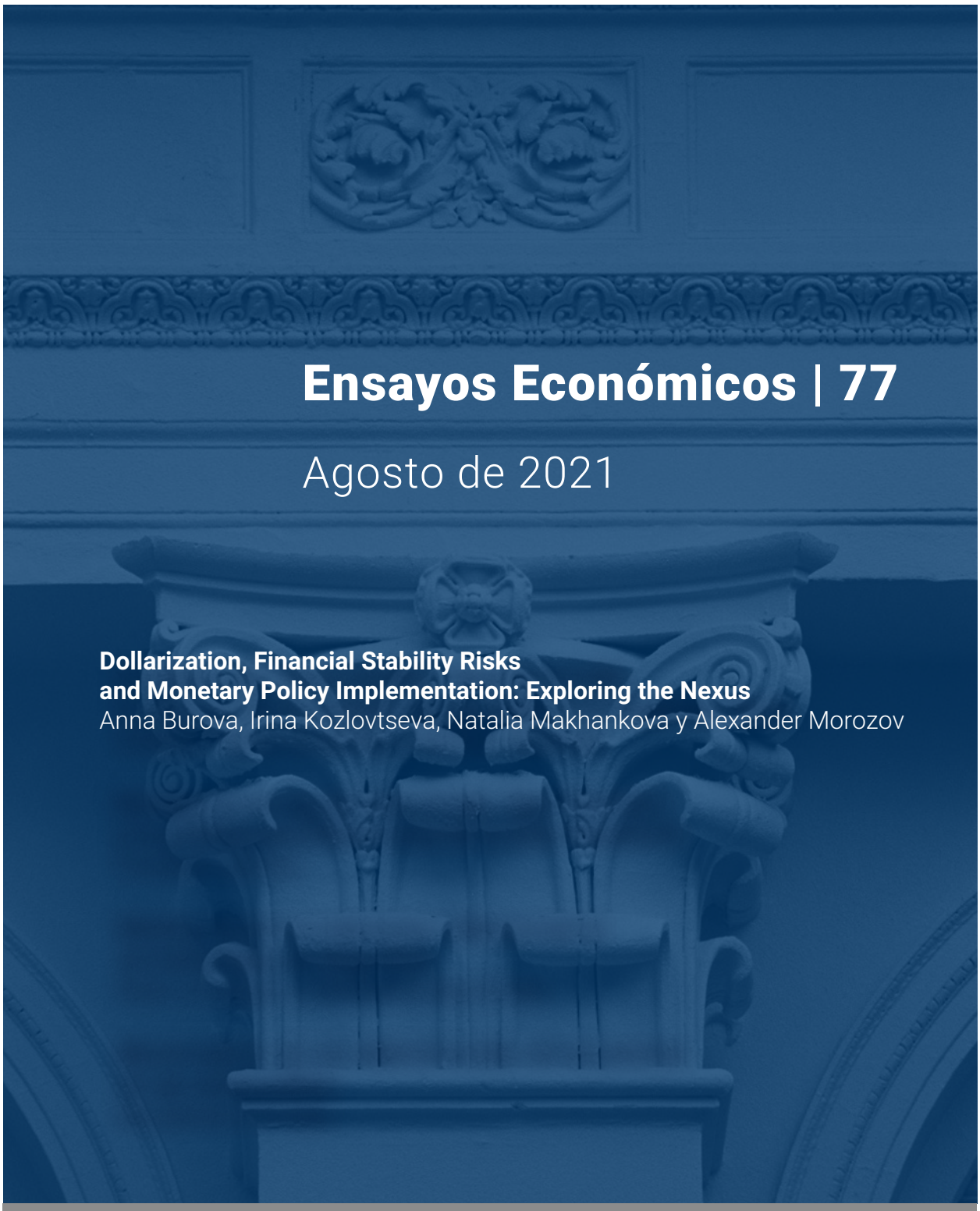


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Dollarization, Financial Stability Risks and Monetary Policy Implementation: Exploring the Nexus

Anna Burova, Irina Kozlovtseva, Natalia Makhankova y Alexander Morozov

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Dollarization, Financial Stability Risks and Monetary Policy Implementation: Exploring the Nexus

Anna Burova
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Abstract

We review the main aspects of financial dollarization in Russia during the period 2001-2020. We measure dollarization of households (HH) and non-financial corporations (NFCs) separately. An elevated exchange rate volatility was observed in 2015-2016, during the first years of the floating exchange rate regime introduced in November 2014. Notably, the increased exchange rate volatility did not translate into an increased volatility of foreign-currency denominated deposits. The dynamics of deposit dollarization is associated with the expected yield differential that includes the collective memory about the major events of currency depreciation in the past (hysteresis effect). Two deposit dollarization equilibrium levels possibly exist for an emerging market economy around 15% and 75% of deposits. When the expected yield differential is effectively zero, convergence to a higher equilibrium takes place above the 45%–50% dollarization threshold. To foster de-dollarization, tighter monetary policy should be in place when the expected yield differential on domestic and foreign currency deposits is close to zero. The ruble depreciation triggered a spike in loan dollarization in Russia in both 2009 and 2015. However, the dollarization level declined rapidly after the crisis in 2008, probably signaling the lower willingness of NFCs to accept exchange rate risk. De-dollarization policies in emerging market economies are most effective when they combine floating exchange rate, inflation targeting and macroprudential policies and are supported by sustainable fiscal policy.

JEL classification: E43, F31, G32.

Keywords: de-dollarization, financial dollarization, hysteresis effect, currency mismatch.

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Dolarización, riesgos de estabilidad financiera y la implementación de la política monetaria: explorando la conexión

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Irina Kozlovtseva
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Alexander Morozov
Banco de Rusia

Resumen

Revisamos los principales aspectos de la dolarización financiera en Rusia durante el período 2001-2020. Medimos la dolarización de los hogares (HH) y las sociedades no financieras (NFC) por separado. Una elevada volatilidad del tipo de cambio se observó en 2015-2016, durante los primeros años del régimen de tipo de cambio flotante introducido en noviembre de 2014. Cabe destacar que la mayor volatilidad del tipo de cambio no se tradujo en una mayor volatilidad de los depósitos denominados en moneda extranjera. La dinámica de la dolarización de los depósitos está asociada con el diferencial de rendimiento esperado que incluye la memoria colectiva sobre los principales eventos de depreciación de la moneda en el pasado (efecto de histéresis). Posiblemente existan dos niveles de equilibrio de dolarización de depósitos para una economía de mercado emergente: alrededor del 15% y el 75% de los depósitos. Cuando el diferencial de rendimiento esperado es efectivamente cero, la convergencia hacia un equilibrio superior tiene lugar por encima del umbral de dolarización del 45% al 50%. Para fomentar la desdolarización, debería establecerse una política monetaria más estricta cuando el diferencial de rendimiento esperado de los depósitos en moneda nacional y extranjera sea cercano a cero. La depreciación del rublo provocó un repunte en la dolarización de los préstamos en Rusia tanto en 2009 como en 2015. Sin embargo, el nivel de dolarización disminuyó rápidamente después de la crisis de 2008, lo que probablemente indica la menor disposición de las NFC a aceptar el riesgo de tipo de cambio. Las políticas de desdolarización en las economías de mercados emergentes son más efectivas cuando combinan un tipo de cambio flotante, metas de inflación y políticas macroprudenciales y están respaldadas por una política fiscal sostenible.

