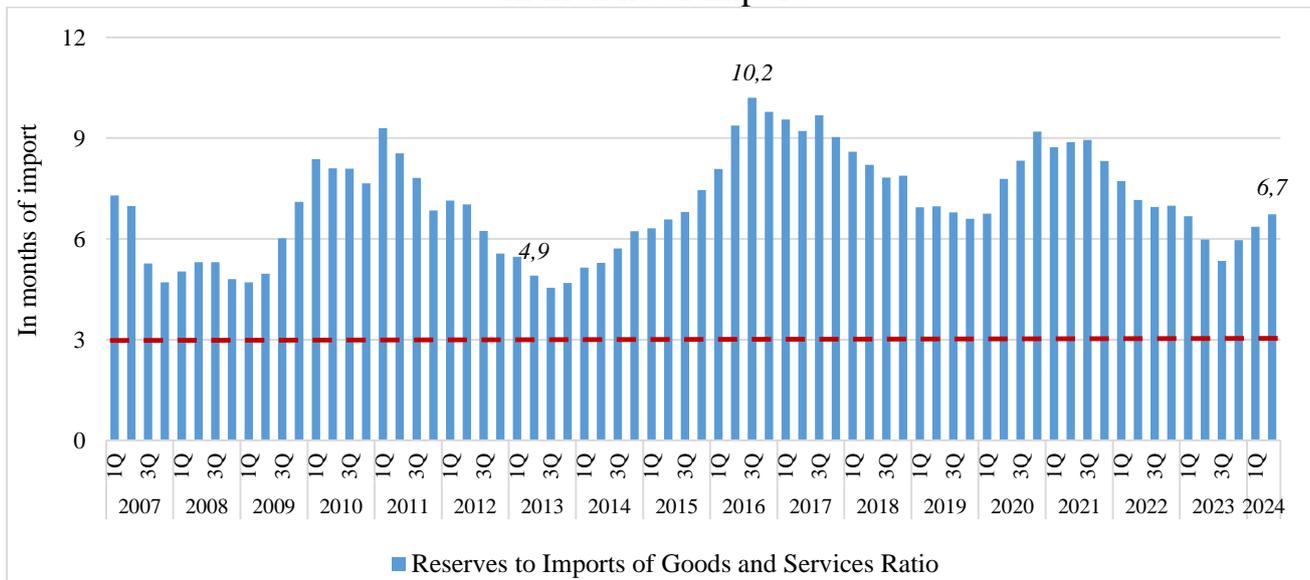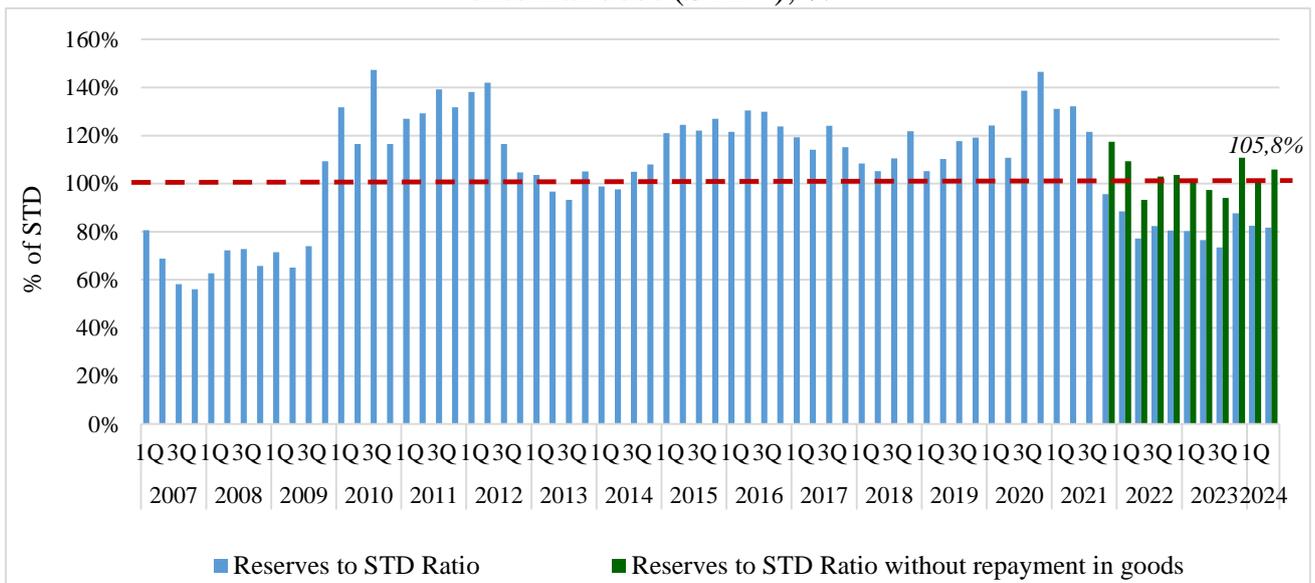

Source: NBK, authors' calculations.

