

# Analysis of Bank Stability and Profitability in the Eurasian Economic Union

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DISSERTATION

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**ANALYSIS OF BANK STABILITY AND PROFITABILITY  
IN THE EURASIAN ECONOMIC UNION**

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Japan  
2018

## Thesis Declaration

I, Olga Pak, declare that the thesis titled “ANALYSIS OF BANK STABILITY AND PROFITABILITY IN THE EURASIAN ECONOMIC UNION” submitted in the partial fulfillment of the requirements for the degree of *Doctor of Philosophy* at Kyushu University, the Graduate School of Economics.

I declare that this thesis was composed by myself and that this work has not been submitted for any other degree or diploma at a university or other institution of higher education.

I declare that the thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.

I declare that material covered in Section 1.3 of Chapter 1 and Chapter 3 has been previously published in Pak, O. (2018b). The Impact of State Ownership and Business Models on Bank Stability: Empirical Evidence from the Eurasian Economic Union. *The Quarterly Review of Economics and Finance*, forthcoming. The part of Appendix B related to Kazakhstan has been previously published in Pak, O. (2018a). Business Drivers of Bank Stability in Kazakhstan. *Review of Integrative Business and Economics Research*, Vol. 7, No. 1, pp. 1-15.

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*Olga Pak*

*This doctoral dissertation is devoted to my parents  
Vladislav Pak and Svetlana Khvan*

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## List of Abbreviations

AASF	Available Amount of Stable Funding
ADF	Augmented Dickey Fuller test
BHC	Bank Holding Company
BCBS	Basel Committee on Banking Supervision
BIS	Bank of International Settlement
CBR	Central Bank of Russia
CEE	Central and Eastern European countries
CET 1	Common Equity Tier 1
CRD IV	Capital Requirements Directive IV
CRR	Capital Requirements Regulation
DGMM	Dynamic GMM (Arellano and Bond, 1991)
DGSD	Deposit Guarantee Scheme Directive
EAEU	Eurasian Economic Union
ECB	European Central Bank
EDIS	European Deposit Insurance Scheme
EC	European Commission
EEC	European Economic Community
EMU	European and Monetary Union
EU	European Union
FDIs	Foreign Direct Investments
FSAP	Financial Services Action Plan
GDP	Gross Domestic Product
GFC	Global Financial Crisis
GMM	Generalized Method of Moments
HHI	Herfindahl-Hirschman Index
ICAAP	Internal Capital Adequacy Assessment Process
IFRS	International Financial Reporting Standards
ILAAP	Internal Liquidity Adequacy Assessment Process
IMA	Internal Measurement Approach
IQR	Interquartile Range
IRBA	Internal Rating-Based Approach
LLPs	Loan Loss Provisions
LLRs	Loan Loss Reserves
LCR	Liquidity Coverage Ratio
LTD	Loan to Deposit
M&As	Mergers and Acquisitions
NBK	National Bank of Kazakhstan
NBRB	National Bank of the Republic of Belarus
NIM	Net Interest Margin
Non-II	Non-Interest Income
NPLs	Non-Performing Loans
NSFR	Net Stable Funding Ratio
PP	Phillips-Perron test

RASF	Required Amount of Stable Funding
RCAP	Regulatory Consistency Assessment Programme
ROE	Return on Equity
ROA	Return on Assets
RWAs	Risk-Weighted Assets
SA	Standardized Approach
SGMM	System GMM (Arellano and Bover, 1995; Blundell and Bond, 1998)
SIBs	Systemically Important Banks
SMP	Single Market Program
SPER	Supervisory Review and Evaluation Process
SRM	Single Resolution Mechanism
SSM	Single Supervisory Mechanism
TCR	Total Capitalization Ratio
TOR	Total Operating Revenue

## INTRODUCTION

The global financial crisis initiated a new wave of integration processes around the world as countries strove to strengthen their economies through shared resources and assets. The Eurasian Economic Union (EAEU) emerged from the Custom Union of the Russian Federation, the Republic of Kazakhstan and the Republic of Belarus.<sup>1</sup> The Treaty on the EAEU (the Treaty) was signed on 29 May 2014 in Astana, Kazakhstan, by the presidents of the three founding states and came in force on 1 January 2015. The Republic of Armenia and the Kyrgyz Republic became full-fledged members of the EAEU on 2 January 2015 and on 12 August 2015 respectively.

This thesis analyzes a specific aspect of this economic integration – the formation of the single market for financial services in the EAEU by 2025.

Independent Russian, Kazakhstani and Belarusian banking systems arose from the collapse of the Soviet Union in December 1991. They have gone through massive post-soviet structural reforms, transitioning from a stated-owned mono banking structure to a two-tier banking system comprised of a central bank and commercial credit institutions. The establishment of the EAEU has initiated a new era of transition to integrated regional markets. However, in the aftermath of the financial crisis, adverse oil price dynamics and new sanctions imposed on Russia, Eurasian regional economies have experienced a downturn. It is expected that the economic and financial integration will release the regional economies' potential and contribute to their development. The EAEU project, however, depends on many factors. One of the critical prerequisites for successful economic integration of EAEU member states is financial stability at both the country and regional levels.<sup>2</sup> Therefore, this research work aims to provide a comprehensive assessment of EAEU banking sectors' stability prior to the integration and pursues the following three objectives:

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<sup>1</sup> The Eurasian Custom Union of Russia, Kazakhstan and Belarus came in force on 1 January 2010 with the aim to remove trade barriers and facilitate trading among member states.

<sup>2</sup> The definition of financial stability in this research work is narrowed to banking stability.

1. It compares banking sectors' structures, regulatory frameworks and key stability indicators of Russia, Kazakhstan and Belarus (the post-soviet countries at early stage of integration) for identification of discrepancies that may hinder the creation of a common market for financial services. The banking sectors of the Central and Eastern European and Baltic States (the post-soviet countries at late stage of integration) and the European regulatory framework are used as a benchmark to draw inferences on banking development in the EAEU through the integration. The assessment of key stability indicators helps reveal risks accumulated by each EAEU banking sector before the integration processes began. These risks should be urgently addressed by national regulators prior to financial integration in order to prevent their dissemination in other member states.
2. It aims to fulfill the gap in the empirical literature on emergent markets. First, the banking sectors of EAEU founding states mainly consist of unlisted credit institutions, whereas most prior studies from developed countries use samples of listed banks or international samples of large banks. This may significantly influence the empirical results. Second, there is no consensus in the empirical literature on the impact of business models on banking stability and profitability. It is indicated that the effect depends on some initial conditions such as a level of bank capitalization, bank size or business focus. Therefore, the findings from advanced countries can not be directly generalized for economies in transition since they operate under different institutional settings, regulations and economic environments.
3. It contributes to the design of effective banking regulation in the EAEU. The implementation of Basel III liquidity requirements inevitably leads to balance sheets' reshaping, which in turn may adversely affect bank profitability and financial strength. This is the first study that calculates the Net Stable Funding Ratio (NSFR) for EAEU banks using public bank data. The analysis of the Basel III NSFR, its business determinants and the effect of the NSFR on bank profitability is quite new even for advanced economies. The research work also contributes to a scarce scope of studies on systemically important financial institutions. There is no comparative analysis on regulation of systemically important banks in the EAEU. Moreover, there is no

research work that directly measures the effect of systemic importance on bank profitability.

The vast scope of research highlights the importance of financial integration for financial development and economic growth.<sup>3</sup> Giannetti et al. (2002), Volz (2004), Jappelli and Pagano (2008) outline several major channels, through which financial integration facilitates financial development in the EU. Financial integration increases the depth, liquidity and transparency of financial markets, which allow a better diversification of risks and a wider choice of financial products including ownership of assets across borders. The increased competitive pressure from more technologically advanced foreign banks reduces the cost of financial intermediation in countries with less developed financial systems and stimulates financial innovations. Financial integration also improves comparability and reliability of financial services between member states through harmonization and enforcement of domestic regulations according to best practices. This, in turn, positively contributes to their financial development. Monti (2010) notes that the creation of a single capital market and a single market for financial services are crucial drivers of the EU economic development and stability. The Five Presidents' report (2015) outlines three stages towards a genuine European Economic and Monetary Union. The foremost step requires completing the Financial Union comprising the Banking Union and the Capital Markets Union.<sup>4</sup>

The European Union (EU) continues to remain the leading model of the flexible multi-tier economic integration that includes the EU single market and the Eurozone single currency. The EU's successes and challenges throughout its evolution suggest important lessons for all other economic alliances regardless of differences in their economic and/or political settings (Cameron, 2010). The EU experiment has shown that

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<sup>3</sup> See London Economics (2002), Giannetti et al., (2002), Jappelli and Pagano (2008) for the surveys of studies on financial integration, financial development and economic growth.

<sup>4</sup> The Banking Union is a new regulatory and supervisory system of the EU area banks (and other future members) executed at micro and macro levels under a single rulebook. The single rulebook ensures that legal and administrative rules are applied consistently across all EU countries. The Capital Markets Union aims to deepen the financial integration by developing capital investments and complementing bank financing with more diversified funding sources.



an intensive economic integration, not accompanied with corresponding strengthening of the EU financial system and regulation, eventually led to fragility of many European credit institutions. In response, the Basel Committee on Banking Supervision (BCBS) introduced new post-crisis capitalization and liquidity standards to enhance resilience of banks and banking systems. This thesis refers to BCBS Basel III regulatory framework, which remains the only valid benchmark for measuring developments in the EAEU banking regulations. Indeed, Annex 17 (Article 22) to the Treaty states that “*In the banking sector, the Member States shall harmonize requirements for the regulation of and supervision over credit institutions guided by international best practices and the Core Principles for Effective Banking Supervision of the Basel Committee on Banking Supervision*”.

The thesis structure and major findings are presented next. Chapter 1 reviews the empirical and regulatory literature related to several complement areas of research. *First scope* of the literature defines financial integration and discusses its benefits and costs for economic development. The brief review of financial integration in Europe provides insight into its historical background and ongoing integration processes as well drawing important lessons from the EU experience. Since the stability of the financial sector is a critical condition for future success in financial and economic integration, *the second scope* of the literature reviews the most common measures of bank risk-taking.<sup>5</sup> This is followed by discussion of the research works that have studied the relationship between bank business choices and selected stability indicators. *The third scope* of the literature analyzes profitability as an important metric of bank stability. The relationship between bank profitability, funding liquidity, systemic importance and other internal and external factors are discussed next. The chapter concludes with presenting major gaps in empirical and regulatory research in the context of emerging EAEU economies.

Chapter 2 examines the banking sectors of Russia, Kazakhstan and Belarus in order to understand preliminary conditions on which a single financial market will be based. The practical contributions are derived from the following three dimensions. *First*,

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<sup>5</sup> In this research work, bank risk-taking is used as an inverse term for bank stability.

the comparison of EAEU banking sectors' structures prior to integration reveals a low level of foreign ownership and the dominance of state-controlled banks. Although CEE and Baltic banking sectors shared similar features during their first years of sovereignty, they have changed dramatically through the integration processes with the EU. In particular, current CEE and Baltic States are characterized by the greater presence of foreign banks (except for Slovenia and Latvia), a low level of public ownership (except for Slovenia) and above average competition (except for Estonia and Lithuania). Within the EAEU, significant heterogeneity of banking sectors is still observed in terms of capacity, ownership and concentration. This thesis posits that the removal of cross-border barriers for financial services will reinforce Russian banks' power in the smaller EAEU countries. Harsh cross-border competition will lead to a decrease in a market share of state banks and facilitate further consolidation of the banking sectors; however, it may also harm the stability of some financial institutions. *Second*, the enhancement and harmonization of banking regulations and supervisory practices are critical starting points for moving to a single market for financial services. This thesis reports that the degree of legislative conversions in the banking sectors of member countries remains weak. Russian banks' regulation is more advanced and compliant with Basel III capitalization and liquidity standards. Kazakhstani and Belarusian banks' regulations are still behind in terms of advanced risk management and mitigation tools, supervisory oversight, and information disclosure recommended by Basel III. *Third*, the analysis of the key stability indicators reveals national imbalances in accumulated bank risks: Belarusian banks operate at the lowest net interest margin; Russian banks are exposed to a greater structural liquidity risk; whereas Kazakhstani banks report sizable credit losses. Unless the regulation is strengthened and appropriate prudential tools to control bank risks are properly set, financial integration may facilitate a spillover of risks across national borders and threaten financial stability of the EAEU.