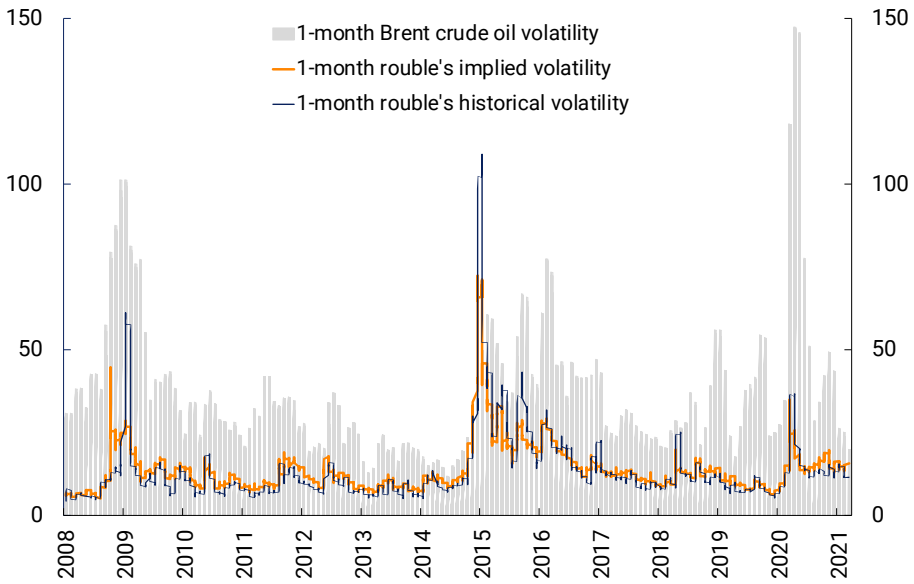
Clasificación JEL: E43; F31; G32.

Palabras clave: desdolarización, dolarización financiera, efectos de histéresis, descalce de monedas.

1. Introduction

We define dollarization as the share of foreign currency deposits (loans) in the total volume of deposits (loans). Financial dollarization should be considered in the context of and exchange rate regime, and monetary and macroprudential policies. Since 2005, the Bank of Russia had used the dual-currency basket of the US dollar and the euro as an operational target of its managed float exchange rate policy. The Bank of Russia set the band for this target and conducted foreign exchange interventions to smooth exchange rate fluctuations. During 2008-2009 the Bank of Russia modified its exchange rate policy framework, and in 2009 the fixed band for the ruble was abandoned. During 2010-2014, a floating operational band was in place. In November 2014, the transition to a floating exchange rate regime was completed and in February 2017 a fiscal rule became operational. These policy changes helped to reduce both absolute and relative (*vis-à-vis* oil prices) volatility of the ruble (Figure 1).

Figure 1. Oil price and exchange rate



Source: Bank of Russia, authors' calculations.

The increase in deposit dollarization in 2008-2009 was associated with the ruble depreciation. Since 2008, with the gradual transition to a floating exchange rate regime, we have observed changes in the behavior of households, following the increase in exchange rate volatility.[1] Notably, the increased volatility of the exchange rate did not translate into an increased volatility of foreign-currency denominated deposits. With the floating exchange rate regime and low inflation, households became much less sensitive to exchange rate volatility.

[1] Khabibullin R., and A. Ponomarenko (2020); "An empirical behavioral model of households' deposit dollarization", Bank of Russia, Working Paper Series, Working Paper N° 67.

Financial stability risks from high levels of dollarization become more pronounced for economic agents with currency mismatch when foreign currency liabilities exceed foreign currency assets. We assess financial vulnerability due to currency mismatch at a sectoral level of the Russian economy.

The paper is structured as follows. Firstly, we provide a brief literature review of financial dollarization papers. Secondly, we cover Russian deposit dollarization dynamics and illustrate the hysteresis effect with Russian data. Thirdly, we consider loan dollarization dynamics. Fourthly, we assess currency mismatch of Russian sectors and financial stability exposure. Additionally, we explore hedging features of some large Russian companies on a micro-level: using the conventional assumption that export-oriented NFCs actively use hedging against exchange rate risk. The link between the operational and the financial activities of NFCs is explored using consolidated annual reports prepared under the International Financial Reporting Standards (IFRS). We conclude with policy implications from our findings.

2. Literature Review

A wide range of theoretical and empirical literature address the issue of dollarization (Calvo, 2002; Ponomarenko *et al*., 2013; Ponomarenko and Krupkina, 2017; Bocola and Lorenzoni, 2020). We will focus on papers related to features of dollarization in Russia and some recent literature that links dollarization issues and financial stability risks.

The dynamics of dollarization in Russia for the period 2001-2010 was comprehensively discussed in Ponomarenko *et al.* (2013). Authors used balance sheet analysis building on Allen *et al.* (2002) to estimate currency mismatches of the sectors of the Russian economy. Currency risk exposure of the non-banking private sector was highlighted. Authors particularly highlight that the share of loans denominated in foreign currency was historically lower for households than for NFCs. Alongside this observation, its level was less volatile and moved down persistently. Corporate loan holders react not only to exchange rate developments but also to other macroeconomic factors (*e.g*. oil price).

Currency appreciation does not always reduce the level of dollarization in the economy because of the hysteresis effect. The hysteresis effect is referred to a situation when after a strong exchange rate depreciation and corresponding dollarization growth, the exchange rate stabilization does not imply a return to the previous level of dollarization (Ponomarenko and Krupkina, 2017; Della Valle *et al.*, 2018). In these circumstances, network externalities and depreciation expectations are important factors causing the hysteresis effect (Valev, 2010; Oomes, 2003; Feige *et al*., 2003). Network externalities reduce the cost of using foreign currency when foreign currency transactions are widely used within the economy. As for adaptive expectations, depositors doubt on the stability of national currency in the future after past episodes of significant depreciation, and it takes a long time for them to forget about these episodes. In these circumstances, depositors choose to keep a certain share of their savings in less risky foreign currency as a precautionary measure.

Considering the hysteresis effect, Ponomarenko and Krupkina (2017) identified two deposit dollarization equilibrium levels for an emerging market economy: around 15% and 75% of total

deposits. When the expected yield differential is effectively zero, convergence to a higher equilibrium takes place above the 45%-50% dollarization threshold.

Dalgic (2018) showed that in countries with higher levels of dollarization, the yield premia of the local interest rate over the foreign currency interest rate is higher. As policy interest rate has effects on national currency deposit rate, financial dollarization can reduce monetary policy space and set an eligible lower bound (ELB) for policy rate.

Khabibullin and Ponomarenko (2020) explored the sensitivity of household deposit dollarization to the exchange rate movements in Russia. The authors note that after a transition to a floating exchange rate regime, the link between movements in exchange rate and dollarization became weaker. The authors used a behavioral model to explore the origins of this phenomenon. They divide depositors into chartists and fundamentalists. Chartists extrapolate expectations regarding the exchange rate developments while making their currency choice. Fundamentalists use mean-reversing expectations. Authors estimate proportions of chartists and fundamentalists to determine how households switch between chartist and fundamentalist strategies. They show that when Russia moved to a floating exchange rate regime and exchange rate movements became less predictable by simple extrapolation, these developments punished chartists and made the fundamentalist strategy more beneficial to follow. Thus, the adaptive extrapolating approach proves to be misleading under a floating exchange rate regime.