Graph 2. Adequacy of Kazakhstan's foreign exchange reserves to cover broad money, %
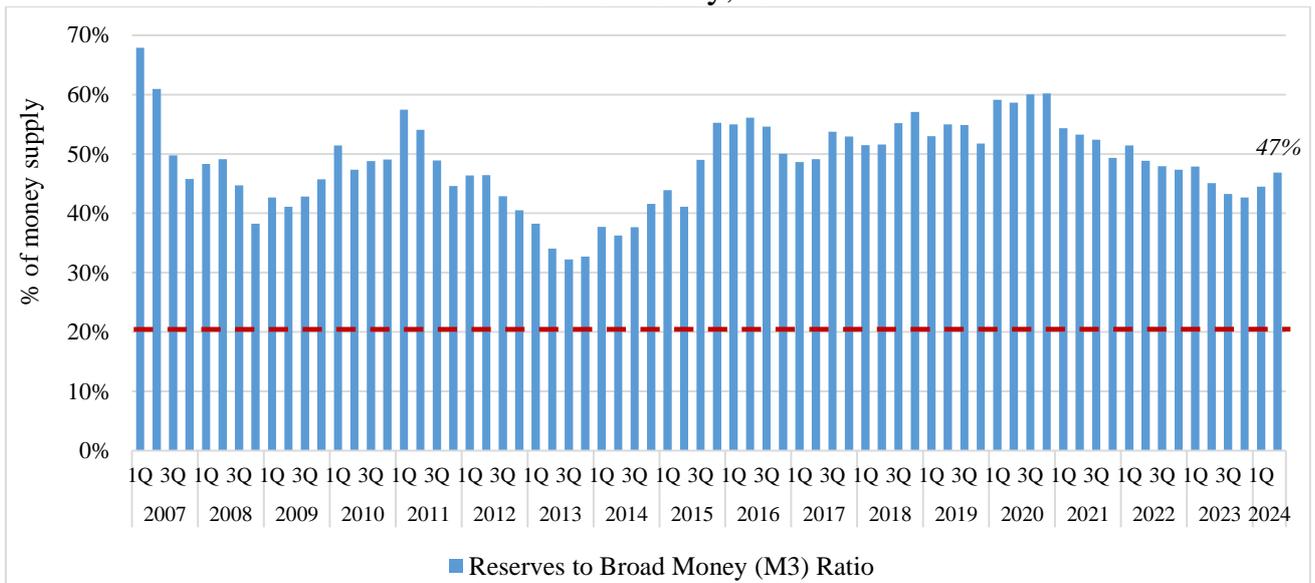
Source: NBK, authors' calculations.

Graph 3. Adequacy of Kazakhstan's foreign exchange reserves to cover short-term external debt (STD*), %

Source: NBK, authors' calculations.

Note: Short-term external debt (remaining maturity basis) includes short-term debt by original maturity (up to 1 year), the part of long-term debt maturing within a year or less, and interest to be accrued within a year or less. Statistical data on debt repayment in goods, services, or works is available from the 4th quarter of 2021.

The ARA indicator is calculated by weighing the indicators determined by the IMF using the following weights:

For a fixed exchange rate regime:

$$ARA = 10\% * \text{export of goods and services} + 10\% * \text{broad money} +$$
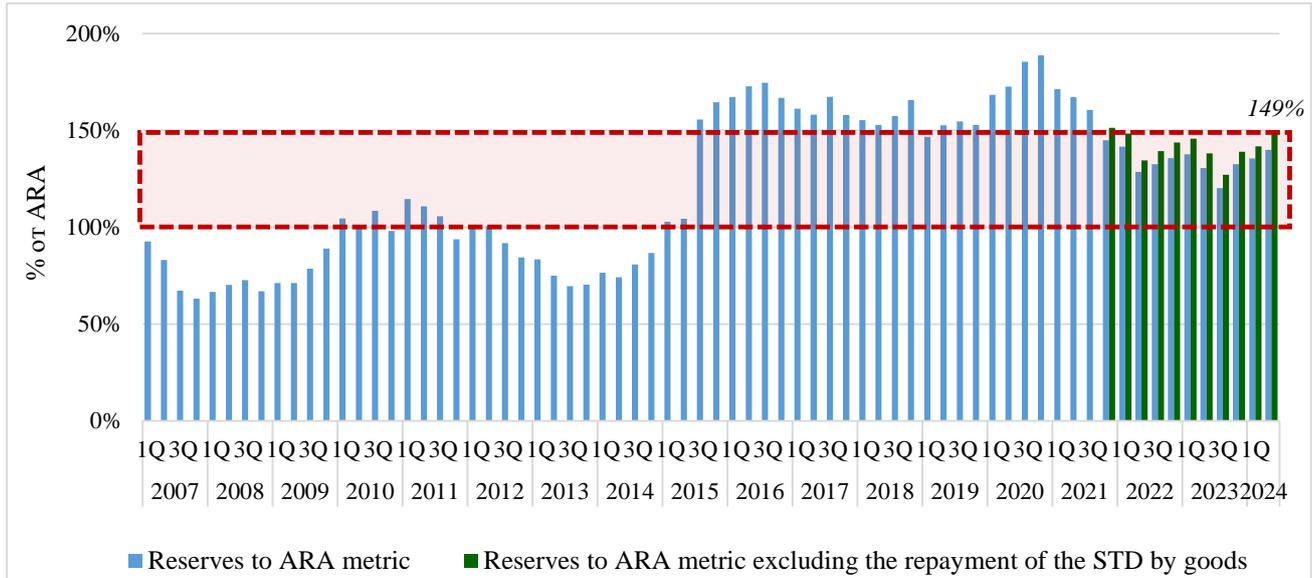
$$+30\% * \text{short term external debt} + 20\% * \text{other external liabilities}[3]$$

For a floating exchange rate regime:
$$ARA = 5\% * \text{export of goods and services} + 5\% * \text{broad money} +$$
$$+30\% * \text{short term external debt} + 15\% * \text{other external liabilities}$$

The recommended range of the ratio of international reserves to the sum of indicators weighted by the above coefficients is between 100% and 150%.