Chapter 3 conducts an empirical investigation of banking stability in the EAEU founding states. The recent financial crisis clearly showed that banks failed due to two major problems: capital inadequacy against asset risks and improper liquidity management. We analyze the effect of ownership and business models on financial and

funding stability of banks in the EAEU. The Z-score serves as a proxy for bank financial stability, whereas the Basel III NSFR is a measure of bank funding stability. The analysis is performed separately for state, foreign and private banks and at both the country and regional levels. The fixed and random panel data methodology and the Generalized Method of Moments with a fixed effect are applied to analyze the data. State ownership is concluded to be strongly associated with a lower likelihood of bank defaults and mitigates the destabilizing effect of sanctions. The impact of sanctions on state and foreign banks is not material, whereas private banks experience negative impacts of sanctions on their financial stability. It appears that sanctions undermined public trust in private banks and triggered an outflow of deposits to “safer” state-owned credit institutions. In terms of business models, bank financial stability deteriorates with larger size and lending growth but improves with greater short-term borrowing and capitalization. Evidence is also provided that the funding stability of EAEU banks does not depend on state ownership. Moreover, the funding liquidity of the Russian and Belarusian banks is negatively affected by sanctions, whereas there is no effect of sanctions on Kazakhstani banks’ NSFR. Overall, enhanced capitalization and less reliance on short-term borrowing improve the weak structural liquidity of EAEU banks.

Chapter 4 expands the empirical analysis on the EAEU banking stability by introducing two additional research questions. First, we investigate whether the introduction of the NSFR affects profitability of EAEU banks. Profit persistence in a banking sector is a vital component of bank stability as weak profitability constrains bank growth through retained earnings, increases the cost of funding and shortens time for banks to use their capital to cover asset losses. Second, we explore whether the profitability of banks depends on their systemic importance. A variable of systemically important status is added to the full EAEU bank sample. The analysis is also performed across the subsamples of systemically important and non-systemically important banks. Arellano and Bover (1995), Blundell and Bond (1998) dynamic system Generalized Method of Moments is used to analyze the data. This methodology is the most appropriate as it deals with several important econometrical issues arisen from the model and dataset. The results report a strong degree of stability of the Net interest margin and a lack of

persistence in the Return on assets of EAEU banks. The findings confirm the critical role of traditional interest-generating activities for maintaining bank profitability and stability in the region. This chapter shows that implementation of the NSFR will negatively influence the interest margins of Eurasian banks. The absence of the effect for systemically important banks is explained by the fact that these banks have not to date adjusted their NSFRs to the required threshold. Moreover, the systemic status of EAEU banks is associated with poorer profitability in terms of interest margin, but it does not significantly influence Return on assets. The result suggests that systemically important banks should be subject to tighter capital and liquidity regulation as their profitability is not sustainable to support their operations. We also find that Western sanctions have adversely affected the Net interest margin of Russian banks and are not material with respect to Return on assets.

The conclusion emphasizes the contribution of this doctoral thesis to the empirical and regulatory research. It summarizes the new academic findings and suggests their possible implications for effective design of the banking regulation in the EAEU. The thesis closes by suggesting areas for future research.

## CHAPTER 1 Analysis of Empirical and Regulatory Literature

### 1.1 The concept of financial integration

#### 1.1.1 Definition of financial integration

The concept of financial integration relies on the law of one price. It implies that financial instruments with identical cash flows and risks should have the same prices regardless of the place of transaction. Similarly, the costs of financial intermediation should be identical irrespective of bank location. However, transaction costs and other market frictions distort the law of one price (Baele et al. 2004). London economics (2002, p. 12) broadly defines the financial integration as a process of “making formerly regionally separate financial markets work as a single integrated market,” where financial markets include equity market, bond market and the banking sector. Jappelli and Pagano (2008) point out several barriers for reaching a single market for financial services:

- *Differences in currencies* require a risk premium for financial instruments denominated in foreign currencies and induce additional transaction costs from currency conversion.
- *Differences in taxes* affect the after-tax cost of debt. Asymmetric tax treatment creates exogenous friction that affects valuation of debt instruments, which in turn, contribute to capital markets’ segmentation. Pirinsky and Wang (2011) confirm that the cost of financial intermediation (measured by underwriting fee and mutual fund expense ratios) significantly higher at the segmented markets.
- *Differences in financial markets’ operations* (trading, settlement systems, and issuance policies) impede securities trading across national borders, inhibit arbitrage forces to restore the law of one price and limit diversification opportunities.
- *Differences in regulation, enforcement and information disclosure* deepen asymmetric information that constrain the flow of foreign investments in domestic financial markets, restrain financial institutions from competing across borders and create barriers for foreign banks’ entry.

Baele et al. (2004) provide the most comprehensive definition of financial integration. The authors state that the financial markets and services are *fully integrated* if three sets of characteristics are simultaneously applicable for market participants:

- *Common rules* are applied when market participants decide to deal with financial instruments and services. Full integration could be achieved in markets with heterogeneous financial structures if they are governed by a single set of principles.
- *Equal access* to financial instruments and services is granted regardless of the market participants' region of origin. Full integration assumes nondiscriminatory flow of foreign investments and access to international borrowing, which require elimination of restrictions for cross-border operations.
- *Fair treatment* of all active market participants is ensured. Full integration can be achieved in the presence of frictions as long as these frictions affect market players symmetrically.

Jappelli and Pagano (2008) also highlight that under *full integration* a level of financial development should be measured by the size of the integrated area rather than a segmented financial market of an individual member state.

### **1.1.2 Benefits of financial integration**

The vast scope of literature highlights the crucial importance of financial integration for financial development, which, in turn, facilitates economic growth (Bekaert et al. 2005).<sup>6</sup> The early work of Levin (1997) provides an evidence of a strong positive link between the measures of financial development and the indicators of economic growth using a sample from 77 countries (the author, however, restrains to conclude on causality of this relationship). London Economics (2002) states that the European financial integration brings substantial benefits for financial markets, consumers and corporates. First, financial integration increases market competition, which, in turn, lowers transaction costs and stimulates technological innovations. Second,

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<sup>6</sup> See London Economics (2002), Giannetti et al., (2002), Jappelli and Pagano (2008) for the surveys of studies on financial integration, financial development and economic growth.

financial integration increases depth, liquidity and transparency of financial markets, which allow for better diversification of risks through a wider choice of financial products (including ownership of assets across borders). Baele et al. (2004, p. 7) highlight three benefits of financial integration: more opportunities for risk sharing, more efficient asset allocation and a higher potential growth of an integrated economy. Baele et al. (2004, p. 10) also state that financial integration leads to changes in the existing financial structures and overall financial stability. For instance, more aggressive competition may harm sustainability of some financial intermediaries. Giannetti et al. (2002), Jappelli and Pagano (2008) outline two major channels, through which the financial integration facilitated financial development in the EMU. First channel is increased competitive pressure from more technologically advanced foreign banks. These banks are able to offer more efficient trading and settlement systems, and broader range of financial instruments. As a result, the cost of financial intermediation falls in countries with less developed financial systems, which facilitates the increased demand for financial services. The credit supply is also enhanced by cross – border loans from developed countries, which seek to maximize their net interest margin. Second channel is the required standardization and enforcement of domestic regulations according to best practices (e.g. International Financial Reporting Standards, corporate governance, securities laws, Basel capital standards etc.). It improves comparability, transparency and reliability of financial services between member states, which also contribute to their financial development. Both channels should promote some convergence in the indicators of bank efficiency and overall financial development within the integrated area.

Several studies tried to quantify the potential effect of financial integration and financial development on economic growth. The Cecchini report (1988) first focuses on the benefits of financial integration of eight EU member states and reports the increase in the value – added by 0.7% of GDP.<sup>7</sup> London Economics (2002) analyzes the impact of European financial integration on cost of equity and bond financing. It was found that

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<sup>7</sup> Commission of the European Communities. (1988). Europe 1992: The Overall Challenge. The Cecchini report, April 13.

equity trading, clearing, settlement costs and credit spread for corporate bonds significantly decreased in the EU through greater depth and liquidity of financial markets resulted from the integration. This, in turn, reduced the average cost of equity capital and the cost of debt by around 0.5% and 0.4% respectively. The simulation of a macroeconomic impact of integration using combined effects of equity and bond financing resulted in 1.1% increase in real GDP, 6% greater business investments, 0.8% increase in consumption and 0.5% higher employment rate in the EU. Giannetti et al. (2002) provide empirical evidence that under the assumption of the similar access to finance for the US corporations, the financial integration contributes between 0.75% - 0.94% to annual growth of the manufacturing industry in Europe. The authors also point out that countries with less developed financial systems generate greater benefits from the integration processes.

### **1.1.3 Costs of financial integration**

Apart from significant potential benefits, financial integration may have harmful side effects such as increased speculation with capital and likelihood of financial crisis (Pirinski and Wang, 2011). Agénor and Montiel (2015), Stavarek et al. (2011) point out the following dangers that may stem from the financial integration if certain conditions are not met:

- *Loss of macroeconomic stability.* Large foreign capital inflows may cause inflationary pressures and growing current account deficit. The persistent deficit induces the domestic currency depreciation, which may eventually lead to readjustment of relative prices and self-corrective movements in capital flows under the floating foreign exchange rate system. In the fixed exchange rate regime, the loss of competitiveness may undermine economic growth and increase the likelihood of currency crisis and financial instability. In both cases, large spillover effect exists due to increased interdependence of economies.
- *Concentration and misallocation of capital flows.* There is a tendency of capital inflows' concentration in several recipient countries, whereas some small developing economies are ignored at capital markets in spite of their openness. Boyd and Smith



(1992), Edison et al. (2002) state that the major reason is poor development of financial and legal systems, which may also cause capital outflows from those countries in favor of economies with stronger financial institutions. Moreover, concentration of domestic investments in speculative and low-productivity businesses may undermine the capacity for economic growth in the long run.

- *Pro-cyclicality and volatility of capital flows.* The business cycle expansion attracts significant capital inflows, stimulates spending and consumption. The effect, however, is reversed during economic downturns. Pro-cyclical behavior of short-term capital flows contributes to macroeconomic instability and is associated with two major reasons. First, developing economies are subject to greater business cycle volatility due to their lower productivity and high dependence on commodity prices. Second, lack of market transparency increases asymmetric information problems and triggers the capital withdrawal in response to adverse economic shocks. Accessibility of foreign capital increases the leverage and liquidity risk of a financial system. As a consequence, high level of short-term borrowing combined with pro-cyclical nature of capital flows may lead to systemic financial crisis.
- *Risk of foreign banks' entry.* Firstly, foreign banks tend to concentrate their lending on the most credible and large corporates and disregard small and medium firms and households. Voltz (2004) states that the development of small and medium enterprises is constrained in the foreign-dominating banking systems, which becomes a cost of financial integration for those economies. Secondly, foreign banks mainly operate at lower costs, which increase competitive pressure on domestic credit institutions. As a result, the excessive bank consolidation may distort the competition and lead to creation of systematically important banks that are "too big to fail". Thirdly, increase in foreign banks' market share does not contribute to stability of the domestic banking system. The effect is either neutral or downside as they easily cut their businesses during the crisis periods.