Financial dollarization relates to financial stability risks. Currency depreciation leads to higher debt servicing costs of foreign currency loans, which increase borrowers default risk and can result in borrower's insolvency (Della Valle *et al*., 2018; Hofmann *et al*., 2019). There are empirical findings that financially dollarized economies display a more unstable money demand, a greater propensity to suffer banking crises after a depreciation of the local currency, and slower and more volatile output growth (Yeyati, 2006). However, this issue is rather controversial, as some works find no evidence that financial dollarization relates to banking crises or that firms with foreign currency liabilities experience balance sheet constraints after depreciation (Bleakley and Cowan, 2008; Christiano *et al*., 2021).

Salomao and Varela (2020) explored the effect of depreciation on firms' financial stability considering dollarization. The authors believe that foreign currency financing motivated by lower costs promotes higher capital accumulation in times of stable exchange rate. In turn, this allows companies to grow and become more resilient to shocks. So, these companies are able to overcome moderate depreciation shocks without significant reactions. In the case of substantial depreciation, the increase in debt servicing burden can undermine companies' solvency. So, the effect of depreciation on firms' default is non-monotonic.

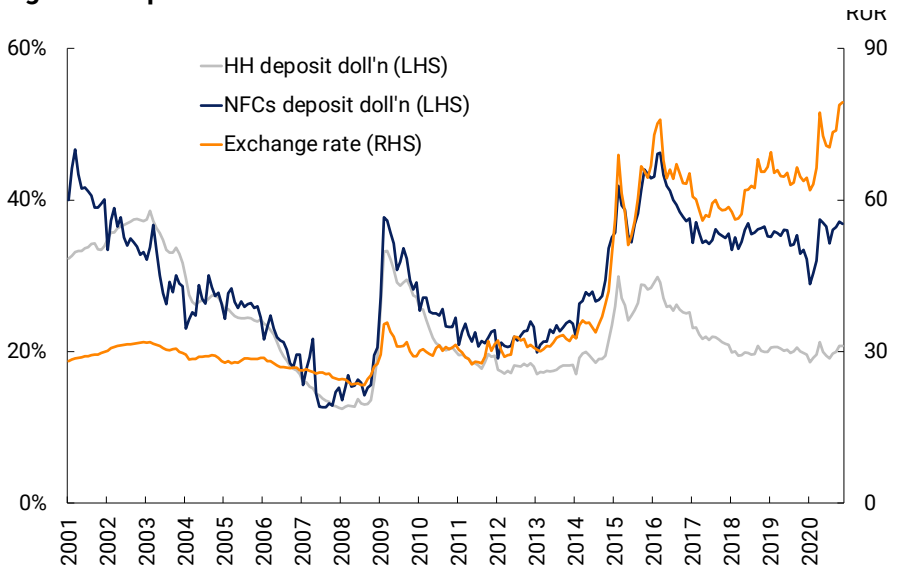
Burova *et al*. (2021) found support for efficient allocation of exchange rate risk within the Russian economy. Their framework suggests that companies that take more dollarized debt are the ones that are better suited to take the risk. Thus, the distribution of dollarized debt across Russian firms makes them more resilient to shocks.

Our paper contributes to the existing literature in several aspects. First, we use dollarization features mentioned above to critically overview dollarization developments during 2001-2020 in Russia. We further contribute by evaluating the available policy space subject to eligible lower bound (ELB). We use companies' financial statements to support our case-study findings about corporate hedging practices. Our paper adds to the literature of financial stability as we evaluate the net currency position and analyze probable reasons of currency mismatch in the sectors of the Russian economy; we also corroborate its main determinants.

3. Deposit dollarization and the hysteresis effect

Prior to 2015, the Bank of Russia had carried out a managed float exchange rate policy and conducted foreign exchange interventions to smooth exchange rate fluctuations (Figure 1). Initially, during the first two years of the floating exchange rate regime introduced in November 2014, an elevated exchange rate volatility was observed. However, changes in household deposits dollarization became less pronounced. Notably, the amount of foreign currency deposits denominated in USD remained stable after 2015. Deposit dollarization has increased mainly due to currency revaluation (Figure 2).[2]

Figure 2. Deposits dollarization



Source: Bank of Russia, authors' calculations.

We argue that the reaction of households to exchange rate changes weakens when the exchange rate dynamics becomes more uncertain. Presumably, the increased exchange rate volatility in 2015-2016 discouraged adaptive expectations of households and mitigated their reaction to exchange rate depreciations in Russia. The changes in deposit dollarization are associated with the expected yield differential that incorporates the *hysteresis effect* (Ponomarenko and Krupkina, 2017). The hysteresis effect is the collective memory about episodes of significant currency

[2] The exchange rate fluctuations are generally regarded as the driver of deposits dollarization, see Honohan (2007), Neanidis and Savva (2010).

depreciation in the past. To illustrate this point, we compare the dynamics of the expected deposit yield difference with adaptive exchange rate expectations and hysteresis effect (Equations 1-2).

Yield difference with adaptive exchange rate expectations:

$$\boldsymbol{Y_t = r_t^{RUR} - r_t^{U.S.dol.} - e_{t-1}}, \quad (1)$$

where:

$\boldsymbol{r_t^{RUR}}$ is the ruble deposit interest rate in period *t* (%);

$\boldsymbol{r_t^{U.S.dol.}}$ is the US dollars deposit interest rate in period *t* (%);

$\boldsymbol{e_{t-1}} = \frac{\boldsymbol{average(E_{t-1} \ldots E_{t-12}) - average(E_{t-13} \ldots E_{t-24})}}{\boldsymbol{average(E_{t-13} \ldots E_{t-24})}} * \boldsymbol{100\%}$ is the ruble depreciation rate (average exchange rate of 12 months of the current year versus the average exchange rate of 12 months of the previous year);

$\boldsymbol{E_t}$ is the nominal exchange rate in period *t*, in units of national currency per one unit of foreign currency (US dollar in our case).

Equation (1) assumes adaptive expectations about exchange rate path, which has been a plausible assumption in 2008-2014 when the Bank of Russia stick to a managed exchange rate strategy. After the transition to a floating exchange rate, depositors stopped forming adaptive expectations due to its high volatility and focused only on the difference in inflation targets as the "fair" ruble depreciation.