Graph 4. Adequacy of Kazakhstan's foreign exchange reserves according to the ARA metric, %

Source: NBK, authors' calculations.

Thus, the adequacy of foreign exchange reserves is estimated not to be met by the criterion of covering short-term external debt to maturity. However, calculations should take into account the existence of external liabilities for which debt repayment is made in goods, works and services. In Kazakhstan, for example, debt repayment to foreign investors under large Production-Sharing Agreements is made in oil. This type of debt does not put pressure on the country's reserves as it does not create a demand for foreign currency. This explains the adjustment of short-term external debt by the amount of "goods" debt. To ensure the relevance of reserve adequacy assessments, this study uses *short-term external debt excluding debt in the form of goods, works, and services*.

After adjustment for external debt, the reserve adequacy criterion is met under all the approaches considered.

However, fulfilment of the criteria of these approaches does not always guarantee the adequacy of reserves. For example, China's reserves, which are among the largest in the world ($3.2 trillion at the end of 2023), cover more than 8 months of imports and twice as much short-term external debt. However, broad money – the main potential source of demand for foreign currency – exceeds China's reserves by 13 times. In this

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[3] Other liabilities (debt and equity) are defined as the difference between sum of total portfolio investment and other investment liabilities from the IIP less the measure of short-term debt.

context, the ability of China's reserves to act as a "buffer" in the event of a potential crisis involving a mass conversion of yuan into foreign currency may be low.

The decomposition of the metric components of the ARA for Kazakhstan shows that reserve accumulation requirements are relatively lower under a floating exchange rate regime than under a fixed exchange rate regime (Graph 5). In general, countries with less flexible exchange rate regimes require higher reserves to intervene during periods of foreign exchange market pressure.

Graph 5. Decomposition of ARA metric (100%) for Kazakhstan
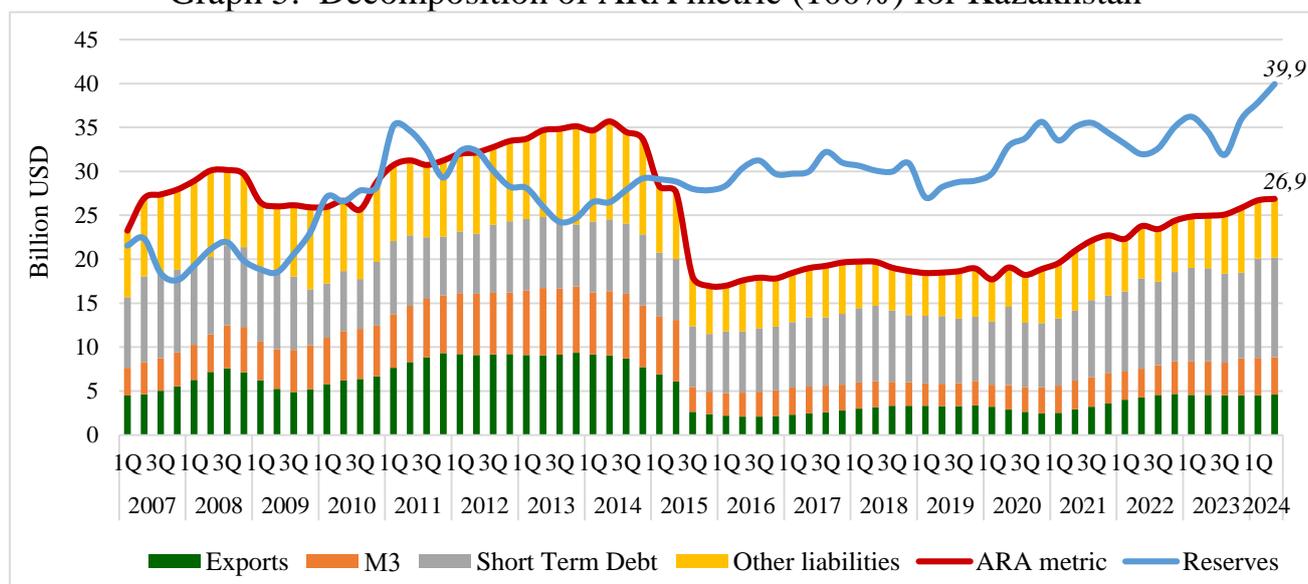
Source: NBK, authors' calculations.

It is worth noting that the IMF's ARA metric for reserve adequacy has its limitations, as it does not take into account country-specific characteristics (Graph 6). For example, Russia is estimated to have had a significant reserve surplus in 2023. However, almost half of Russia's reserves (about $300 billion) are blocked due to sanctions imposed by Western countries and are not available for use in implementing monetary policy. Thus, Russia's reserve adequacy indicator is actually overestimated.

In Turkey, gross foreign reserves at end-2023 were estimated at $92.7 billion, while net foreign reserves were negative. Net foreign reserves are defined as the difference between reserve assets and reserve liabilities. This means that the Central Bank of Turkey's external liabilities to foreign creditors, including loans and deposits from financial institutions, exceed available reserves. In addition, Turkey has a chronic current account deficit. However, according to the ARA metric, Turkey's gross reserves meet the adequacy criteria. However, the assessment based on net international reserves signals that Turkey's reserves may not be able to act as a buffer in crisis scenarios.