## 1.2 Development of financial integration in Europe

The financial integration in Europe started from the *Treaty establishing the European Economic Community (EEC)* signed on 25 May 1957 in Rome (Treaty of Rome) by Belgium, France, Italy, Luxemburg, the Federal Republic of Germany and the Netherlands. The Treaty of Rome was put in force on 1 January 1958 and already contained the basic principles of financial integration through free movements of capital within the six founding countries.<sup>8</sup> The Single Market Review (1997, Volume 3) of the European Commission provides general characteristics of the member countries' banking systems prior to 1986. It describes that the credit institutions were operated at high degree of state influence and unequal regulatory regimes. For example, the restrictions on interest rates and capital control existed in Belgium, France, West Germany, Portugal and Spain. Restrictions on branching and cross-border operations were widespread in France, Italy and Portugal. Foreign banks' entry and engagement in non-banking financial activities were prohibited in some countries. Moreover, an excessive and diverse regulatory treatment undermined the competition at both domestic and cross-border markets. Portugal, Greece, Belgium and Spain were considered as the most regulated among other member states. Some countries, however, liberalized their banking systems prior to the implementation of the Single European Act in February 1986.<sup>9</sup>

On 14 June 1985, the Commission of the European Communities issued a "*White paper*" on completing the internal market and emphasized the importance of formation of a common market in services for the future prosperity of Europe. The proposal was justified by the fact that by 1982, the services' market was accountable for majority of job places and contributed significant value added to the European economy (see pages 28-29 of the White paper). With respect to financial integration, the White paper (1985)

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<sup>8</sup> Denmark, Ireland and the United Kingdom joined the EEC on 1 January 1973; Greece – on 1 January 1981; Portugal and Spain – on 1 January 1986; Austria, Finland and Sweden – on 1 January 1995.

<sup>9</sup> The UK liberalized capital movements in 1979; West Germany and the Netherlands released interest rates' control in 1981.

The Single European Act (SEA) signed on 17 February 1986 was the first substantial change to the Treaty of Rome. The major aim of the SEA was the creation of the single market in the European Community by 1992.

proposed to remove cross-border barriers and controls to ensure free flow of capital within the member states. The same year, the launch of the *Single Market Program (SMP)* facilitated the minimum harmonization of the financial regulation and supervision that was an essential condition for liberalization of financial services within the Community. The financial institutions started operating at the “single financial passport” that allowed for the mutual recognition of licenses in member states. However, the control over cross-border financial institutions was carried out by its home country. Another important step for successful financial integration in EEC was the adoption of the similar standards for measuring a banks’ financial stability, like capital adequacy, and its management principles.

The Single Market Review (1997) reports that the implementation of the SMP resulted in decrease of the number of banks, increase in domestic banks’ mergers and acquisitions, and greater banking sectors’ concentration nearly in all member states. Increase in cross-border competition and cross-border branches stimulated the technological developments and innovations in the financial industry. The Single Market Review (1997) provides evidence that deposit and loan prices of member states exhibited some degree of convergence post-SMP period. As a consequence of more competitive environment, the banks’ net interest margin declined (the decrease was greater in high margin countries). However, banks were able to improve their profitability by engaging in non-interest generating activities that expanded rapidly due to application of the universal banking model.<sup>10</sup> SMP resulted in decrease in cross-border costs of supplying financial services, although the changes in cost income ratio were not apparent.

The next important stage of the European financial integration was *the Treaty on the European Union* in the Dutch city of Maastricht (Treaty of Maastricht) signed on 7 February 1992 by twelve countries: Belgium, Denmark, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and the United Kingdom. The Treaty came into force on 1 November 1993. Apart of creation of the European

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<sup>10</sup> Universal banking was introduced into the legislation under the EU’s Second Banking Directive. Universal banking is broadly defined as banking activities that include corporate, wholesale, and retail banking, investment banking, securities and insurance businesses.

citizenship and closer cooperation among the member states on various policies, the Maastricht Treaty approved three stages for completing the launched *European and Monetary Union (EMU)*.<sup>11</sup> The final stage included an introduction of Euro as a single currency of the European Union effective on 1 January 1999. It was a giant leap towards deepening of the financial integration in Europe through elimination of the foreign exchange risks, increased price transparency, reduced transaction costs, and improved cross-border competition. However, other barriers still impeded the full financial integration. In 1999, the *Financial Services Action Plan (FSAP)* became the major priority for the EU member states toward the harmonization of the legal environments, financial infrastructure, regulatory standards and procedures. According to the Green paper on financial services policy 2005-2010 issued on 3 May 2005 for public consultation, the most of objectives of the FSAP were met and put in practice. The White paper on financial services policy was published on 1 December 2005 and set the final priorities and strategies for the European financial sector's development over the next 5 years.

Leibschner et al. (2006) report that significant financial integration has been achieved at the money market and government bonds' market since the introduction of Euro in 2002. Elimination of the foreign exchange risk also created a crucial condition for the development of the pan-European corporate bond market that witnessed significant growth after 1999. However, equity, mortgage and retail lending markets maintained high level of fragmentation. The European banking sector experienced active expansion through cross-border activities that mainly took the forms of cross-border branching, securities trading and interbank loans. The volume of cross-border corporate and retail financing within the old EU members, however, remained weak (Jappelli and Pagano, 2008).

The accession of three Baltic States, five Central and Eastern European countries, Cyprus and Malta on 1 May 2004 and two South European states on 1 January 2007 in the EU created the room for further cross-border expansion of financial services and

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<sup>11</sup> The first stage introduced the free movement of capital between member states (1990 -1993); the second stage focused on increased cooperation between national central banks and convergence of economic policies, and the establishment of the European Central Bank (1994 – 1998).

capital markets.<sup>12</sup> By the time of accession, the new member states lagged much behind the old member states by their economic, financial and technological developments. The European Commission's report on the level of integration of East and West in the European Union (2014) highlights that the income gap between the old and new EU members reduced during 1995-2007 period, but still remained significant. Increase in trade openness and huge flow of foreign direct investments from more developed economies facilitated high economic growth of the CEEC-10.<sup>13</sup> The gap in innovations between the old and new EU member states was even greater than the income gap. Therefore, the import of knowledge and technologies by the CEEC-10 was crucial for increase of their international competitiveness. Baltzer et al. (2008) used the measures of financial integration suggested by Baele et al. (2004) for the analysis of financial integration between the old and new EU member states. The authors report strong evidence of ongoing integration processes especially in the money and banking markets since the time of new EU states' accession. Government bond markets experienced strong development. However, only largest economies (Czech Republic, Poland and Hungary) showed signs of integration. Equity market of the EU's new member states remained highly segmented.

The Global financial crisis (2007 - 2010) followed by the Eurozone sovereign debt and banking crises (2010 - 2016) slowed down the integration processes in Europe and contributed to greater fragmentation of the European financial markets (Degl'Innocenti et al., 2017). The negative effect, however, is temporal as the European financial markets have recovered and continue to develop even deeper framework of financial integration. Monti report (2010) to the President of the European Commission examines the challenges that the EU faces at the current stage and proposes strategies to protect and relaunch the single market. Monti (2010, p.61) states that *"the single market for capital and the closely*

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<sup>12</sup> The Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, the Slovak Republic, Slovenia, Cyprus and Malta joined the EU on 1 May 2004. Bulgaria and Romania became the EU members on 1 January 2007. CEEC-10 is assigned to this group of countries.

<sup>13</sup> According to the EC report "25 years after the fall of the Iron Curtain: on the state of integration of East and West in the EU", three quarters of total direct investments to CEEC-10 were supplied by the Netherlands, Germany and Austria. The largest FDI recipients were Poland, Czech Republic and Hungary.

*interrelated single market for financial services are critical for the efficient allocation of resources – a key driver of growth and employment – and for the financial stability of the economy*”. He argues that intensive financial liberalization in Europe and the United States not accompanied by the subsequent enhancement of financial regulation and supervision was one of the major reasons of the financial crisis. De Larosiere Group’s Report (2009) provides detailed analysis of causes of the financial crisis and weaknesses of the existing financial regulation. It draws comprehensive set of recommendations for building sound regulatory and supervisory architecture across the EU single financial market.<sup>14</sup> The Report states that full harmonization of the regulation and supervision is no longer an option, but a required condition for the future sustainability of the EMU. Moreover, the introduction of a new risk-sharing mechanism for stabilizing the EMU during economic downturns is critical to break the vicious circle between banks and public finance.<sup>15</sup>

The Global financial and Eurozone debt crises initiated the new level of integration in the EU. The European Commission’s Five Presidents’ report (2015) clearly states that deeper economic, financial, fiscal and political integration is required to preserve the integrity of the EMU. The report outlines two major stages towards more resilient EMU to be completed by 2025. The foremost step in the current stage is the completion of the Financial Union comprised of the Banking Union and Capital Markets Union. The Banking Union is a new regulatory and supervisory system of EU area banks (and other future members) executed under a single rulebook. The Banking Union comprises of three pillars: Single Supervisory Mechanism (SSM), a Single Resolution Mechanism (SRM) and European Deposit Insurance Scheme (EDIS). Three pillars cover banks of the Banking Union’s participating countries.<sup>16</sup> SSM ensures effective supervision of EU area credit institutions using Basel III capital requirements. SRM allows timely intervention of

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<sup>14</sup> European Commission. February 2009. The high-level group on financial supervision in the EU. The de Larosiere Group, Brussels.

<sup>15</sup> The European Commission fact sheet. 24.11.2015, MEMO/15/6164

<sup>16</sup> All Eurozone countries participate in the Banking Union automatically. Other EU member states may join the Banking Union; however, regardless of the current non-participating status, they are subject to the single rulebook’s directives.

a Single Resolution Board into a distress bank and provides recovery tools through a Single Resolution Fund. EDIS is still in the process of development and will gradually replace the harmonized Deposit Guarantee Scheme (DGS). Both SRM and EDIS will be fiscally neutral over time as they would be privately funded by participating banks. The European Commission's White paper on the Future of Europe (March 2017) illustrates five possible scenarios of the EU development in the medium term. However, only two scenarios are able to reduce a gap between promised and delivered financial stability.<sup>17</sup>

### **1.3 Literature review on bank ownership, business models and stability**

#### **1.3.1 Overview of bank-level risk measures**

The post-crisis banking regulatory framework strongly supports the adoption of more sophisticated internally developed risk models. Since the data from these models is not publicly available, the academic research widely relies on accounting risk measures (Delis et al., 2014) and market risk estimates derived from stock returns' volatility (Leung et al., 2015). Individual or joint realization of bank risks undermines bank stability, which is a crucial condition for effective development of a real sector and successful economic (and financial) integration. This section reviews the measures of credit, liquidity and overall bank financial risks applied in the empirical literature for assessing an individual bank's stability. The range of risks and their measures, however, is not limited to the current discussion.