Yield difference with hysteresis effect:

$$\boldsymbol{Y_t = r_t^{RUR} - r_t^{U.S.dol.} - (1 - \beta) * e'_{t-1} - \beta * e_{t-1}^{max}}, \quad (2)$$

where:

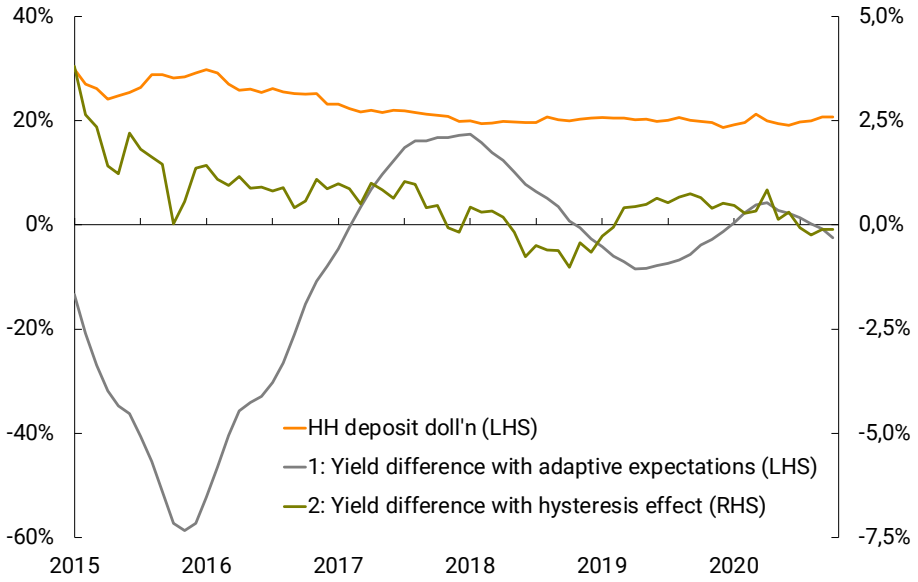
$\boldsymbol{e'_{t-1} = Infl.target_{RUS-USD}}$ = $\boldsymbol{4\% - 2\% = 2}$%, is the difference in inflation targets between Russia and the USA;

$\boldsymbol{e_{t-1}^{max} = max\{e_{t-1}, e_{t-2} \ldots e_{t-10\ years}\}}$, is the realized worst-case scenario of currency depreciation over the past 10 years.

Equation (2) assumes that the worst-case scenario will occur with probability *β*. We take *β* to be equal to 5% according to the findings of Ponomarenko and Krupkina (2017). We assume that memory about significant depreciations fades over time, a fading effect is set to 2% per year.

Figure 3 shows the difference in expected deposit yield based on the two concepts after 2015.[3] If depositors formed adaptive expectations (Fig. 3 grey line), the expected yield difference would have been more volatile. If depositors do not form adaptive expectations but remember the episodes of a significant ruble depreciation (hysteresis effect), their expected yield difference would have bounced around zero (Fig. 3 green line). Such depositors' behavior is consistent with the observed stability of the deposit dollarization level after the transition to a floating exchange rate regime in late 2014.

Figure 3. Expected deposit yield differences estimated with alternative assumptions



Source: Bank of Russia, authors' calculations.

In 2020, the expected yield difference with hysteresis effect was moving towards zero since August 2020.

With adaptive expectations, the expected deposit yield difference will continue to decline, which will potentially increase the preferences for foreign currency deposits. A high dollarization level can trigger a transition to a higher stationary state of dollarization in the presence of hysteresis effect. The financial dollarization level can adversely affect the monetary policy transmission mechanism: if the shares of foreign currency banks' assets and liabilities are high, banks are subject to foreign financial conditions. In that case, the national interest rate channel becomes a less efficient policy tool.
We evaluate the potential monetary policy space in the context of the eligible lower bound (ELB) using the following inputs:

- dollar deposits rate was equal to 0.7% in November 2020, which corresponds to the monthly average interest rate of new dollar deposits weighted by its amounts;

[3] The sources of information are the Reporting Form 0409129 "Weighted Average Interest Rates Funds offered by Credit Institutions" and Credit Institutions Survey.

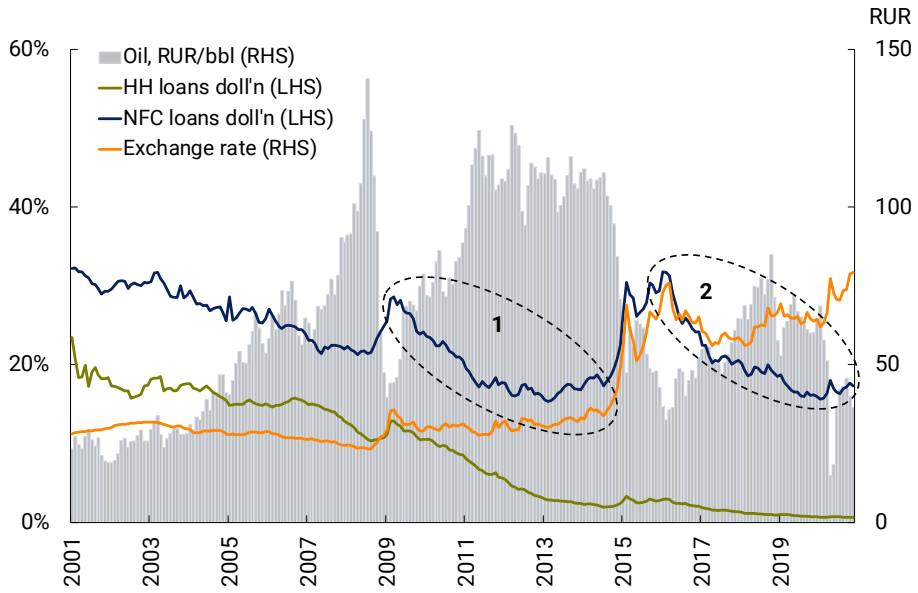
- maximum ruble depreciation rate was recorded in 2015 and reached 64.3% in annual terms;
- the difference in inflation targets in Russia and in USA is 2%.

The minimum *required* interest rate on ruble deposits then should be 3.8% (based on Eq. 2). As of December 1, the *actual* weighted average rate on ruble deposits was 3.6%, which is slightly below the minimum required rate. This may indicate a very limited monetary policy space as the risk of dollarization increases. Our approach, however, has some limitations. Among other things, we do not consider dollarization of other financial assets and the adjustment effect of portfolio composition.[4]

4. Loan dollarization

Loan dollarization is the next important aspect of financial dollarization. The share of loans denominated in foreign currency was historically lower for households (HH) than for NFCs. Besides, its level was less volatile and has been steadily declining (Figure 4). Corporate loan holders react not so much on exchange rate developments but rather on other macroeconomic factors (*e.g.* oil price). Ruble depreciation triggered a spike in loan dollarization in both 2009 and 2015. After the 2008 crisis, the loan dollarization level declined rapidly, probably signaling a lower willingness of NFCs to accept exchange rate risk (1st area in Figure 4).

Figure 4. Loans dollarization



Source: Bank of Russia, authors' calculations.

If a significant part of foreign currency assets of the banking sector represents claims on the domestic NFCs, it is subject to financial vulnerability. In 2016, the Bank of Russia implemented

[4] We do not consider how changes in the exchange rate affect the structure of the asset portfolio.

macroprudential policy measures aimed at reducing dollarization of assets of the banking sector (Figure 4, 2nd shaded area): risk weights of foreign currency loans to NFCs were increased. The same measure was applied to exposure to debt securities denominated in foreign currencies and to legal entities in cases of real estate purchases. Additional measures were taken to limit foreign currency loans in 2018. The capital risk weight was increased for real estate loans, for loans to exporters with insufficient foreign currency revenue, and for other liabilities denominated in foreign currency. As a result, lending in foreign currency decreased, mainly to NFCs representing the non-tradable sector with insufficient cash inflows to service foreign-currency denominated debt.

