can affect the profitability of banks, especially when they hold a large share of foreign currency-denominated assets and liabilities. Banks may also engage in currency speculation to hedge against exchange rate risk, which can further fuel currency substitution.

Therefore, policymakers and central banks need to carefully consider the effects of interest rate differentials and exchange rate changes on the banking sector and the wider economy when implementing monetary and financial policies.

4.2. Investigating the dynamics and structural characteristics of financial dollarization in Ukraine

The financial sector is a critical component of the economy, and its stability plays a crucial role in the economic development of a country. One of the significant concerns for policymakers is the degree of financial dollarization, particularly in emerging economies. Ukraine is such an economy where the level of dollarization in

the banking system has been a persistent issue, impacting its economic stability and growth prospects.

In Figure 2.1. the dynamics of dollarization of deposits and loans to the residents (except for deposit corporations) are presented. The dynamics of deposit and loan dollarization in Ukraine have been a topic of concern for macroprudential regulators and researchers alike. The dollarization in the crisis years 2008-2009 (with the deposit dollarization reaching 50% and the loan dollarization of 59.1%) heavily influenced the economy of the country. The war on East of the country caused the deepening of the crises and increased the levels of dollarization in 2015 with deposit dolarization of 58.8% and loan dollarization 59.8%. However, since then, it was observed the record decrease of dollarization, which was, to our mind, influenced by the implementation of effective monetary policy, especially regarding inflation targeting. Besides, the experience from previous crisis periods, particularly the high currency risk, made hryvnia-denominated loans more attractive compared to foreign currency loans. As of February 2022, the amount of loans in foreign currency has fallen to 30%, and the share of deposits in foreign currency reached 36%.

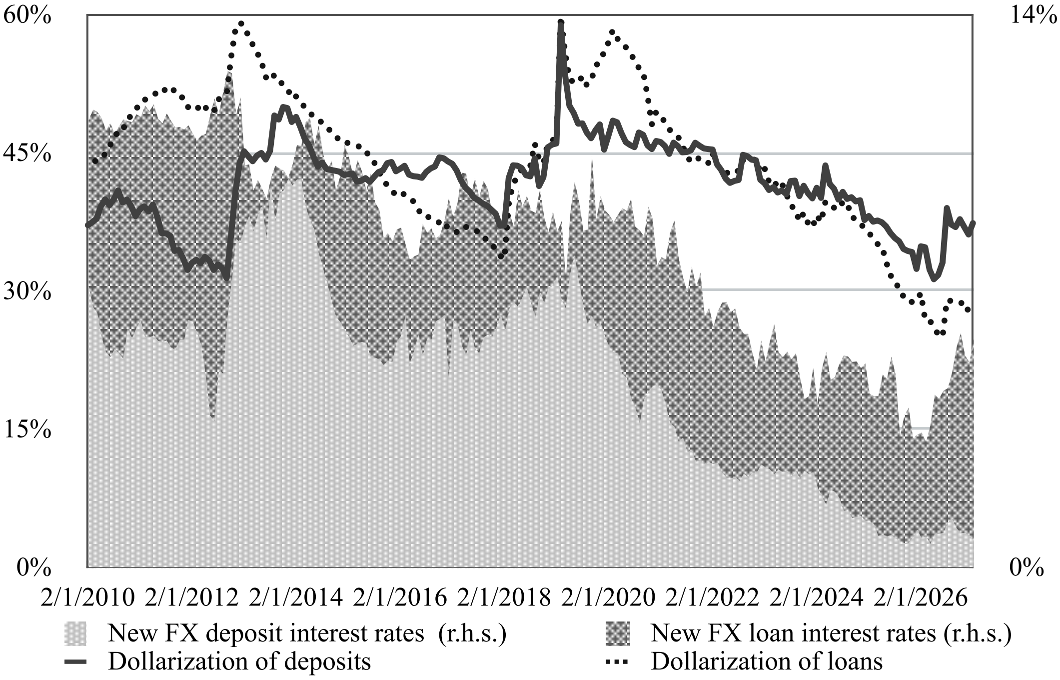

Figure 4.1. Share of FX loans and deposits from 2006 till 2022

Source: developed by authors based on data [7, 8]

Since the beginning of the full-scale invasion, NBU implemented measures that limited the rapid increase of DD and LD, as could have been expected based on the experience of the previous crises.

Fixation of the official UAH/USD exchange rate and foreign exchange restrictions developed and introduced by the NBU right after the beginning of the full-scale invasion, prevented the national currency depreciation and protected banks from foreign exchange deposit outflows. However, these temporary restrictions had limited effect and in the second half of 2022 LD and DD started to grow and reached their prewar levels. Partially such an increase in DD can be explained by hryvnia depreciation, as a response to the corrected fixed exchange rate of UAH to USD.

According to Banking Sector Review, the share of foreign exchange retail deposits remained almost unchanged in Q4 2022 (see Figure 4.2). The dollarization of corporate loans dropped by 3.6 pp in Q4 due to large inflows of hryvnia deposits.