Credit risk directly influences bank's probability of survival as lending represents the major bank activity and accounts for the largest proportion of assets in banks with traditional business models. Table 1.1 presents the most widely used credit risk measures. *Non-performing loans (NPLs)* is a bank loan, which interest or agreed installment has not been paid for 90 days or more.<sup>18</sup> According to the BCBS Consultative document (2016,

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<sup>17</sup> See, Scenario 4 (Doing less more efficiently) and Scenario 5 (Doing much more together) in the White paper on the Future of Europe. European Commission. 1 March 2017. Brussels

<sup>18</sup> NPLs also include all exposures that are "defaulted", all exposures that are credit-impaired according to IFRS 9, and all exposures with evidence that full repayment is unlikely without the realization of collateral (regardless of the number of days the exposure is past-due).

p. 8), “Non-performing exposures should always be categorized for the whole exposure, including when non-performance relates to only a part of the exposure, for instance, unpaid interest”. *Loan loss provisions (LLPs)* represent an expense set aside from net income. LLPs aim to cover potential credit losses when loan quality deteriorates. Timely and adequate LLPs contribute to bank stability as they are able to mitigate credit risk early implying more sensitivity of risk recognition (Ozili and Outa, 2017). The major difference between Loan loss provisions and Loan loss reserves (LLRs) is that LLPs represent the periodic increment (the flow) in Loan loss reserves, whereas the LLRs represents an actually formed allowance for impairment (the stock) accumulated for several periods. *Risk-weighted assets* are calculated as a weighted - average amount of on – balance sheet and off - balance sheet assets adjusted to credit risk (according to Basel I, Basel II or Basel III).<sup>19</sup>

**Table 1.1 Credit risk measures**

<b>Risk measure</b>	<b>Description</b>	<b>Research papers</b>
Loan loss provisions (reserves) to Total loans (or Total assets)	Higher level of loan loss provisions (reserves) reflects lower quality of loan portfolios.	Foos et al. (2010), Haq and Heaney (2012), Dietrich et al. (2014), Basegla-Pascual et al. (2015), Fahlenbrach et al. (2016)
Non-performing loans to Total loans (or Total assets)	Higher level of non-performing loans reflects the greater credit risk realization.	Agoraki et al. (2011), Leung et al. (2015)
Risk-weighted assets adjusted to credit risk to Total assets	Higher ratio indicates the greater credit risk of bank assets.	Berger and Bowman (2013)

Financial crisis revealed that bank distress occurred not only due to insufficient capital adequacy relative to asset risks, but also due to inappropriate liquidity management. Funding liquidity risk arises when depositors or wholesale lenders withdraw their money at the same time forcing a bank to run out its liquid reserves. If amount raised from liquid assets is not sufficient to cover cash outflow, banks may fail even being sufficiently capitalized (Rantovski, 2013). Table 1.2 presents the summary of major

<sup>19</sup> Basel II introduced finer calibration of credit risk and an option between a standardized and an internal risk-based approaches for risk measurement. Basel III introduced “through-the-cycles” loan loss provisioning system.



liquidity risk indicators used in the empirical literature. *Loan to deposit ratio* measures the proportion of loans funded by core deposits. The major disadvantage of the ratio is that it does not differentiate between short-term wholesale funding and long-term debt financing; the latter represents a stable source of funds as its duration is close to those of long-term assets. *Ratio of Short- term funding to Liquid assets* better explains the sources of funding liquidity risk as it shows the proportion of short-term obligations covered by short-term liquid assets (Imbierowicz and Rauch, 2014). If the ratio is greater than 1, it indicates high liquidity risk. Altunbas et al. (2011) measure liquidity risk by the amount of funding received from the European System of Central banks out of total bank assets.

**Table 1.2 Liquidity risk measures**

<b>Risk measure</b>	<b>Description</b>	<b>Research papers</b>
Loans to Deposits	Indicator of bank funding liquidity risk if the ratio becomes greater than 1.	Lopez-Espinoza et al. (2013), DeYoung and Jang (2016)
Short- term funding to Liquid assets	Indicator of funding liquidity risk or inability to meet short-term obligations if the ratio is greater than 1.	Imbierowicz and Rauch (2014)
A Central bank's liquidity support = Refinancing from a Central bank / Total assets	Short-term and long-term refinancing from a Central Bank may signal liquidity problems.	Altunbas et al. (2011)
Liquidity Coverage Ratio (LCR) = High quality liquid assets / Net cash outflow	Indicates the proportion of highly liquid assets available to cover net cash outflow under a stress scenario lasted for 30 days. The adequate ratio is 100%.	Hong et al. (2014)
Net Stable Funding Ratio (NSFR) = Available amount of stable funding/Required amount of stable funding	Indicates the proportion of illiquid assets that are financed with long - term stable liabilities. The adequate ratio is 100%.	King (2013), Distinguin et al. (2013), Dietrich et al. (2014), Vazques and Federico (2015), Bologna (2015), Mergaerts and Vennet (2016)

Post-crisis Basel III regulation introduced new measures for enhancing the existing liquidity rules, the Liquidity coverage ratio (LCR) and the Net Stable Funding ratio (NSFR), which intend to assess short-term and long-term liquidity risks respectively. The LCR is not often used by researchers due to lack of available public data on cash flows within 30 days horizon. The NSFR, however, attracts increasing attention from the academic world and has already been tested from different perspectives for banks in

advanced economies (see King, 2013; Dietrich et al., 2014 etc.). The NSFR is the ratio of Available stable funding (represented by long term liabilities) to Required stable funding (represented by illiquid assets). The closer matching between two amounts (when the ratio is 1 or more) indicates better bank sustainability to liquidity shocks within one year horizon (Distinguin et al., 2013).

**Table 1.3 Comprehensive measures of bank risk-taking**

Risk measure	Description	Research papers
Coefficient of variation of bank returns (or profit) $VAR = \frac{\delta(ROA)}{ROA}$	Coefficient of profit variation indicates greater risk of bank profit that is the result of higher bank risk-taking.	De Nikolo (2000), Lepetit et al. (2008), Houston et al. (2010), Dietrich et al. (2014), Lee et al. (2014)
Z-score index of bank stability $Z = \frac{ROA + (E/A)}{\delta(ROA)}$	Lower Z-index indicates increase in probability of bank failure.	Berger et al. (2009), Uhde and Heimeshoff (2009), Martinez-Miera and Repullo (2010), Demirgüç-Kunt and Huizinga (2010), Altunbas et al. (2011), Kohler (2015), Leung et al. (2015), Bhagat et al. (2015)
Bank stock returns' volatility and its decomposition	Market perception about the overall risk-taking: greater stock returns' volatility implies higher bank risk.	Laeven and Levin (2009), Altunbas et al. (2011), Haq and Heaney (2012), Guidara et al. (2013), Leung et al. (2015), Bhagat et al. (2015)
Bank failure (or bank under bankruptcy, government assistantship, liquidation, dissolved by merger etc.)	Bank is assigned a dummy variable "1" if a bank failure event occurs; or "0" otherwise.	Altunbas et al. (2011), Berger and Bowman (2013), DeYoung and Torna (2013), Vazques and Federico (2015)

Table 1.3 summarizes comprehensive measures of bank-level risk-taking. Coefficient of profit variation and Z-score index are quite popular in the empirical literature due to their reliance on accounting data. Both a Z-score and a coefficient of variation are subject to some econometric issues especially when only annual data is available. Delis et al. (2014) suggest that profit variation should be estimated over shorter horizon to reflect short - term nature of bank risks. The major advantages of all accounting risk measures are their calculation simplicity and relative consistency across banks from different samples. However, these risk measures provide *ex post* view on risk-taking indicating the past risk realization and are weak in predicting evolution of bank risks (Delis et al., 2014).

The basic *decomposition of stock returns* allows to extract systematic and firm-specific risks from a single index model's equation (Altunbas et al., 2011; Guidara et al., 2013; Bhagat et al., 2015). Haq and Heaney (2012) split total equity risk of European banks in systematic, idiosyncratic, and interest rate risks. Leung et al. (2015) decompose US banks' equity risk in six components and analyze the effect of bank fundamentals on those risks. Risk measures derived from stock returns' variability are forward looking; however, they are applicable only for listed and actively traded banks. For developing and transition economies, the estimation of bank risks through market data is complicated by lack of transparency, liquidity and efficiency. Finally, the actual case of bank distress (or another similar event) is used in the literature as a proxy to measure bank failure. Altunbas et al. (2011) analyze EU and US banks and code a bank with "1" if it received a government's support. Berger and Bowman (2013) assign a dummy variable "1" for banks that stayed at the market one quarter before and one quarter after the defined crisis event. Again, this risk measure is subject to data limitations for transition economies.

### **1.3.2 Bank ownership and stability**

Differences in bank performance and risk-taking across ownership types are widely accepted in prior studies. Bertay et al. (2015) show that state ownership results in less lending procyclicality of 1633 US banks. Cornett et al. (2010) report that state banks in 16 Asian countries operate at lower profitability, equity capital, managerial efficiency and experience greater credit losses than private banks. Moreover, the divergence between two ownership types increases with deeper governmental involvement in the banking sector. Saghi-Zedek (2016) provides evidence that the effect of diversification through non-interest income on bank performance and solvency varies with bank ownership categories. The author finds that state control in Western European banks is associated with lower profitability, greater volatility of earnings and likelihood of bank failure. In contrast, Iannotta et al. (2013) note that the lower default probability of European state-owned banks is not related to better operating performance and is a consequence of stronger government protection available for state banks. Zhu and Yang (2016) report a robust negative impact of state ownerships on Chinese banks' capitalization and liquidity

and a positive effect on credit losses compared to foreign banks. The authors state that the difference is stipulated by stricter regulation and market discipline of foreign banks whereas implicit government support motivates state banks to accept greater risks. Giannetti and Ongena (2009) show that foreign banks in developing economies demonstrate better performance and survival probability. With respect to funding stability, Dietrich et al. (2014) find that state-owned banks in Europe generally have a wider maturity mismatch between assets and liabilities. However, state or private ownership type do not have a significant role in explaining the NSFR. In contrast, foreign ownership is associated with lower structural liquidity implying stronger reliance on short-term borrowing in their funding structures.

### **1.3.3 Bank activities and financial stability**

#### *1.3.3.1 Size, lending and growth*

During the financial crisis 2007 – 2010, governments of many countries stepped in to bail out large distressed banks in order to protect their financial systems (and economy) from severe disruption. Large number of medium and small size US banking firms also disappeared from the market during the last crisis (DeYoung and Torna, 2013). The impact of bank size on risk – taking (and stability) is complicated by the effect of economies of scale, possible diversification benefits from the business models' mix and moral hazard of “too big to fail” status (Kohler, 2015). That's why the large scope of empirical literature on bank business models and risk-taking reports controversial findings depending on samples and periods selected.

Hughes and Mester (2013) analyze the scale of economies of US banks and document the evidence of diversification that increases with bank size. Banks enjoy cost reduction from managing risks and are able to retain its capitalization. Using a sample of EU-15 listed and unlisted banks, Kohler (2015) reports that the diversification effect strongly depends on bank size. Small banks benefit more from engagement in non-interest generating activities, whereas large banks tend to combine non-traditional operations with greater leverage, which ultimately undermines large banks' financial stability. Bhagat et

al. (2015) report positive relationship between size and risk-taking of US financial institutions during the pre-crisis (2002 – 2006) and the crisis (2007 – 2009) periods. The authors decompose the main risk variable, Z-score, and find that large banks engage in riskier activities through greater leverage. Altunbas et al. (2011) provide evidence that EU banks' size is positively associated with probability of receiving state liquidity support. The authors explain that moral hazard of bank activities increases with size and maximizes when a bank becomes "too big-to-fail".