5. Balance-sheet analysis, currency mismatches and net foreign currency position

In this section we assess financial vulnerabilities of Russian economic sectors related to currency mismatch in the structure of assets and liabilities. Financial stability risks are present for economic agents with currency mismatches when foreign currency (FX) liabilities are not equal to foreign currency assets. Specifically, financial vulnerabilities emerge:

- in case of national currency depreciations, when FX liabilities exceed FX assets: increased FX liabilities cannot be covered by assets and national currency assets' ability to cover liabilities decreases;

- in case of national currency appreciations, when FX assets exceed FX liabilities: foreign currency difference between assets and liabilities shrinks and economic agents lose their FX safety cushion;

- a build-up of FX assets in the domestic economy does not necessarily decrease risks, as FX assets growth of one economic agent implies an increase of FX liabilities of other economic agent, and attempts to achieve significant excess of FX assets over FX liabilities can undermine financial stability of other sectors.

To estimate currency mismatches among sectors of the Russian economy we use balance sheet analysis as developed in Allen *et al*. (2002) and applied to the Russian data for 2000-2010 by Ponomarenko *et al.* (2013). The analysis is based on foreign currency assets and liabilities accounts for different sectors of the economy. We consider the following sectors:

- The private non-banking sector, including households (HH), non-financial corporations (NFCs), and other financial institutions (OFIs)

- The banking system:
    - Banking sector
    - Central bank

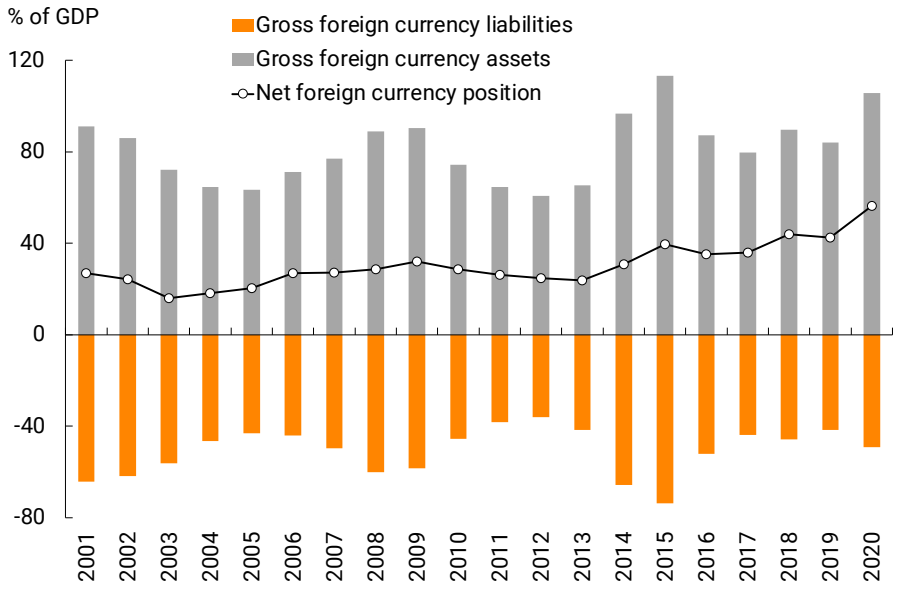
- The general government, including federal, state and local government.

We collected foreign currency assets and liabilities of the private non-banking sector, the banking system and the government for 2001-2020, and foreign currency assets and liabilities of the banking sector and the Central Bank for 2014-2020. We use the International Investment Position, External Debt statistics, Banking System Survey, Credit Institutions Survey and Central Bank Survey. We followed the balance sheets accounts approach in Ponomarenko *et al*. (2013) (for more details see the Appendix I). We also included external assets of the government and the Central Bank's claims on and liabilities to the government.

We construct the net foreign currency position defined as foreign currency assets minus foreign currency liabilities. We use a graphic illustration to show foreign currency assets, foreign currency liabilities, and the net foreign currency position. All foreign currency assets and liabilities are denominated in rubles, the figures show their ratio to GDP at current prices.

The **Russian economy** net foreign currency position has been positive and gradually increasing since 2001 (Figure 5). Absolute values of assets and liabilities reached local maximums in 2009, 2015, and 2020. We describe economic sectors separately. Note that fluctuations drivers changed over time.

Figure 5. Net foreign currency position of the Russian economy
(in percent of GDP)

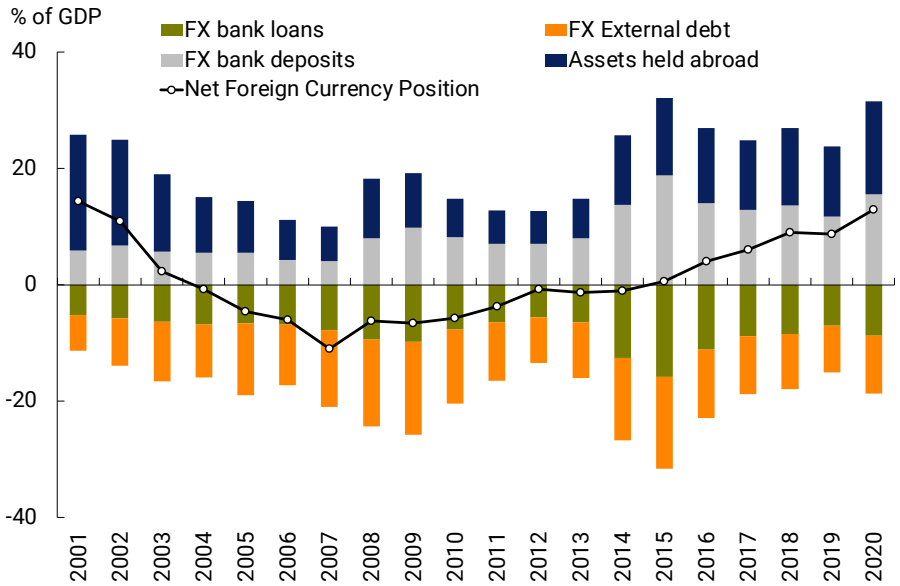


Source: Bank of Russia, authors' calculations.

The **private non-banking sector** net foreign currency position has been falling during 2001-2007 as the non-banking private sector reduced FX deposits and boosted foreign currency debt under the managed float exchange rate regime, benefiting from high oil prices (Figure 6). Russian exporters account for a large part of the non-banking sector use of foreign currency. Their foreign currency assets and liabilities dynamics are closely connected with the prices of exported goods, in particular, oil. The global financial crisis of 2008-2009 led to an increase in assets and liabilities

denominated in foreign currency. Since 2009, net position improved as HHs and NFCs de-dollarized their loans. In 2015, foreign currency assets and liabilities increased mainly because of currency revaluation. Macroprudential measures taken in 2016 and 2018 induced a further reduction of the share of foreign currency loans. The Bank of Russia increased the mandatory reserve requirements for credit institutions liabilities denominated in foreign currency and increased the risk weight of foreign currency loans. The redemptions of external debt and lower oil prices in 2016 had contributed to the contraction of non-financial corporations' deposits denominated in foreign currency (Bank of Russia, 2016).