Graph 6. Ratio of reserves to ARA metric as of 1 January 2024
for a sample of countries
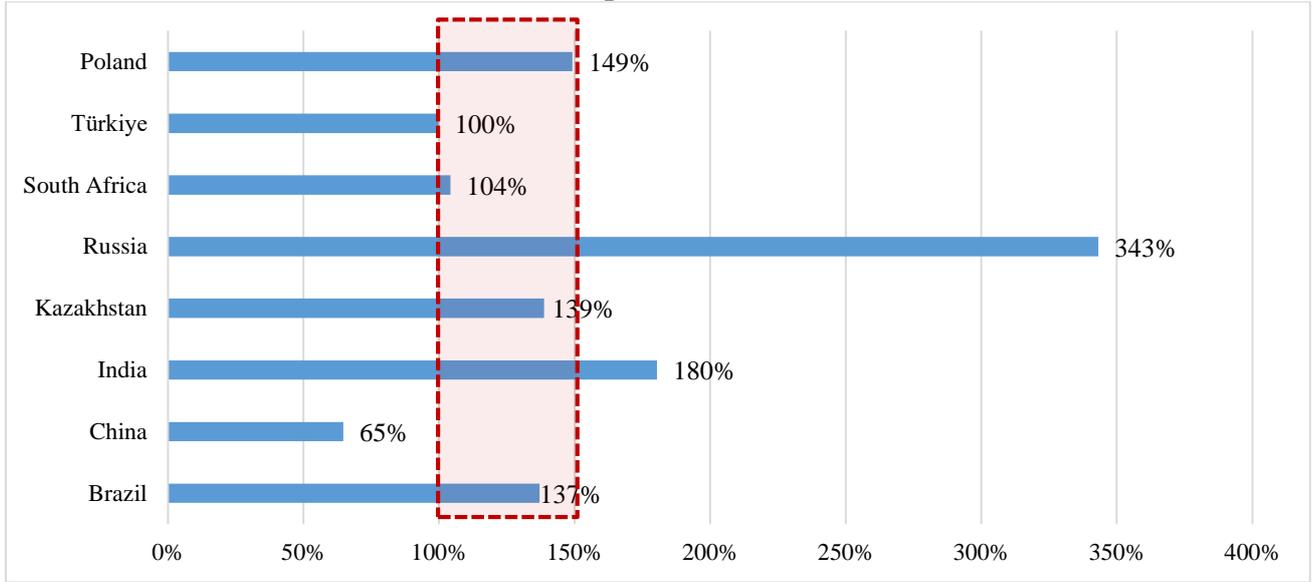
Source: IMF, authors' calculations.

Thus, given the generalised nature of the IMF methodology, it is necessary to modify the ARA metric for the Kazakh economy, taking into account the specific risks characteristic of the country. To this end, an attempt has been made to reproduce the IMF methodology in order to recalibrate the coefficients before the components of the ARA metric.

According to the IMF (2011), the ARA metric is calculated in two steps. First, periods of exchange rate pressure are identified using the Exchange Market Pressure Index (EMPI). In the second step, the 10th percentile of export declines, broad money and short-term debt outflows for emerging markets during crises is calculated by comparing their crisis period values with their pre-crisis (three-year) values. The 10th percentile of the three-year changes before periods of currency pressure is used as the coefficient for the corresponding variable in the ARA metric.

In general, exchange rate pressure is reflected in a sharp change in the nominal exchange rate and/or a depletion of international reserves.

Numerous studies use different approaches to construct the Exchange Market Pressure Index (EMPI). In this paper, the EMPI is calculated using the following formula (Kaminsky, Reinhart, 1999):

$$EMPI = \Delta e_t - \frac{\sigma_e}{\sigma_r} \Delta r_t \qquad (1)$$

where $\Delta e_t -$ change in the exchange rate of tenge to the US dollar in period *t*; $\sigma_e -$ standard deviation of the exchange rate; $\sigma_r -$ standard deviation of international reserves; $\Delta r_t -$ change in international reserves in period *t*.

The currency market experiences pressure if the EMPI exceeds a certain threshold, i.e.:

$$Crisis = \begin{cases} if\ EMPI_t > \beta\sigma_{EMPI} + \mu_{EMPI}, 1 \\ in\ other\ case, 0 \end{cases} \qquad (2)$$

where σ_{EMPI} –*EMPI* standard deviation*; μ_{EMPI}* – average *EMPI; β* – a coefficient that traditionally varies from 1.5 to 3.

The results of the EMPI calculation for Kazakhstan show that during the periods of fixed exchange rates, a currency crisis was observed in 2009 and 2014 (Graph 7). After the transition to a floating exchange rate regime, there were no episodes of apparent currency crisis in Kazakhstan, apart from the transition period itself. After the transition to a floating exchange rate regime for the tenge, apart from the transition period itself, there were no episodes of overt currency crisis in Kazakhstan. At the same time, the threshold *(with coefficient β=1.5)* has increased significantly compared to the fixed exchange rate regime, which is due to the increased volatility of the tenge exchange rate within the floating exchange rate regime.