The range of bank activities represents a trade-off between traditional business models and market-based models. Beltratti and Stulz (2012) report that global banks with more loans and deposits and lower leverage prior to 2007 show better performance during the last financial crisis. However, the literature highlights that the severity of banks' distress is attributable to excessive asset growth prior to the crisis. Using an international sample of banks from major developed economies, Foos et al. (2010) find that *excessive* loan growth significantly reduces the interest revenue and capitalization of sampled banks through greater credit losses.<sup>20</sup> Kohler (2015) reports that lending growth is an important determinant of the European banks' risk. EU banks pursued *abnormal* lending growth by reducing lending standards and collateral quality, which resulted in lower stability of EU banks (measured by the Z-score). Vazquez and Federico (2015) find positive relationship between asset growth and the probability of failure of US and EU banks during the last crisis. Another interesting and timely paper of Fahlenbrach et al. (2016) reports that fast-growing US banks have lower loan loss provisions in the extension year; however, over three years these banks experience much greater level of loan losses and lower profitability compared to low-growing banks. The authors explain that excessive credit demand leads to understatement of loan risks at the time of formation. As a result of loan mispricing, credit losses realize consequently and it becomes obvious that bank growth is achieved by lower quality lending.

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<sup>20</sup> Foos et al. (2010) measure *excess loan growth* as the distance of an individual bank's growth from an industry's median loan growth.

*1.3.3.2 Non-traditional banking activities*

Deregulation and rapid development of financial innovations have widely expanded the range of bank activities. The failures of largest US investment banks during the last financial crisis drew attention to some business models and their risks. Lopez-Espinoza et al. (2013) analyze a sample of internationally active banks and find that trading activities positively contribute to banks' stability. The authors note that investments in capital market are able to diversify bank business models and reduce their overall riskiness. Using the sample of EU-15 listed and unlisted banks from 2002 – 2011, Kohler (2015) provides evidence that the effect of non-interest generating activities on a bank's Z-score varies with the original business strategy. In particular, banks with traditional business models (savings, retail cooperative banks) improve their stability with a greater reliance on non-interest income, whereas banks with investment-oriented models tend to become riskier. Demirguc-Kunt and Huizinga (2010) report an inverse U-shaped relationship between the Z-score and fee income for banks from 101 countries, indicating some diversification benefits at a low share of fee income. However, further engagement in fee-generating activities increases both bank risk and return, suggesting a trade-off. The volatile nature of non-interest activities and their strong dependence on market conditions may eliminate the initial diversification effect (Stiroh and Rumble, 2006). DeYoung and Torna (2013) decompose the fee income of US banks and find that involvement in pure non-traditional businesses (such as investment banking, venture capital or securitization) increases the stability of healthy banks and the probability of failure of distressed banks. Fees from services (for example, insurance or brokerage activities) improve the risk profile of unhealthy banks. The authors also state that interest income has a strong positive effect on bank stability, confirming its importance for long-term bank soundness.

*1.3.3.3 Wholesale short-term funding and capitalization*

Banks' optimal funding structure is effectively a trade-off between deposits, non-deposit borrowings and shareholders' equity. Altunbas et al. (2011) analyze the business models of US and EU banks and find that a greater reliance on short-term market funding significantly increases the probability of receiving government support during the crisis.

Moreover, the effect depends on the current bank risk profile: a higher share of market funding contributes to the likelihood of distress for riskier banks but does not impact on less risky banks. Baselga-Pascual et al. (2015) also report a significant negative relationship between the wholesale funding and individual bank solvency, the Z-score, of European banks.

Berger and Bowman (2013) investigate US banks' capitalization and its effect on earnings and the probability of survival during two banking and three market crises. They find that capitalization significantly improves the sustainability of small banks in all crisis periods and increases the likelihood of survival of medium and large banks only during banking crises. Lee and Hsieh (2013) analyze the impact of capital adequacy on profitability and risk of banks from 42 Asian countries. Their results confirm that greater capitalization reduces risk-taking and the effect is stronger for banks from the Far East, Central Asia and lower than average income countries. Vazques and Federiko (2015) state that US and EU banks with weaker funding liquidity and lower capitalization before the crisis are more vulnerable to financial distress during the crisis. The authors also provide evidence that stability of small banks is more dependent on their funding liquidity, whereas large cross-border financial institutions mainly fail because of higher leverage.

Other scope of literature indicates positive association between bank capitalization and risk-taking. For example, Athanasoglou (2011) reports positive relationship between capital and risk-taking of banks from seven South Eastern European countries. The author points out that significance and causation of this relationship depends on the current degree of banks' capitalization. Delis et al. (2014) finds that better capitalization and liquidity stimulate US banks during 1985 – 2012 to accept greater risk. He argues that better capitalized banks feel safe and tend to take on more risk. Additionally, value maximizing banks with high level of liquid assets are willing to invest their excess liquidity in risky assets in the next period.

### **1.3.4 Business determinants of funding stability**

The Basel Committee on Banking Supervision (BCBS) responded to the crisis by introducing new liquidity requirements: the Liquidity Coverage Ratio and the Net Stable Funding Ratio. The NSFR aims to strengthen bank resilience to liquidity shocks by narrowing the maturity imbalance between assets and liabilities. This research contributes to limited but growing literature on bank structural liquidity. King (2013) analyzes the NSFR in 15 countries and finds that banks from 10 countries do not meet the minimum ratio. King (2013) also shows that a balance sheet restructuring towards the target NSFR would lead to lower bank interest margins, implying a trade-off between funding stability, bank risk-taking and profitability. The work of Dietrich et al. (2014) is especially relevant to this study as they investigate the major business drivers of the NSFR in European banks. The authors report that lending growth and a greater share of short-term borrowing have significant negative effects on bank structural liquidity. Moreover, an increase in non-interest income is strongly associated with a lower NSFR, implying that EU banks use short-term wholesale funds to finance their non-traditional activities. Dietrich et al. (2014) also confirm the important role of capitalization in improving bank funding stability. Jean-Loup (2017) notes the idiosyncratic nature of liquidity risk in European banks. Jean-Loup (2017) argues that greater bank size and capitalization are associated with lower liquidity risk whereas the effects of deposit and market financing on liquidity vary with initial level of liquidity exposure.

## **1.4 Literature review on bank funding liquidity, systemic importance and profitability**

### **1.4.1 Overview of bank profitability measures**

Profitability is one of bank performance indicators along with measures of stability, risk and default probabilities. The most fundamental proxies of profitability are Return on assets (ROA), Return on equity (ROE) and Net interest margin (NIM). There are also variety of other profitability measures derived from the basic ones such as risk-



adjusted ROA or risk-adjusted ROE, interest income margin, interest expense margin, non-interest income margin etc. Table 1.4 summarizes the common bank profitability ratios and their application in the literature.

**Table 1.4 Profitability measures**

<b>Profitability</b>	<b>Description</b>	<b>Literature</b>
Return on assets	Net profit before tax divided by total average assets	Dietrich and Wanzenried (2011), Demirguc-Kunt and Huizinga (2010), Bertay et al. (2013), Petria et al. (2015), Djalilov and Piesse (2016), Mergaerts and Vennet (2016), DeYoung and Jang (2016), Bouzgarrou et al. (2018)
Return on equity	Net profit before tax divided by total average equity	Berger and Bouwman (2013), Dietrich and Wanzenried (2011), Bertay et al. (2013), Petria et al. (2015), Mergaerts and Vennet (2016), DeYoung and Jang (2016), Bouzgarrou et al. (2018)
Net interest margin	Net interest income before provisions for impairment divided to total average assets	Dietrich and Wanzenried (2011), Bertay et al. (2013), King (2013), Entrop et al. (2015), Mergaerts and Vennet (2016), Bouzgarrou et al. (2018)
Risk - adjusted ROA	ROA divided by volatility of ROA	Kohler (2015), DeYoung and Jang (2016)
Risk - adjusted ROE	ROE divided by volatility of ROE	DeYoung and Jang (2016)

ROA is a proxy of overall bank profitability from all business activities. It shows the net profit earned per unit of a currency and indicates how well bank assets are managed to generate revenues. ROE is estimated as the net income earned from the shareholders' investments. The major drawback of this ratio is that it disregards the leverage risk and the effect of regulation on leverage. NIM is calculated as the net interest income divided to total assets (or interest earning assets). It measures bank profitability from lending and deposit-taking intermediation activities.

The use of average values of assets and equity produces ratios that are more accurate because they take into account the changes during the year. For cross-country samples, the pretax profit for ROA (ROE) and pre-impairment net interest income for NIM are more appropriate as they isolate the profitability proxies from differences in income tax rates and provisioning methodologies. One of the shortcomings of all ratios is that they disregard the profit generated from off-balance sheet operations. However, this

aspect is often to be negligible for transition economics, in which bank involvement in off-balance sheet and derivatives operations is still low (Djalilov and Piesse, 2016).

#### **1.4.2 Regulation of bank size and systemic importance**

The Global Financial Crisis (GFC) is full of examples of large banks' failures and, for some of them, costly bailouts by governments resulted in huge social costs and economic distraction. Are large banks different in terms of risk-taking and profitability? There is a strong view that "too-big-to-fail" status is associated with excessive risk-taking due to explicit or implicit state support (Boyd et al., 2009; Bertay et al., 2013; Bhagat et al., 2015). Laeven et al. (2016) report that large banks across 56 countries tend to operate at higher leverage, less stable funding, and greater exposure to non-interest activities. ECB Financial stability review (May 2016) also reports that G-SIBs are the most leveraged in the euro area as their median ratio is still around 4% as of December 2015. We observe the similar pattern in behavior of big banks in the EAEU. Appendix A shows that in all three EAEU countries a larger bank size is associated with lower capitalization and profitability. In addition, large Belarusian banks operate at less stable funding and greater engagement in securities business.

The GFC initiated the policy debate on large banks' risks and their special systemic status in the financial system in the domestic and international context. For example, the SAFE Banking Act (2012) in the US proposed to limit bank size by setting a 10% cap for the share of deposits out of total insured deposits of all US banks and 2% limit on the ratio of non-deposit liabilities to US GDP for US BHC.<sup>21</sup> The act was not put in force, however. Dodd-Frank Wall Street Reform and Consumer Protection Act in the US (2010) introduced enhanced prudential regulation for large banks with aim to mitigate their systemic risk.<sup>22</sup> For example, banks with consolidated assets above of \$250 bn and standalone banks with total assets greater than \$50 bn are subject to greater capital requirements, stronger stress testing, and must meet the minimum thresholds for the LCR

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<sup>21</sup> The Safe, Accountable, Fair and Efficient (SAFE) Banking Act was proposed in the US Senate on 9 May 2012, but not put in force.