Figure 6. Net foreign currency position of the private non-banking sector
(in percent of GDP)



Source: Bank of Russia, authors' calculations.

Currently, foreign currency assets exceed foreign currency liabilities. The same level of currency mismatch may be perceived differently depending on whether the borrower hedges against exchange rate depreciation or appreciation risk. We assume that currency mismatches are more acceptable for borrowers with foreign currency revenue (cash inflow) as oppose to foreign currency expenses (cash outflow). Particularly, exporting companies are more "naturally" hedged against exchange rate volatility due to a higher share of revenue denominated in foreign currencies (Ranciere *et al*., 2010).

We make a brief overview of both exporting and non-exporting companies and their relative exposure to exchange rate risk. Since the data on composition of foreign currency assets and liabilities is available in the form of non-standardized notes to the Financial Statements, we perform illustrative case studies using the opensource data on major public companies in Russia. We use the relevant information from their annual reports. We cannot compare companies using the change in profits attributable to exchange rate fluctuations, or net currency position. Instead, we use some relative measures of exposure to foreign exchange shocks that could be comparable at the

aggregate level. To do this we derive the exchange rate elasticity of profits from companies' financial reports and calculate a profit ratio to net currency position. For example, if profits of a company fall by 100 due to a 10% depreciation of the ruble, and its net foreign currency position is -1,000, then the ratio is set equal to 100/1,000 = 0.1 or 10%. In the case that the change in profits divided by the net currency position equals the initial change in the foreign exchange rate, we assume the absence of hedging instruments to cover the balance sheet risk of assets and liabilities revaluation.

Currency risk disclosed in financial statements is mainly attributable to foreign exchange loss related to currency-denominated borrowings (including short term debt and payable accounts), which is partially offset by the foreign exchange gain related to currency-denominated cash and trade receivables.

Integrated exporter companies (with more than 60% of revenues denominated in foreign currency), including oil and gas companies, mining, metals, chemicals and refineries, disclose the use of derivatives to manage the risk of currency appreciation (depreciation). Companies apply derivative financial instruments (including cross-currency interest swaps) to manage the risk by matching cash inflows denominated in foreign currency and financial liabilities denominated in national currency.

Next, we use financial reports of non-exporting companies to analyze the differences in their exposure to exchange rate shocks.

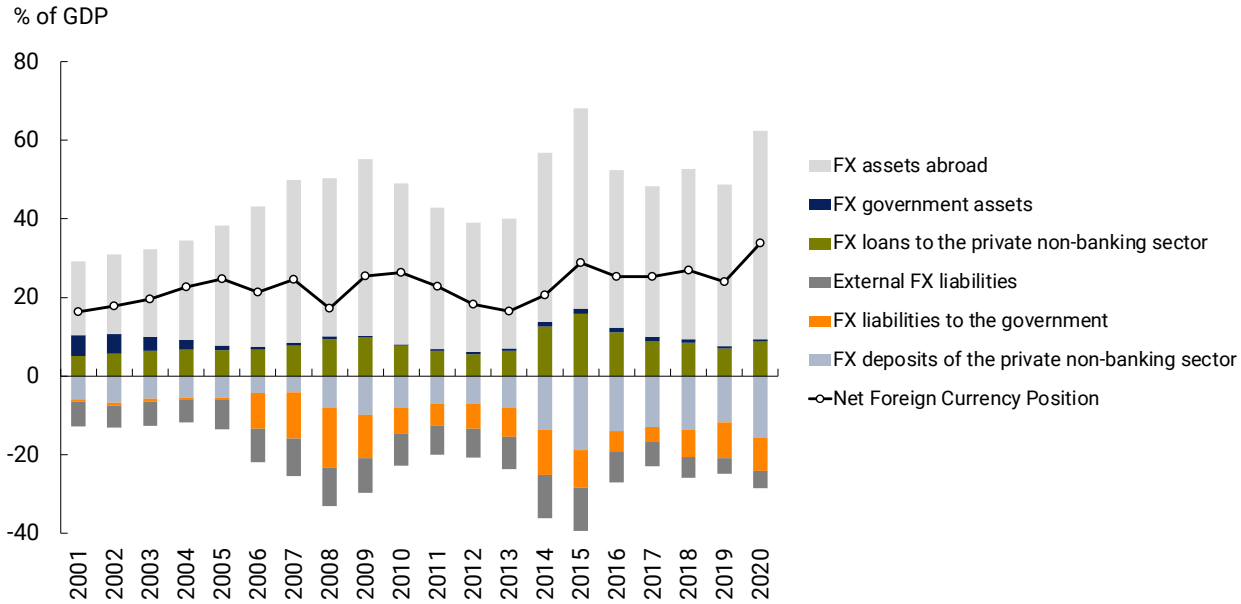
Companies with a significant share of fixed assets in lease (such as transportation companies), have the corresponding lease obligations (*i.e.* debt) on their balance sheets. Lease obligations denominated in foreign currency constitute a significant part of the overall foreign currency liability exposure. Since the dominant part of cash inflows of such companies are in rubles, financial stability risks should not be understated. Companies use FX derivatives to hedge FX risks.

Major retail companies tend to have a significant part of their working capital (*i.e.* inventory and payable accounts) denominated in foreign currency with the major part of revenues (and the corresponding receivable accounts) set in rubles. Companies in the retail industry mostly hedge foreign currency risk with foreign currency forward contracts (typically short-term, maturing within a year).

The sensitivity analysis performed on a case-by-case basis shows an average 16% loss in the net currency position with a 20% ruble depreciation scenario. With the observed sectoral heterogeneity, the exporting companies and non-exporting companies show comparable results on the aggregate level. This means that even if companies do not have enough income (cash inflow) in foreign currency, they use hedging instruments to cover foreign currency risk exposure. At the same time, exporting companies have a "natural hedge" for currency risks whereas non-exporting companies only use financial derivatives.

The **Banking system's** net foreign currency position was persistently positive, fluctuating in the range of 15-30% of GDP in 2001-2019, before increasing to 34% in 2020 (Figure 7). Within the banking system, we analyze the *Banking sector* (credit institutions) and the *Central Bank* separately.