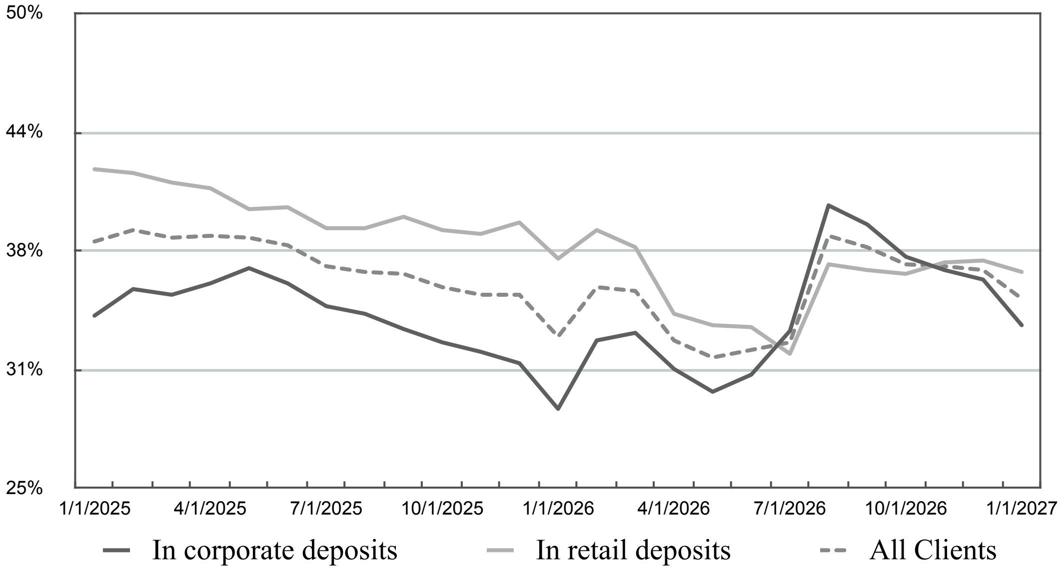

Figure 4.2. Share of FX deposits from 2021 till 2022 as of the end of the month by type of economic agents

Source: developed by authors based on data [8]

In the meantime, over the last quarter of 2022 foreign exchange term deposits grew more rapidly than those in the hryvnia (see Figure 2.4).

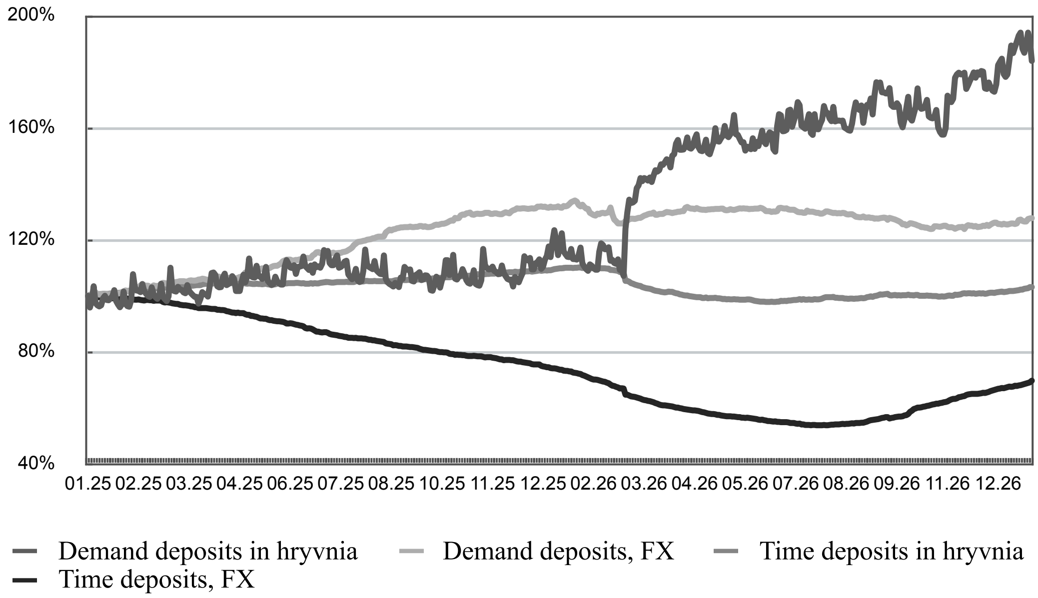

Figure 4.3. Daily retail deposits, 2020 = 100%

Source: developed by authors based on data [7, 8]

In the first half of 2022, the volume of hryvnia corporate loans increased due to government credit support programs and the foreign exchange corporate lending decreased. Volumes of foreign exchange lending decreased with higher probabilities of non-performing loan repayments due to higher credit and currency risks. In 4Q 2022 hryvnia loans declined by 6,7% qoq, and foreign exchange loans by 5,2% qoq in dollar terms (see Figure 4.4). Corporate net loan portfolio in hryvnia decreased among all groups of banks. NBU states that the decline in the volume of the net hryvnia retail loan portfolio in Q4 was primarily in foreign and private banks due to the increase in provisions against credit losses.