<sup>22</sup> A pillar of the Dodd-Frank Act, P.L. 111-203.

and the NSFR. A High-level Expert Group Report chaired by Liikanen (2012) in Europe claimed to set restrictions on some risky activities of large banks such as mandatory separation of proprietary trading of securities and derivatives for European deposit-taking banks. The Group also suggested greater capitalization and special recovery and resolution frameworks for large banks. The BCBS advocated for greater capital requirements and proposed surcharge up to 2.5% of total Risk-weighted assets (RWAs) for systemically important credit institutions. First, BCBS recommends to develop a methodology for assessing the degree to which a bank is systemically important in the domestic or global context. Then, the risks of SIBs should be controlled by two measures. First, systemic banks are required to raise additional capital within the range of 1% - 3.5% of total RWAs. Second, SIBs are subject to tighter supervisory oversight compared to non-SIBs. Russia, Kazakhstan and Belarus have implemented the principles and recommendations of BCBS with respect to SIBs. Table 1.5 presents the methodology for estimation of an index of domestic systemic importance for Russian, Kazakhstani and Belarusian banks.<sup>23</sup>

Table 1.5 presents the summary of assessment methodologies for identification of systemically important banks in Russia, Kazakhstan and Belarus. It appears that complexity and calibration of the SIB Index vary across EAEU countries. Bank size is the most important metric of systemic importance due to its simplicity and transparency. It correlates with complexity and interdependence of bank activities, but not perfectly. For Russian banks, size is measured by a ratio of total assets of a bank to all bank assets in the banking system and is assigned a weight of 50%.<sup>24</sup> In Kazakhstan and Belarus, two indicators (see 1.1 and 1.2 in the table) define bank size. In Kazakhstan, each bank is assessed based on eleven indicators and considered as systemically important if a weighted index of these indicators exceeds 10%. A bank with an index below 10% but greater than 5% is placed at a watch list of potential SIBs.<sup>25</sup> Another difference between

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<sup>23</sup> There are no global systemically important banks (G-SIBs) in the EAEU.

<sup>24</sup> The Central Bank of Russian Federation. On the definition of a list of systemically important credit institutions. Instruction of the Bank of Russia No. 3174-U dated 16.01.2014.

<sup>25</sup> The National Bank of Kazakhstan. On approval of rules for classifying financial organizations as systemically important. Ordinance of the National Bank of Kazakhstan No. 257 dated 24.12.2014.

the methodologies is that there are two groups of systemically important banks in Belarus subject to different capital requirements. The assessment of banks in each EAEU economy resulted in the following list of SIBs and their corresponding regulation (Table 1.6).

**Table 1.5 Assessment methodologies for identification of systemically important banks**

	<b>Russia</b>	<b>Kazakhstan</b>	<b>Belarus</b>
Broad criteria	1. Size 2. Interconnectedness through interbank investments 3. Interconnectedness through interbank borrowings 4. Deposits to individuals	1. Size 2. Interconnectedness 3. Substitutability 4. Complexity of operations	1. Size 2. Interconnectedness 3. Economic influence 4. Cross-border operations
Indicators  (Note: all indicators are divided by their aggregated amount in the national banking system)	1.1 Assets (0.5) 2.1 Interbank loans (0.125) 3.1 Interbank borrowing (0.125) 4.1 Deposits to individuals (0.25)	1.1 Assets (0.2) 1.2 Liabilities (0.2) 2.1 Interbank loans (0.05) 2.2 Interbank borrowing (0.05) 2.3 Deposits from individuals (0.1) 3.1 Interbank transfers (0.1) 3.2 Loans to customers (0.07) 3.3 Custodian operations (0.03) 4.1 Contingent assets (0.05) 4.2 Contingent liabilities (0.05) 4.3 Trading and available for sale securities (0.1)	1.1 Assets (0.15) 1.2 Capital (0.1) 2.1 Interbank loans (0.08) 2.2 Interbank borrowing (0.08) 3.1 Deposits from individual (0.15) 3.2 Corporate deposits (0.09) 3.3 Claims to customers (0.15) 4.1 Claims to non-residents (0.1) 4.2 Borrowing from non-residents (0.1)
Data frequency	3 preceding years	4 preceding quarters	4 preceding quarters
SIB Index (I)	Sum of weighted indicators averaged for four quarters	Sum of weighted indicators averaged for four quarters	Sum of weighted indicators averaged for four quarters
Criteria for SIB Index (I)	If $I > 17\%$ , a bank is assigned to a group of systemic importance.	If $I > 10\%$ , a bank is assigned to a group of systemic importance; If $5\% < I \leq 10\%$ , a bank is put to the list of potential SIBs.	If $I > 5\%$ , a bank is assigned to Group 1 of systemic importance. If $1\% < I \leq 5\%$ , a bank is assigned to Group 2 of systemic importance.

This table presents the methodologies for assigning a systemically important bank's status in Russia, Kazakhstan and Belarus. The weights for calculation of the SIB Index (I) are given in brackets next to each indicator.

**Table 1.6 The list of systemically important banks**

	List of SIBs	Comments	Regulation
Russia	UniCredit Bank, Gazprombank, VTB Bank, Alfa-bank, Sberbank, Credit Bank of Moscow, Bank FC Otkritie, Rosbank, Promsvyazbank, Raiffeisenbank, Russian Agricultural Bank	According to the list of SIBs approved by the CRB on 13 September 2017	SIBs are required to hold additional capital of 0.15% of RWAs as of January 2016, 0.35% as of January 2017, 0.65% as of January 2018, and 1% as of January 2019. SIBs are required to comply with minimum requirements for the LCR by 1 January 2019 and the NSFR as of 1 January 2018.
Kazakhstan	Halyk Bank, Kazkommertz bank*	As of 1 January 2017 *was acquired by Halyk Bank in 2017	SIBs are required to hold an additional capital buffer of 1% of RWAs starting from January 2017.
Belarus	Group 1: Belarus Bank, Belgazprombank, BPS-Sberbank, Belvnesheconombank, Prior bank, Belinvestbank Group 2: Alfa-bank, Bank VTB (Belarus), MTBank, Bank Moskwa-Minsk, Technobank, Trade Capital Bank*	According to the list of SIBs approved by the NBRB on 1 January 2018	SIBs from group 1 are required to hold additional capital of 0.75% of RWAs from January 2018 and 1.5% from January 2019. SIBs from group 2 must build a buffer of 0.5% and 1% starting from the years 2018 and 2019 respectively.

The table lists the systemically important banks (SIBs) in Russia, Kazakhstan and Belarus. CRB is the Central Bank of Russia. NBRB is the National Bank of the Republic of Belarus. RWAs stands for risk-weighted assets.

All SIBs are subject to additional capital surcharge. In Russia, capital buffers for systemically important banks at the domestic level are effective since 1 January 2016 and set at 0.15% of RWAs. The level will gradually increase to 0.35% from 2017, 0.65% from 2018, and 1% starting from 2019.<sup>26</sup> In Kazakhstan, SIBs are required to have an additional capital buffer of 1% of RWAs starting from 1 January 2017. In Belarus, a level of additional capitalization depends on a SIB's group. Banks from the first group have greater systemic influence and are subject to an additional capital buffer of 0.75% from January 2018 and 1.5% from January 2019. Banks from the second group are required to build a buffer of 0.5% and 1% starting from the years 2018 and 2019 respectively.<sup>27</sup> Another interesting observation is that only SIBs of Russian Federation have to meet the

<sup>26</sup> The Central Bank of the Russian Federation, Press Service. On measures to implement Basel III and to regulate systemically important banks. 17 July 2015.

<sup>27</sup> The National Bank of the Republic of Belarus. Methodology on determination of systemically important banks and non-banking credit organizations. Instruction No.180 dated 18.05.2017.

minimum requirements for the LCR and NSFR. The CBR introduced Basel III LCR from 1 January 2016 at a minimum threshold of 70% with an annual 10% increase so that the ratio reaches 100% as of 1 January 2019.<sup>28</sup> When setting up the level of the ratio, CBR takes into account the current liquidity issues of Russian banks.

Indeed, the closer analysis of the new liquidity regulation in the EAEU reveals that it is not uniform across the countries. Table 1.7 shows that in Kazakhstan, Belarus and the European Union, the NSFR requirements are applied for all banks. In Russia, the NSFR regulation is set for systemically important banks. In the US, only Global systemically important banks, large Bank Holding Companies (BHCs) with size more than \$250 bn. and regional banks with size more than \$50 bn. are subject to the minimum NSFR threshold. In support of the above regulation, Distinguin et al. (2013, p. 3310) wrote: “Adding liquidity ratios to capital ratios might be more relevant for large banking institutions than for small banks. Large banking institutions might underestimate liquidity risk because of their too big to fail position. However, large banking institutions might also be managing their liquidity differently, with more sophisticated off-balance sheet instruments”.

**Table 1.7 Regulation of the NSFR**

	<b>Requirements for the NSFR</b>	<b>Comments</b>
Russia	100% as of 1 January 2018	Applied only for systemically important banks
Kazakhstan	100% as of 1 January 2018	Applied for all banks
Belarus	100% as of 1 January 2018	Applied for all banks
EU	100% as of 1 January 2018	Applied for all banks
USA	100% as of 1 January 2018	Applied only for Global SIBs, large BHCs with size more than \$250 bn. and regional banks with size more than \$50 bn.

<sup>28</sup> The Central Bank of the Russian Federation, Press Service. On introducing liquidity coverage ratio. 7 September 2015.

### 1.4.3 Determinants of bank profitability

#### *1.4.3.1 The trade-off between bank funding liquidity, risk and profitability*

The prior studies clearly indicate the trade-off between bank funding liquidity, risk-taking and profitability that initiated two research directions. One strand of the literature explores the effect of funding liquidity on bank risk-taking. Vazquez and Federico (2015) analyze US and European credit institutions during 2009 – 2011 and find that banks with greater leverage and funding liquidity risk are more likely to fail during the crisis. Moreover, they report that Global banks' failure is mainly associated with excessive leverage, whereas domestic banks' distress is related to imprudent structural liquidity. Bologna (2015) investigates different funding structures and their effects on probability of default of US banks during the crisis 2007-2009. It is found that the lower loan to deposit ratio and the higher NSFR positively influence on resilience of sample banks. Hong et al. (2014) also estimate the effect of Basel III LCR and NSFR on bank failures in the US. The authors provide evidence that idiosyncratic liquidity risk had a minimal effect on bank distress, whereas systemic liquidity risk is a major driver of bank failures during the last financial crisis. The findings imply that effective liquidity management should target both the individual and systemic liquidity risks. Khan et al. (2017) explore the relationship between funding liquidity and risk-taking of US banks from 1986 to 2014. They provide evidence that better funding liquidity (measured by bank deposit ratio) is associated with higher amount of risk-weighted assets, greater liquidity creation and lower Z-scores. Ly et al. (2017) state that US BHCs have increased the adjustment speed towards compliance with imposed Basel III NSFR requirements. The adjustment speed is higher for smaller banks and banks with lower NSFR. The authors find that the changes significantly reduce the liquidity and systemic risk of US banking system.

Another strand of the post-crisis research refers to relationship between bank structural liquidity and profitability. Although the literature on risk-taking generally concludes that prudent funding structures improve bank risk profile, the reverse effect is expected with respect to bank profitability as the reduction in funding liquidity risk is

mainly achieved by narrowing the maturity mismatch between assets and liabilities. Bordeleau and Graham (2010) report that ROA and ROE of US and Canadian banks have improved with holding of liquid assets but to the limited extent. The further increase in liquid assets' share has significantly worsened profitability of the banks. DeYoung and Jang (2016) confirm that the relationship between US banks' profitability and liquidity adjustment exhibits inverted U-shape. It means that the liquidity management in banks should be optimized since further increase in the NSFR leads to lower accounting returns measured by ROA and ROE. King (2013) analyzes the NSFRs of representative banks from 15 countries and suggests the most effective strategies to meet the required threshold for the ratio. The study reports that the new liquidity requirements may improve bank risk profile through more prudent funding structures and better capitalization. However, the expected changes in business models will adversely affect bank profitability as the study estimates on average 70-88 basis points decrease in the NIM. Moreover, banks with more diversified business strategies experience greater decline in the NIM due to adjustment of their balance sheets towards the target level of the NSFR. Dietrich et al. (2014) analyze the major business drivers of the NSFR and its effect on profitability of 921 Western European banks during 1996 – 2010. Contrary to authors' expectations, there is no effect of the NSFR on ROA, ROE and NIM. Mergaerts and Vennet (2016) examine the stability and performance of European banks between 1998 and 2013. The authors find that the NSFR negatively affects ROE and NIM, but there is no evidence that higher NSFR adversely influences ROA and Z-score. Wei et al. (2017) theoretically evaluates the impact of the NSFR on banks' choices of debt maturities and assets structures, and then consequences of these choices for banks' profitability and social welfare. They report that under the strict liquidity regulation, the NSFR will reduce the reliance on short-term financing, maturity mismatch problems and improves bank sustainability. However, at the same time, a narrower maturity gap negatively affects bank profits, which, in turn, may increase probability of banks' failure over long-term horizon.