Graph 7. Periods of pressure on the currency market according to EMPI
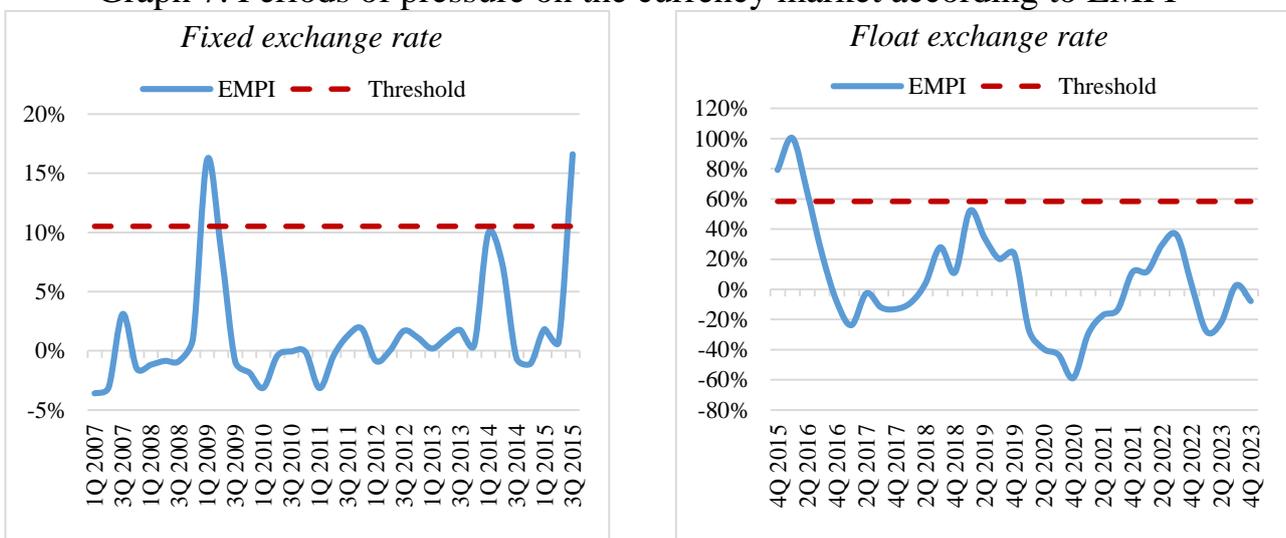
Source: authors' calculations.

In 2019 and 2022, the EMPI values were close to the critical threshold. However, there were no other signs of crisis in these periods, suggesting a decline in exports, capital outflows and other signs of crisis years. Thus, it is not possible to reproduce the second stage of the IMF methodology with a floating exchange rate: in both 2019 and 2022, the indicators included in the ARA metric did not change significantly compared to the previous three-year period.

It should be noted that the IMF calculations in 2011 (estimated time series from 1980 to 2008) and subsequent update in 2015 (estimated time series from 1980 to 2012) were made for all developing countries with very different economies (e.g. Angola and China) and do not cover Kazakhstan's transition to a floating tenge exchange rate regime. Among the developing countries included in the IMF calculations, countries such as Albania, Armenia, Czech Republic, Poland, Indonesia, Israel and South Korea had a floating exchange rate regime. These countries differ from Kazakhstan in their economic structure and are therefore vulnerable to shocks of a different nature. Therefore, the question of the acceptability of using the ARA parameter for Kazakhstan remains open.

4. Development of approaches to assess reserve adequacy for Kazakhstan

4.1 Reserve adequacy assessment for Kazakhstan: proposed methodology

As part of this study, a methodology has been developed to extend the range of outflows considered as a risk by adding all household and corporate funds that could potentially create a demand for foreign exchange or «leak» out of the country during a crisis. It is proposed to use the concept of broad money to determine the potential size of these funds.

Broad money is the total amount of cash in circulation and non-cash assets held in the accounts of individuals and legal entities. In the NBRK, broad money (M3) is calculated on the basis of the consolidation of the balance sheet accounts of the NBRK and second-tier banks (STBs) and consists of cash in circulation and deposits of non-bank resident legal entities and resident households with depository organizations, both in tenge and in foreign currency.

Thus, the developed methodology allows not to focus on individual sources of risk, such as imports, short-term external debt and other liabilities. This is due to the fact that M3 already includes all funds that can be used to pay for imports, debt repayments, etc.

In the context of assessing reserve adequacy, it is necessary to define the concept of a crisis in which the country should have a buffer. This paper distinguishes between two crises – capital flight (as part of a banking crisis) and a currency crisis.

Capital flight is a spontaneous, unregulated outflow of capital by legal entities and individuals abroad in search of more reliable and profitable investments.

As mentioned above, a *currency crisis* is the emergence of a critical situation in the foreign exchange, characterized by sharp fluctuations in the exchange rate and the depletion of the country's foreign exchange reserves.

The need for foreign exchange depends on the nature of the crisis. At the onset of a massive physical outflow of domestic and foreign currency deposits by households and enterprises, *M3* is considered a source of risk. On the other hand, in the event of a currency crisis, when the demand for foreign currency increases, it makes sense to consider only the tenge money supply, which can potentially be converted into foreign currency.

The sources of the country's foreign exchange supply in this scenario are the country's foreign assets, represented by international reserves and the sovereign wealth fund – the National Fund of the Republic of Kazakhstan (NFRK). The inclusion of the NFRK in the calculation of reserves is logical. According to the IMF (2011), reserves are not the only external buffer for a country. Commodity-intensive economies, unlike other countries, need an additional buffer due to the volatility of the terms of trade. Thus, when assessing the adequacy of reserves, the savings in the sovereign wealth fund act as an additional buffer. An example is Russia's international reserves, which include the liquid part of the National Welfare Fund.

Thus, the proposed methodology for the two types of crises can be expressed as follows (Figure 2).