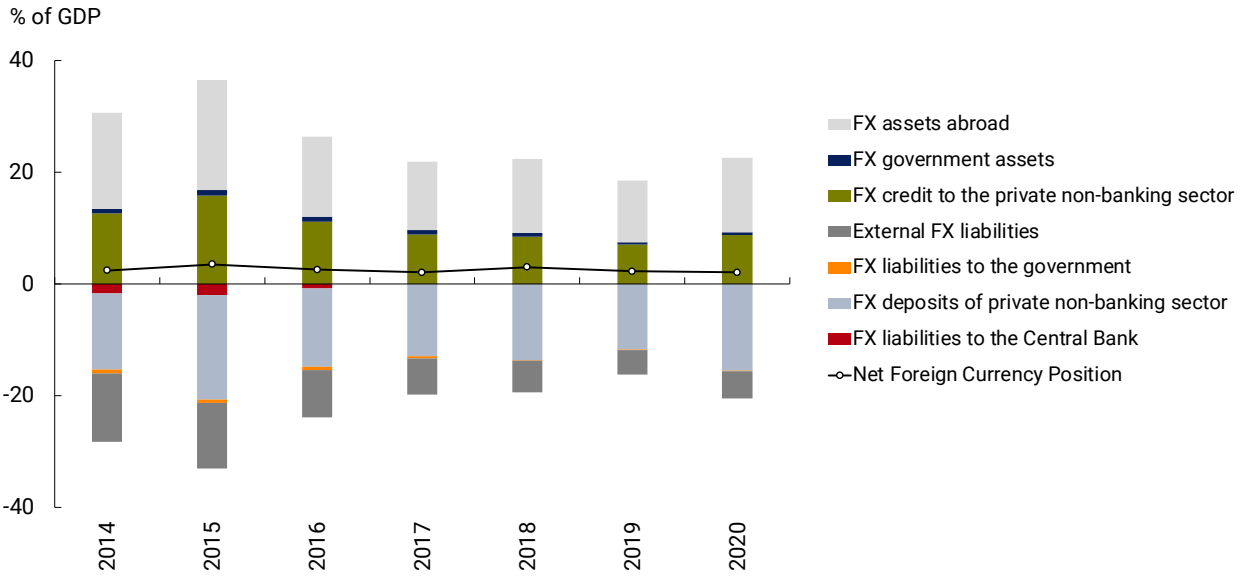
Figure 7. Net foreign currency position of the Banking system
(in percent of GDP)



Source: Bank of Russia, authors' calculations.

The **Banking sector** aggregate net foreign currency position is close to 0 as the Russian regulations set limits on the FX position on each currency (Figure 8).[5] Nevertheless, limiting open currency position may not be sufficient to eliminate currency risks due to maturity mismatch: the banking sector's FX assets may be less liquid compared with FX liabilities (Allen *et al.*, 2002).

Figure 8. Net foreign currency position of the Banking sector
(in percent of GDP)



Source: Bank of Russia, authors' calculations.

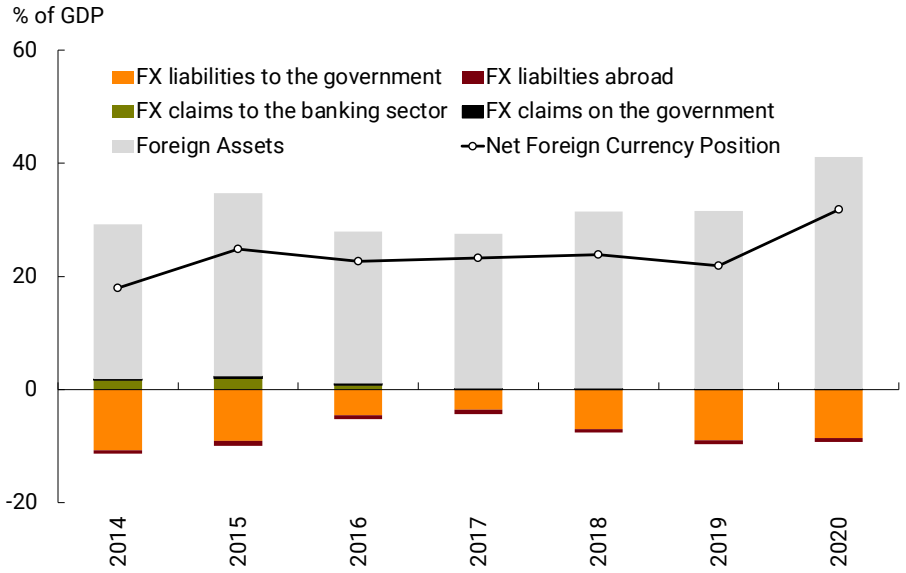
[5] According to the Bank of Russia's Instruction, the net FX position must be less than 10% of the credit institution capital.

Credit organizations can borrow foreign currency from the Central Bank to receive liquid funds during stress times. In 2014-2016, the Bank of Russia supplied liquidity through FX repo and swap agreements (shown as foreign currency liabilities to the Central Bank in Figure 9).

The Bank of Russia made FX purchases/sales on behalf of the Ministry of Finance in the domestic FX market. Purchases made in 2017 and in the first eight months of 2018 reduced foreign assets of credit institutions.[6] In light of the increased volatility of the ruble, the Bank of Russia suspended purchases in August of 2018. In 2019 the Bank of Russia resumed purchases and foreign assets of credit institutions declined further. In 2020 the Bank of Russia shifted from FX purchases to FX sales amid fallen oil prices in accordance with the fiscal rule. This contributed to the growth of banking sector financial assets. The Russian government places its foreign currency deposits mainly with the Bank of Russia (more than 90%). Thus, below we analyze government deposits.[7]

It is important to note that a significant national currency depreciation pushes credit institutions with currency mismatches towards leverage constraints. As a result, they face difficulties in meeting minimum capital requirements, which lead to their financial fragility. If credit organizations boost their foreign currency assets to meet the requirements, it implies a rise in FX liabilities of the non-banking private sector or the government. In case of a further ruble depreciation, the non-banking private sector would face increasing foreign currency debt pressures, and the overall financial stability risk would rise. Thus, mandatory limits of currency mismatches control for financial stability risks of individual credit organizations, but not for the whole economy.

Figure 9. Net foreign currency position of the Bank of Russia
(in percent of GDP)



Source: Bank of Russia, authors' calculations.

[6] The Ministry of Finance of the Russian Federation FX purchases (sales) in the domestic FX market: https://cbonds.ru/indexes/60425/.

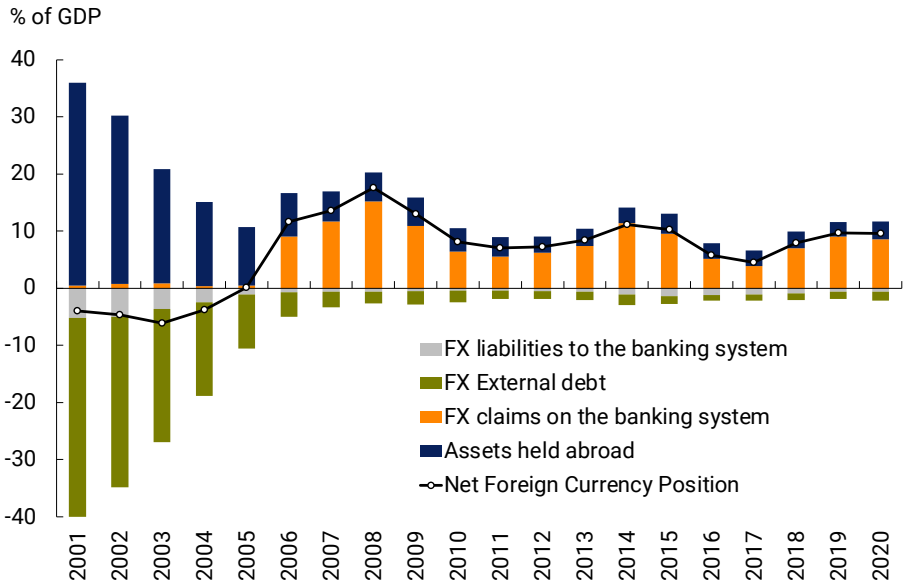
[7] Though ruble deposits are mostly placed on credit organizations' accounts.