#### *1.4.3.2 Empirical literature on funding liquidity, risk and profitability of large banks*

The review of prior literature reveals that many studies investigate the relationship between bank size, risk-taking and performance. However, there is a scarce scope of research works that focus on systemically important financial institutions due to novelty of the issue.

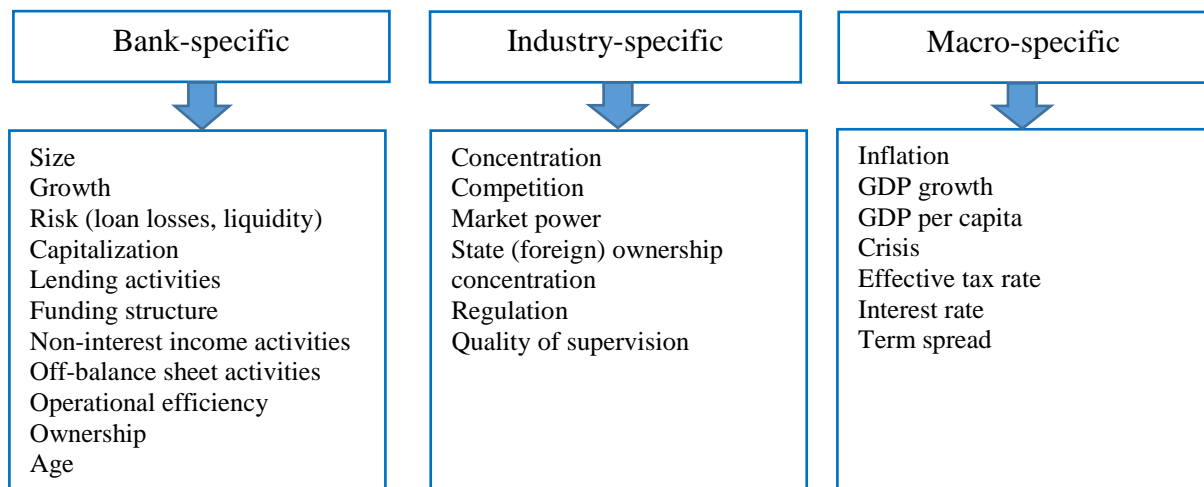
Shehzad et al. (2013) analyze the relationship between size, growth and profitability of banks from 148 countries between 1988 and 2010. The study provides evidence that bank size persistently and positively influences banks' profitability of developed OECD countries; however, the relationship is not significant for the sample of banks from developing non-OECD countries. Gobat et al. (2014) investigate the NSFR for 128 countries and find that most of banks operated at prudent NSFR by the end of 2012. The analysis of 28 global systemically important banks reveals that these banks have made significant progress in addressing the structural funding problems as their average NSFR rose from 97% in 2007 to 117% by the first half of 2013. DeYoung and Jang (2016) explore how US banks manage their liquidity through targeting traditional loans to core deposits ratio and the NSFR during 1992 – 2012. They find that more than half of SIBs historically operate at lower liquidity targets compared to smaller banks (as most of SIBs reported the NSFR below 100% prior to the GFC). However, SIBs have been able to adjust their balance sheets more quickly than smaller banks to comply with the new liquidity regulation. Ly et al. (2017) analyze the effect of the NSFR adjustment speed on bank systemic risk for different size groups. They report that US banks with smaller size tend to adjust their NSFR faster, whereas the adjustment speed of medium and large banks' NSFR is not significant. The authors explain that access to state credit facilities reduces with bank size and motivates small banks to adjust their NSFR quicker. Bertay et al. (2013) investigate the effect of bank size on profitability, risk, business strategies and market discipline using an international bank sample during years 1991 – 2011. The authors report that larger absolute size positively impacts on banks' ROA and ROE. In contrast, banks with large systemic size tend to be less profitable. In terms of

business strategies, larger banks in absolute terms operate at greater share of non-interest income and short-term market borrowing, have higher leverage and hold less amount of loans. Systemically large banks exhibit better market discipline.

#### *1.4.3.3 Internal and external determinants of bank profitability*

There is a significant body of prior literature on the major determinants of profitability for cross-country and individual country's samples. In this section, we identify the most common variables that may drive profitability of EAEU banks. We categorize the variables in three groups: the internal bank-specific, external industry-specific and macro-specific determinants. Figure 1.1 summarizes the most commonly applied explanatory variables of bank profitability.

**Figure 1.1 Determinants of bank profitability**



The empirical literature on determinants of bank profitability goes back to early studies of Short (1979), Bourke (1989), Berger (1995), Berger et al. (2000). We mainly focus on the most recent research works as the banking industry has been developed rapidly during the last two decades. One strand of the literature focuses on profitability of banks at the country level. Garcia-Herrero et al. (2009) provide evidence that low profitability of Chinese banks during 1997 – 2004 is mainly driven by high credit losses, operational inefficiency and leverage. The dominating state ownership and a high banking sector's concentration negatively affect ROA. However, deposit funding, higher interest

rates and inflation are associated with greater pre-provision profit and ROA. Dietrich and Wanzenried (2011) examine profitability of 372 Swiss commercial banks during 1999-2009. They show that excessive lending and GDP growth have positive effect, whereas operational inefficiency, funding costs and effective tax rate have negative effect on all measures of profitability across all samples and periods. The impact of other variables varies with sample periods. For example, equity capitalization and loan loss provisions positively influence the NIM during normal times, but negatively affect ROA during crisis years 2007-2009. Swiss banks with higher share of interest income tend to be less profitable, which implies that some business diversification is important to support bank long-term performance. Entrop et al. (2015) analyze the determinants of the NIM and its components (the interest income margin and the interest expense margin) of German banks during 2000 - 2009. They find that greater capitalization, operating costs and market power positively influence the NIM, whereas non-interest income is associated with lower profitability. The decomposition of the NIM reveals that market power has much stronger impact on interest income than on interest expense. Credit risk and duration gap also have positive effect on the NIM. Among macroeconomic variables, the Libor volatility and inflation are positively associated with NIM. The negative effect of GDP growth on profitability is explained by stronger competition at the loan markets during economic booms that lead to lower credit standards. Bouzgarrou et al. (2018) examine profitability of 170 French banks across bank ownership types. The authors report that foreign ownership is strongly associated with better profitability of the French banking sector. Equity capitalization positively influences ROA but negatively affects ROE and NIM of French banks. Banks with greater size and loan losses tend to have lower profits. Off-balance sheet activities, GDP growth, inflation have various effects depending on profitability measure (ROA, ROE or NIM) and sample compositions (foreign versus domestic ownership types).

Another strand of the literature explores international samples for determination of major drivers of bank profitability. Demircuc-Kunt and Huizinga (2010) analyze the impact of bank business activities on risk and return of banks from 101 countries. They find that banks are able to boost their overall performance by combining interest and non-

interest generating activities. In particular, the greater fee income share, capitalization, and asset growth have significant positive effect on ROA. The authors also provide evidence of non-linear relationship between fee income and ROA. They explain that positive effect of business diversification is limited and further increase in fee income tend to decrease the overall bank profitability. Finally, both inflationary environment and GDP growth favorably influence profitability measured by ROA. Bertay et al. (2013) report that bank capitalization and GDP growth positively impact ROA and ROE of banks from 90 countries. Short-term borrowing has negative effect on NIM, but not material for ROA and ROE. It is also found that commercial banks are more profitable than investments banks. Kohler (2015) analyze the effect of business models on Z-score and its components using banks from 15 European countries. The decomposition of Z-score into risk-adjusted ROA and risk-adjusted equity ratios shows that greater non-interest income and capitalization improve ROA of retail-oriented banks. Lending activities, stronger balance sheets' liquidity and asset growth are associated with lower profitability. Among market controls, inflation and long-term interest rate negatively affect risk-adjusted ROA. Petria et al. (2015) extend the bank sample to 27 European Union countries. They report that greater NPLs, higher cost to income ratio, loan to deposit ratio and market concentration significantly decrease ROA and ROE of European banks during 2004-2011. Better capitalization, stronger reliance on non-interest income and GDP growth contribute to positive performance of the banks. Djalilov and Piesse (2016) compare the determinants of profitability of CEE and Baltic banks' relative to banks from former USSR. They note that bank size and equity capitalization have significant positive influence on ROA of banks from CEE and Baltic countries but not material in the sample of late transition economies. The credit losses improve performance of banks from Eastern European and Baltic region but have deteriorating effect on ROA of former Soviet banks. The negative result of loan losses is explained by poor credit management and adopted risk-aversion strategies in those countries. With respect to external variables, the authors note that government spending and monetary freedom negatively affect bank profitability in transition countries. They also point out that state intervention in the banking sectors of these countries still prevails. Micco et al. (2007) analyze banks from 179 countries and

find that state ownership in developing economies is strongly associated with lower NIM and ROA, whereas private and foreign banks tend to be more profitable. Iannotta et al. (2007) for European banks and Cornett et al. (2010) for banks from 16 Far East countries conclude that state ownership has significant negative effect on bank profitability. Mirzaei et al. (2013) investigate the relationship between market structure, profitability and stability in 17 advanced and 23 developing economies. They find that banks from advanced economies are able to increase their profitability through greater market share, which supports the relative-market-power hypothesis. However, they also report the negative effect of sector concentration on profitability of banks from emerging economies.

### 1.5 Gap in the literature

This research work aims to address gaps revealed by the analyses of empirical and regulatory literature. *First*, most of prior studies use datasets from advanced economies or global international samples that include large *listed* banks. The EAEU banking sectors mainly consist of *unlisted* banks, which is a common feature for emerging economies with less developed capital markets. When Kohler (2015) expanded his study by including unlisted European banks, he reported significantly different results. The findings from developed countries could not be generalized for economies in transition since they operate at different institutional setting, government policy and regulation. Moreover, there is no complete database on banking firms from Eurasian region. Our database is hand-collected from audited annual reports prepared according to the International Financial Reporting Standards (IFRS). It covers 70.7%, 96.7% and 99.1% of sample bank assets out of total bank assets in Russia, Kazakhstan and Belarus respectively as of 1 January 2016.

*Second*, there is no consensus in the empirical literature on the relationship between business models and their impact on bank financial stability. Analysis of literature suggests that shifts in business strategies do not necessarily mean greater risk-taking. On the contrary, some studies confirm benefits from more diverse bank activities (e.g. Lopez-Espinoza et al., 2013; Kohler, 2015). Moreover, the effect depends on some

initial conditions such as level of bank capitalization, size or business focus. This research offers an empirical analysis of EAEU bank stability at the domestic and regional levels that does not currently exist. Regional analysis is extremely important as bank stability in transition economies may be affected by some other factors that are not common for developed countries (e.g. affiliation with a government may play significant role across post-Soviet region).