Figure 2: Methodology for assessing reserve adequacy
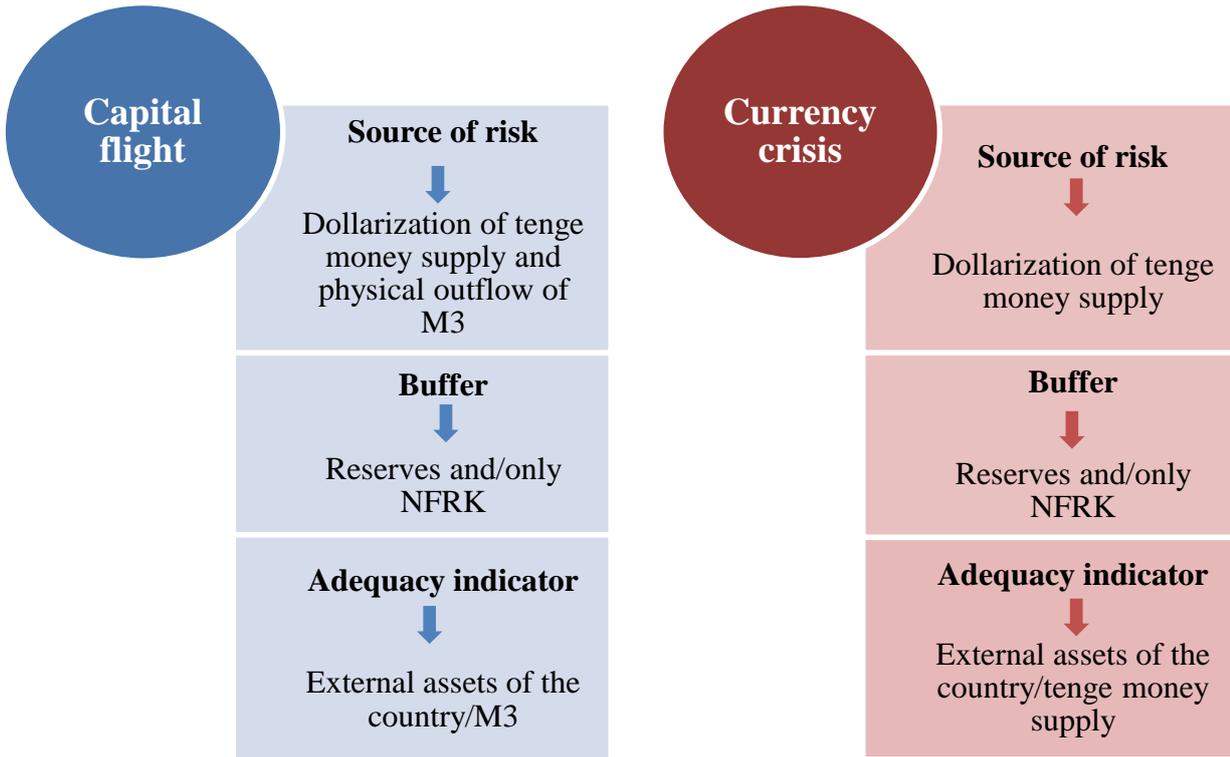
Source: compiled by the authors.

The results of the calculations of the adequacy of foreign assets show that the country's foreign assets **exceed** (more than 100%) the broad money, regardless of the type of crisis (charts 8 and 9). It should be noted that regardless of the type of crisis, all monetary funds of households and enterprises cannot be immediately converted into foreign currency due to the need for tenge liquidity to meet the basic needs of the economy.

Graph 8. Adequacy of the country's external assets during a *capital flight*
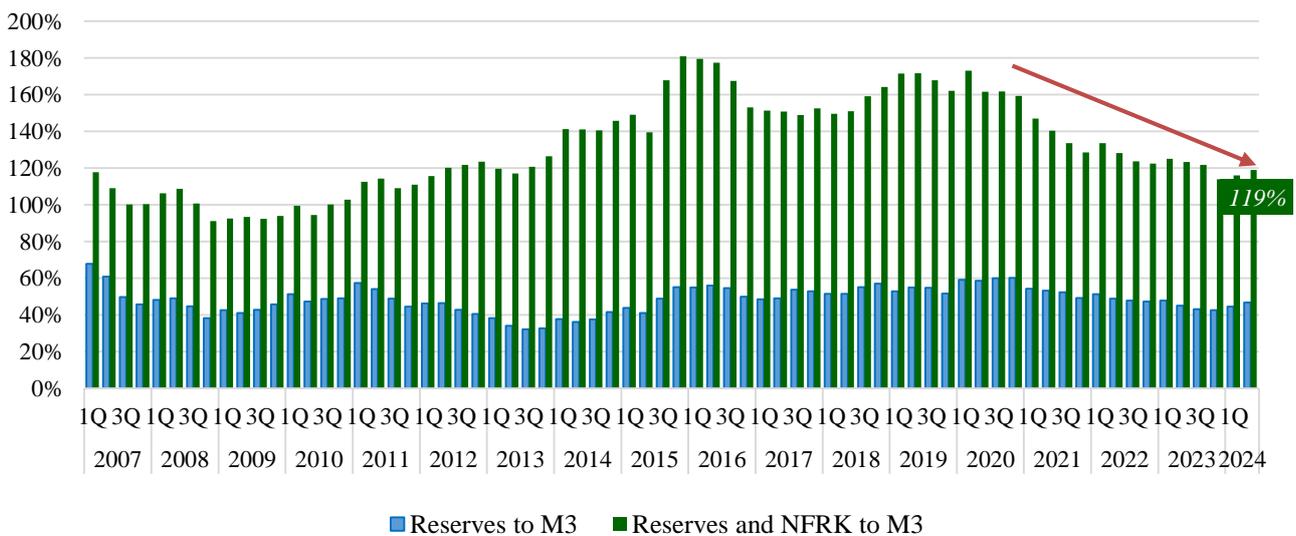
Source: NBK, authors' calculations