Bank of Russia's net foreign currency position is largely determined by its international reserves and its FX liabilities to the government, mostly in the form of the National Wealth Fund (NWF) (Figure 9).[8]

A fall in oil prices in 2014 prompted a symmetric decline in reserves and FX liabilities to the government in 2015-2017, along with the partial withdrawal of funds from the NWF to finance a revenue gap. Further to the recovery in oil prices, fiscal rule-based foreign currency purchases increased both FX reserves and liabilities to the government in 2017-2019. A rise in foreign assets in 2020 is attributable to positive valuation effects from a USD weakening on non-USD reserves, including gold.

The Bank of Russia provided FX liquidity in 2014-2016 and we see non-zero value of claims to the banking sector at Figure 9. Foreign currency liabilities abroad reflect Special Drawing Rights (SDR) allocated to Russia and reported as loans.

Figure 10. Net foreign currency position of the government
(in percent of GDP)



Source: Bank of Russia, authors' calculations.

The **Russian government** has been holding a positive net FX position since 2007, primarily thanks to the build-up of the Stabilization Fund and a shift to borrowing predominantly in rubles (Figure 10).[9] The observed volatility in gross and net FX position between 2007 and 2020 stemmed from

[8] The National Wealth Fund of the Russian Federation was established to smooth federal budget expenditures through oil price cycles. The Fund's resources are used to finance expenditures when oil price falls below a cut-off price. A part of the NWF funds is placed in accounts of the Bank of Russia. It represents a component of foreign currency liabilities to the government in the form of accounts of the Federal Treasury (Figure 9). As already noted, the Bank of Russia makes purchases/sales of foreign currency on behalf of the Ministry of Finance in accordance with the fiscal rule.
[9] In 2008 the Stabilization Fund was split into the Reserve Fund and the National Welfare Fund.

a combination of the balance of the Stabilization Fund/NWF operations and changes in ruble exchange rate that affected the dollar equivalent of GDP (valuation effect).[10]

Before 2007, the net FX position has been largely determined by two opposite trends: the early repayments of Paris Club and International Monetary Fund debt, and the write-off of bilateral debt to Russia. The first trend reduced external foreign currency debt while the second trend decreased assets (mostly, FX) held abroad.

Besides non-residents, the government FX Eurobonds are also held by credit organizations and the Central Bank. They represent FX liabilities to the banking system at Figure 10. In 2002-2006, government FX Eurobonds volumes have been on a downward trend that decreased government FX liabilities to non-residents and the banking system, albeit on a smaller scale. The maximum amount of liabilities to the banking system was recorded in 2015 on the back of the ruble depreciation and a significant reduction of the stock of government Eurobonds held by non-residents.

Our findings indicate that the Russian economy has successfully build up its FX safety cushion after a series of economic turmoil episodes. The reduction of banks' balance sheets dollarization level and corporate external debt in recent years have reduced the vulnerability of the Russian economy to currency shocks. Nevertheless, sudden negative currency shocks that incorporate a fall of oil prices can reduce net foreign currency position of the government. This is due to the automatic tapping of the NWF in accordance with the fiscal rule to finance the fiscal deficit. Besides, currency mismatch risks remain relevant for the Russian economy.

6. Policy implications

For emerging market economies (EMEs) financial dollarization is a long-standing issue. Financial dollarization reflects substitution of *national* currency assets and liabilities by *foreign* currency assets and liabilities. Financial dollarization requires close attention by EMEs regulators, as it has important consequences for monetary policy and its efficiency: since foreign currency supply is out of EMEs control, a highly dollarized economy becomes more susceptive to changes in global financial conditions rather than to domestic monetary policy.

To foster de-dollarization, tighter monetary policy should be in place when the expected yield differential on domestic and foreign currency deposits is close to zero. Noteworthy, the expected yield differential incorporates the hysteresis effect: the collective memory about the episodes of significant currency depreciation in the past.

Adopting a floating exchange rate regime in 2014 in Russia stabilized rather than amplified fluctuations in dollarization. Higher volatility of the exchange rate in 2015-2016 did not prompt higher fluctuations of the dollarization level. Thus, the Russian case argues for the efficiency of inflation targeting policy in tackling both inflation and the financial dollarization problem. Carrying out a moderately tight monetary policy was necessary to achieve these results. Macroprudential

[10] Fund's resources were used when oil prices were low and accumulated when oil prices were high.

policy measures taken in Russia in 2016 and 2018 effectively reduced loan dollarization of the private non-banking sector. Banks reduced lending in foreign currency in particularly to NFCs from the non-tradable sector that had insufficient cash inflows to service foreign-currency denominated debt. Prudent fiscal policy within the framework of a fiscal rule has also made an important contribution to the overall macroeconomic policy success.

Thus, de-dollarization policies are most effective when they combine floating exchange rate, inflation targeting and macroprudential policies and are supported by a sustainable fiscal policy.

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Appendix I. Data sources

For the period 2001-2020

Table 1. Government

Assets	Liabilities
Assets held abroad *Source: International Investment Position of Russian Federation, Bank of Russia*	**External foreign currency debt** *Source: External Debt, External Sector Statistics, Bank of Russia*
Foreign currency bank deposits *Source: Banking System survey, Bank of Russia*	**Foreign currency bank loans** *Source: Banking System survey, Bank of Russia*

Table 2. The Banking system

Assets	Liabilities
Assets held abroad *Source: Banking System survey, Bank of Russia*	**External foreign currency liabilities** *Source: Banking System survey, Bank of Russia*
Foreign currency loans to the private non-banking sector *Source: Banking System survey, Bank of Russia*	**Foreign currency deposits of the private non-banking sector** *Source: Banking System survey, Bank of Russia*
Foreign currency government assets *Source: Banking System survey, Bank of Russia*	**Foreign currency liabilities to the government** *Source: Banking System survey, Bank of Russia*

Table 3. Private non-banking sector

Assets	Liabilities
Assets held abroad *Source: International Investment Position of Russian Federation, Bank of Russia*	**External foreign currency debt** *Source: External Debt, External Sector Statistics, Bank of Russia*
Foreign currency bank deposits *Source: Banking System survey, Bank of Russia*	**Foreign currency bank loans** *Source: Banking System survey, Bank of Russia*

For the period 2014-2020

Table 4. The Central Bank

Assets	Liabilities
Net foreign assets *Source: Central Bank Survey, Bank of Russia*	
Net foreign currency claims on the banking sector *Source: Credit Institutions survey, Bank of Russia*	
Foreign currency claims on the government *Source: Central Bank Survey, Bank of Russia*	**Foreign currency liabilities to the government** *Source: Central Bank Survey, Bank of Russia*

Table 5. The Banking sector

Assets	Liabilities
Assets held abroad	**External foreign currency liabilities**
Source: Credit institutions survey, Bank of Russia	*Source: Credit institutions survey, Bank of Russia*
Foreign currency loans to the private non-banking sector	**Foreign currency deposits of the private non-banking sector**
Source: Credit institutions survey, Bank of Russia	*Source: Credit institutions survey, Bank of Russia*
Foreign currency government assets	**Foreign currency liabilities to the government**
Source: Credit institutions survey, Bank of Russia	*Source: Credit institutions survey, Bank of Russia*
	Net foreign currency liabilities to the Central Bank
	Source: Credit institutions survey, Bank of Russia