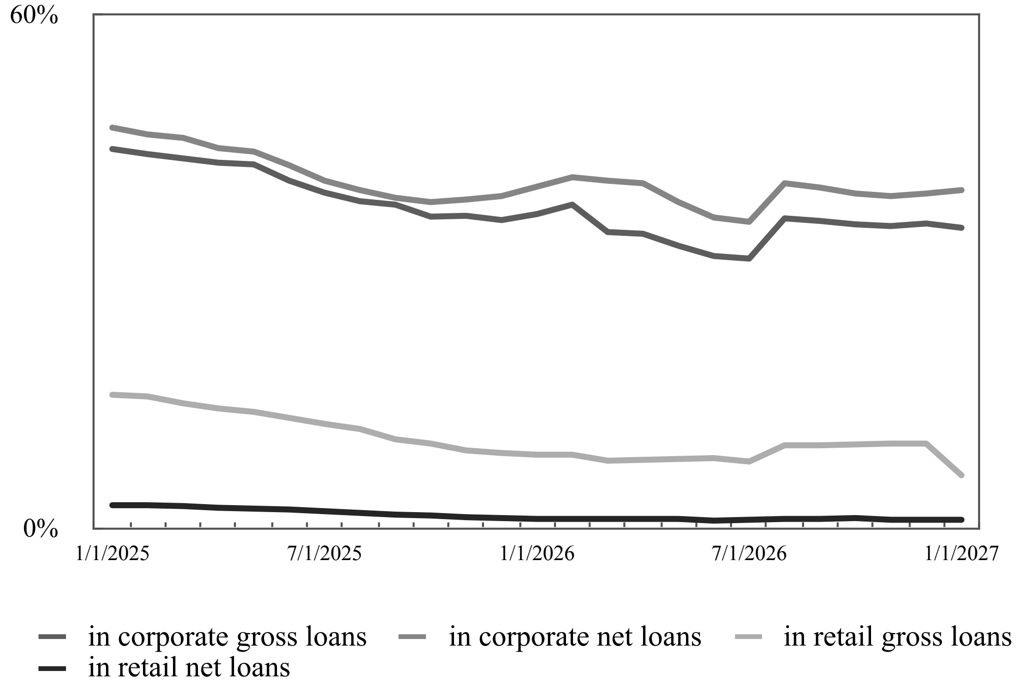

Figure 4.4. Share of FX loans (gross and net) from December 2019 till December 2022 as of the end of the month, by type of borrower

Source: developed by authors based on data [7, 8]

In conclusion, the statistical analysis conducted revealed the significant impact of high deposit and loan dollarization levels on Ukraine's financial system during crisis years and remains a concern for regulators and researchers. The NBU's measures limited the risks of rapid increases in deposit dollarization and loans dollarization by influencing both clients and banks. The government's credit support programs stimulated hryvnia corporate lending, leading to a decrease in foreign exchange lending due to the increase in credit and currency risks. State-owned banks continue to have high dollarization rates, primarily due to their business models.

Despite all the efforts of the NBU to minimize the level of dollarization, it is impossible to eliminate it completely, and it is impractical, because it is possible to isolate the country from international trade. It is necessary to maintain dollarization at a natural level, at which benefits losses prevail from it [9]. In Ukraine this level should be in the range of 20–30% as a medium-term benchmark of the regulator's economic policy [2].

4.3. Modeling and analysis of financial dollarization phenomena

Financial dollarization, or the use of foreign currency for deposits and loans, is a significant issue for many economies, as it can lead to increased volatility and risks to financial stability. To better understand and analyze the drivers and consequences of dollarization, econometric models are often used. These models offer a systematic approach to understanding the drivers and consequences of dollarization by quantifying the relationships between various economic variables. Econometric models can simulate different scenarios to evaluate the effectiveness of potential policy interventions aimed at reducing dollarization levels, such as changes in monetary policy or regulatory adjustments. So, by leveraging such econometric models, policymakers, researchers, and financial analysts can gain deeper insights into the phenomenon of dollarization, devise strategies to manage its effects, and make informed decisions to enhance economic stability and performance.

However, due to the interdependence of variables such as deposit and loan dollarization, using separate econometric equations can lead to biased and inconsistent estimates. Therefore, a system of simultaneous equations is more appropriate for analyzing the dynamics of dollarization, as it accounts for the feedback effects and interrelatedness of the variables. To fully understand and estimate the complex interrelationships between the different variables affecting financial dollarization, it is important to utilize the system of simultaneous equations, which is better suited to capture the interdependent nature of the economic system and provide a more accurate and comprehensive analysis of the issue.

A system of simultaneous equations is a powerful tool in econometrics that allows for the analysis of complex economic relationships between multiple variables. One of the key benefits of this approach is that it can provide a more