Graph 9. Adequacy of the country's external assets during a *currency crisis*
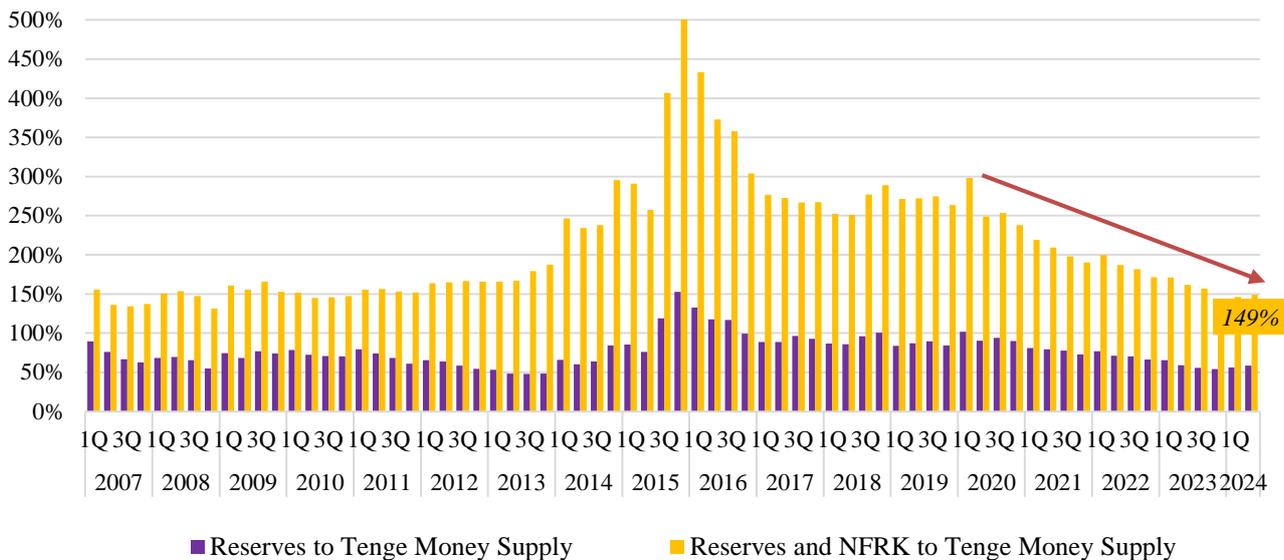
Source: NBK, authors' calculations.

One of the main functions of the NFRK is the savings function – the accumulation of savings for future generations. However, in Kazakhstan the practice of using NFRK funds has developed both in favorable external conditions (high oil prices) and in relatively unfavorable times, leading to its gradual depletion.

Since 1Q 2020, the external asset adequacy ratio has shown a stable downward trend. This is mainly due to increasing government spending, including through transfers from the NFRK, and consequently faster broad money growth. As a rule, economic growth is accompanied by an increase in the country's need for foreign exchange reserves relative to the size of the economy. However, the active withdrawal of funds from the NFRK does not contribute to a further increase in the country's buffer.

Thus, based on the results of the analysis conducted, it can be concluded that a) the assets of sovereign wealth funds (in Kazakhstan – NFRK) can be included in the reserves of countries with high commodity dependence; b) Kazakhstan's external assets will be able to cover the need for foreign exchange in crisis situations, but the permanent use of NFRK funds in both crisis and non-crisis situations may lead to their gradual depletion; c) one of the factors for the decline in the adequacy of external assets over the past four years is the growing government spending.

It should be noted that, in the context of inflation targeting, the NBK's main instrument is the base rate, which reacts primarily to changes in external conditions.

4.2 Determinants of demand for reserves

Models of the determinants of reserve demand allow the analysis and forecasting of factors affecting the level and dynamics of reserves. These models provide a formal framework for assessing the impact of various macroeconomic and financial variables, such as the trade balance, investment flows, exchange rate, monetary policy and other indicators, on changes in reserves. Knowledge of the factors affecting a country's

reserves thus helps to make informed decisions on monetary policy, external strategy and risk management.

The identification of factors contributing to the accumulation of reserves is directly related to the motives for their accumulation. Thus, the main reasons for countries to accumulate reserves are as follows.

Transactions motive. Adequate reserves would promote international stability and the convertibility of the local currency, as well as meeting any foreseeable demand for foreign exchange (servicing the central bank's foreign currency liabilities).

Precautionary motive. Adequate reserves would cover foreign exchange needs in the event of insufficient domestic foreign exchange supply and difficulties in obtaining external financing for crisis mitigation purposes, i.e. reserves reduce the cost of the crisis once it occurs.

Prevention motive. Having adequate reserves reduces the likelihood of a crisis, as adequate reserves underpin investor confidence in the country's ability to meet its external obligations.

Intervention motive. Economies hold foreign exchange reserves as a means of influencing exchange rates. Intervention in foreign exchange markets is mainly driven by the following macroeconomic objectives: to control inflation or maintain internal balance; to maintain external balance and prevent misallocation of resources; and to prevent or deal with disorderly markets or crises.

An econometric model of the demand for reserves in Kazakhstan was constructed using the data in Table 1.

Table 1

Variables used to identify determinants of reserve demand

Name	Symbol	Source
Dependent variable		
International reserves, million USD	LOG_RES_SA	NBK
Explanatory variables		
Imports of goods and services for consecutive 4 quarters, million USD	LOG_IM_SA	NBK
Broad money (M3) as a proxy for deposits, million USD	LOG_M3_SA	NBK
Gold price, USD per 1 ounce	LOG_GOLD	Refinitiv

Source: compiled by the authors.

The model was estimated for fixed and floating exchange rate periods and for the full period from 1Q 2007 to 4Q 2023. The variables were seasonally adjusted to a base of 1Q 2007 and 4Q 2015 for the fixed and floating exchange rate periods respectively.

The variables that were initially included in the model but were found to be statistically insignificant are exports of goods and services, short-term external debt, total external demand, nominal effective exchange rate, interest rate differential between Kazakhstan and the US.

The model has been estimated using the least squares method (OLS), as it provides more relevant model estimates compared to the results of other tested methods

(SVAR, VECM). The validity of the model estimates is confirmed: there is no autocorrelation of the residuals, the residuals are normally distributed and homoscedastic.

The regression equation for a *floating exchange rate* is as follows:

$$D(LOG\_RES\_SA) = \\ = 0{,}44 \times D(LOG\_M3\_SA\text{***}) + 0{,}38 \times D(LOG\_GOLD\_SA\text{***})^4$$

Braod money as a proxy for deposits[5]. It is estimated that, other things being equal, a 10% increase in household and corporate deposits leads to a 4,4% increase in international reserves. The main channel for the impact of deposits on international reserves is the requirement to invest a portion of the STBs funds in domestic assets. According to this requirement, the STB's average monthly domestic assets should cover or exceed its average monthly domestic liabilities. Thus, in order to comply with the domestic asset ratio, the STBs may, among other things, hold their liquidity in accounts with the NBK, thereby increasing international reserves.

Gold prices. All other things being equal, a 10% increase in the price of gold leads to a 3,8% increase in international reserves. This is due to the fact that the share of monetary gold in reserves was around 60% on average over the period 2017-2023. Fluctuations in the price of gold, as well as changes in its physical volume, therefore have a direct impact on the level of reserves.

Under a *fixed exchange rate* regime, the coefficients on the variables are somewhat different: changes in imports of goods and services largely determined the dynamics of reserves. It is estimated that a 10% increase in imports led to an 8.7% decrease in international reserves (Table 2). This is due to the fact that second-tier banks can use funds in accounts with the NBK to meet their customers' demand for foreign exchange to pay for imports, so that a reduction in the STB's correspondent accounts with the NBK leads to a reduction in the volume of international reserves. In addition, under a fixed exchange rate regime, in the context of a negative current account balance, an increase in imports could be accompanied by the sale of foreign currency by the NBK.

Table 2

Results of model estimations

Explanatory variables	Coefficients before variables		
	Fixed exchange rate *(1Q 2007-3Q 2015)*	**Floating** exchange rate *(4Q 2015-4Q 2023)*	Full period *(1Q 2007-4Q 2023)*
D(LOG_IM_SA)	-0,87***	*insignificant*	-0,35**
D(LOG_M3_SA)	0,53***	**0,44*****	0,44***
D(LOG_GOLD)	0,25**	**0,38*****	0,24***

[4] Significance of the variables: ***p<0,01, **p<0,05, *p<0,1.
[5] The share of deposits of the population and businesses in tenge and foreign currency is more than 90% of the broad money.

Source: authors' calculations
Note: Significance of the variables ***p<0,01, **p<0,05, *p<0,1.

The results of the model estimations show that the impact of imports of goods and services on reserve dynamics decreased after the transition to a floating exchange rate regime.

In general, under a floating exchange rate regime, the demand for reserves is driven by precautionary and preventive motives to smooth currency and capital outflow shocks.

5. Conclusion

Traditional and metric approaches to assessing Kazakhstan's international reserves indicate the sufficiency of reserves in the event of various crises and shocks in the domestic currency market. However, despite the wide popularity of such assessment methods among analysts, they have a drawback in that they do not take into account the vulnerability of countries to certain specific shocks.

The methodology developed in this paper for assessing the adequacy of international reserves also indicates the presence of an adequate buffer in Kazakhstan. According to this approach, the assets of the NFRK can be considered as international reserves, since in practice they can be used by the state in the event of a currency crisis or capital flight. However, it should be noted that the use of the NFRK funds in both crisis and non-crisis periods can lead to their gradual depletion. This contradicts the function of accumulating the NFRK for future generations.

Moreover, the main difference with the approach proposed in the paper is the use of the broad money supply indicator, including the tenge money supply, as a source of dollarization risk in the event of a large-scale crisis. This is due to the fact that the money supply includes all internal funds that can create a demand for foreign currency - cash, current accounts, deposits of households and enterprises used, inter alia, to pay for imports, as well as payments to repay external debt and other obligations.

The constructed model of reserve demand showed that in Kazakhstan reserve dynamics are driven by changes in the money supply, as a proxy for household and business deposits, and the price of gold. Thus, according to econometric estimates, Kazakhstan's accumulating and increasing reserves are driven by warning and precautionary motives. At the same time, the impact of imports of goods and services on reserve dynamics declined after the transition to a floating exchange rate regime. This is evidence that the foreign exchange market has started to function without active intervention by the NBK, allowing the exchange rate to absorb imbalances in the domestic foreign exchange market.

The accumulation of international reserves can serve as a protection against various economic and financial risks, such as fluctuations in commodity prices, changes in world interest rates, geopolitical conflicts, etc. The reserves help to mitigate the negative impact of such shocks on the economy and maintain the stability of the financial system. However, it should be remembered that in an inflation targeting

regime, the main instrument of monetary policy is the base rate and the floating exchange rate absorbs imbalances in the foreign exchange market.

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