*Third*, the empirical investigation of the NSFR is quite new and limited even in the Western world due to novelty of the issue. This research is a first attempt to calculate the NSFR using public data for banks from EAEU transition economies. It aims to promote deeper understanding of the relationship between bank business strategies and structural funding liquidity, and assist bank supervisors in designing a more effective regulatory framework. The study of Dietrich et al. (2014) is the closest to this research work, but we propose a broader range of business variables to explain the determinants of the NSFR of EAEU banks.

*Fourth*, this research work expands the existing literature on major determinants of bank profitability by applying two novel regulatory variables. In particular, we add to scarce scope of studies that investigate the effect of newly introduced NSFR on profitability of banks. Moreover, there is no comparative assessment of SIBs' regulations in the EAEU and the effect of bank systemic importance on profitability. In terms of both research questions, this is a pioneered study for banks in the Eurasian region.

The enhanced banking regulation and sustainable banking systems are critical prerequisites towards successful economic and financial integration in the EAEU. This research work contributes to the design of effective banking regulation in the region through the comparative and empirical analyses performed in other chapters of the thesis.

## **CHAPTER 2 Comparative Analysis of Banking Structures, Regulations and Stability Indicators**

### **2.1 Introduction**

The EAEU aims to facilitate a sustainable economic development, modernization and competitiveness, which will subsequently raise the living standard of the member states.<sup>29</sup> The success of the project, however, depends on many factors including the effective design and implementation of common legislations for ensuring free movement of goods, services, capital and labor. The chapter contributes to a specific area of the economic integration – the formation of the single financial market in the EAEU, which objectives and principles are defined in Section 16 of the Treaty.<sup>30</sup> Annex 17 to the Treaty outlines the criteria of the common financial market within the EAEU such as harmonized regulation and supervision, mutual recognition of licenses, provision of financial services without additional incorporation of juridical persons, administrative cooperation and exchange of information between authorized authorities.<sup>31</sup> Moreover, a supranational agency for regulation of financial markets in the EAEU will be established by 2025 in Almaty, Kazakhstan.

The need for Eurasian financial integration is aggravated by geopolitical tensions between Russia and the West, which have resulted in limited access to external sources of financing, withdrawal of foreign capital and additional economic pressure on the Russian ruble. Aalto and Forsberg (2016) state that Western sanctions have affected liquidity of Russian banks and undermined the sustainability of the entire Russian banking sector. Despite their maintained political neutrality, other EAEU member states have also been impacted by negative consequences of the sanctions due to their economies’

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<sup>29</sup> The Treaty on the Eurasian Economic Union, Article 4. <http://www.eaeunion.org>

<sup>30</sup> The Treaty on the Eurasian Economic Union, Part III, Section 16 “Regulation of financial markets”, Article 70 “Objectives and Principles”.

<sup>31</sup> Annex 17 to the Treaty on the Eurasian Economic Union “Protocol on financial services”.

interconnectedness with Russia. Konopelko (2017) specifically notes that the EU sanctions against Russia have adversely influenced the Kazakhstani economy.

The chapter analyzes the banking sectors of EAEU founding states for identification of discrepancies that may hinder creation of the common market for financial services. The research pursues the following three objectives. *First*, using aggregated bank data from the Central Bank of Russia (CBR), the National Bank of Kazakhstan (NBK) and the National Bank of the Republic of Belarus (NBRB), it analyzes the structures of EAEU banking sectors during 2009–2015 in order to suggest the likely effects of financial integration on the reshaping of banking systems in the EAEU. The banking sectors of early transition Central and Eastern European (CEE) and Baltic States serve as a benchmark to draw inferences on banking developments in the EAEU. We observe significant heterogeneity of EAEU cross-country banking sectors, which are currently featured by high concentration, low level of foreign ownership and significant dominance of state-controlled banks. Baele et al. (2004) state that full financial integration could be achieved between countries with different banking structures if all banking systems are subject to nondiscriminatory access to financial services, common regulation and supervisory practices.

*Second*, the research work compares EAEU banking prudential regulations and their compliance with the Basel Committee on Banking Supervision (BCBS) Basel III standards for capitalization and liquidity. The analysis shows that the Central Bank of Russia has introduced most of the Basel III recommendations. The regulations of Kazakhstani and Belarusian banks, however, lag behind as many legal acts are either in the process of issuance or have not yet been put in force. Gordon and Lazarev (2016) emphasize that at the initial stage EAEU countries will follow a “segmented harmonization” with minimum corrections in national legislation. At the final stage, the member states target full harmonization of financial legislation and the transfer of regulatory and supervisory functions to the supranational financial regulator.

*Third*, the analysis of EAEU bank stability reveals another essential condition for successful conversion into the single market for financial services – mitigation of specific



national imbalances in accumulated bank risks. Banks from three EAEU sampled countries show deterioration in net interest margin post – crisis period. Belarusian banks operate at the lowest level of profitability pressured by increasing amount of non-performing loans. Russian banks experience high structural liquidity risk, whereas Kazakhstani banks report sizable credit losses. The issue of falling profitability and accumulated bank risks should be urgently addressed by each EAEU member state. The financial integration may facilitate these risks' spillover across national borders, which, in turn, may threaten financial stability of the EAEU.

The remainder of this chapter is organized as follows. Second section analyzes capacity, concentration and ownership of the banking sectors of the founding EAEU states between 2009 and 2015 and suggests the likely effects of financial integration on the sectors' structural developments. The third section provides an overview of European Basel III standards for capitalization and liquidity. The fourth section compares the regulatory frameworks of EAEU banks and their compliance with Basel III requirements. Fifth section analyzes key indicators of bank stability: profitability, credit risk, capitalization, funding liquidity and business diversification. The final section presents the chapter's conclusions.

## **2.2 Structural changes of EAEU banking sectors relative to banks from CEE and Baltic States**

The banking sectors are analyzed across two dimensions: within the EAEU during 2009 – 2015 and in comparison with the EU as of 1 January 2015. We compare the banking sectors' absolute size, growth, capacity, concentration and ownership characteristics. The following reasons justify the appropriateness of the analysis. *First*, nearly 45 years, the former Soviet countries, CEE and Baltic States had shared a common socialistic system characterized by strong public ownership and political control of all economic sectors. After collapse of the communism in Central and Eastern Europe in 1989 and the Soviet Union in 1991, the countries followed the common target to transit from a centrally planned to a free market economy. *Second*, EAEU, CEE and Baltic States

implemented the sequence of reforms based on Washington consensus, which mainly focused on price and trade liberalization, privatization and stabilization of economic and financial systems.<sup>32</sup> *Third*, the accession of ten CEE and three Baltic States initiated the new era of transition through the integration with the Western Europe starting from 2004 (the South European Romania and Bulgaria joined the EU in 2007). The banking sectors' structures of CEE and Baltic States have changed tremendously due to foreign direct investments' inflow and conversion with the common banking regulation. We follow the framework suggested by Djalilov and Piesse (2016) and treat CEE and Baltic States (the early transition countries) as a benchmark to draw inferences on potential banking development through financial integration in the EAEU (the late transition countries).

### **2.2.1 The capacity and growth**

EAEU banking sectors are characterized by high growth rates but relatively small size. Figure 2.1 presents the dynamic of bank assets to GDP ratios across three EAEU countries. The Russian banking sector's penetration to the economy gradually increased reaching 99.8% of bank assets to GDP as of January 2015. The Belarusian banking sector expanded rapidly from 29.5% of bank assets to GDP in 2009 to 66.2% of bank assets to GDP in 2012 and then stayed at the same level of approximately 55.0% of bank assets to GDP during 2013 - 2015. Kazakhstani banks' assets to GDP ratio shrunk from 90.9% in 2007 to 44.1% in 2013 indicating serious depression in the industry as a consequence of the financial crisis.<sup>33</sup>

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<sup>32</sup> Washington consensus is the list of ten market-oriented policy reforms agreed by international institutions in Washington. These reforms were strongly influenced by the IMF and the World Bank.

<sup>33</sup> Kazakhstani bank assets to GDP ratio reached 57.6% as of 1 January 2016.

**Figure 2.1 Dynamic of EAEU bank assets to GDP, 1.01.2007 – 1.01.2015**

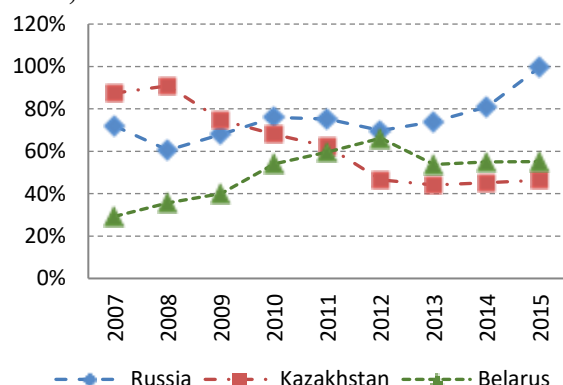


Figure presents dynamic of bank assets to GDP ratios of EAEU banks during 2007 – 2015  
Data source: CBR, NBK, NBRB, calculated by author

**Figure 2.2 EAEU bank deposits, loans and assets to GDP as of 1.01.2015**

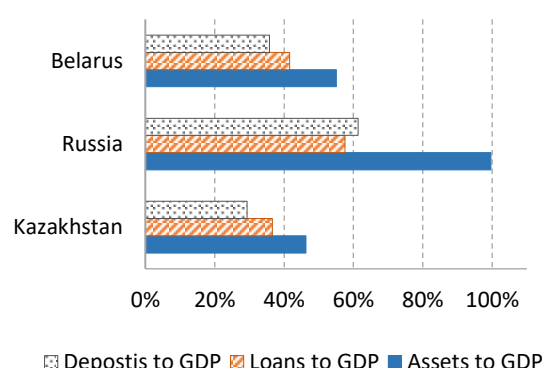


Figure shows bank deposits, loans and assets to GDP ratios of EAEU banks as of 1 January 2015  
Data source: CBR, NBK, NBRB, calculated by author

Figure 2.2 shows that EAEU banks' credit and deposit capacity relative to GDP remains weak. Constrained lending is associated with several country-specific reasons. *First*, large businesses in Russia and Kazakhstan are mainly represented by mining companies, which prefer to borrow at lower rates through foreign capital markets.<sup>34</sup> *Second*, the growth in mortgages and consumer loans is constrained by an unfavorable macroeconomic environment characterized by high inflation and falling income of potential borrowers. *Third*, the market share of state banks is quite significant in the region, especially in Belarus. Government participation in ownership leads to state-directed lending, which restrains a loan to GDP ratio. Finally, large stocks of non-performing loans limit a bank's ability to finance growth.

Figure 2.3 exhibits bank assets to GDP ratios of CEE, Baltic and EAEU economies. During first years of independence, the countries completed structural reforms and introduced two-tier banking systems. The CEE and Baltic regions had experienced a fast GDP growth prior to 2008. However, since joining the EU in 2004, CEE credit institutions have developed rapidly due to active penetration of foreign capital, governance, technology and more advanced regulatory standards. Even relatively smaller

<sup>34</sup> In the Russian Federation, the access to international borrowing has been limited by imposed Western sanctions in 2014.

Baltic States were able to achieve greater financial development through sizable foreign direct investments from Scandinavian countries. Figure 2.3 shows that Russian bank assets to total GDP stands along with Hungary (113%), Slovenia (110%), and Poland (89%). Kazakhstani and Belarusian bank assets to GDP ratios are lower than in Lithuania (70%), Slovakia (70%) and Romania (65%).

**Figure 2.3 CEE, Baltic and EAEU bank assets to GDP as of 1.01.2015**

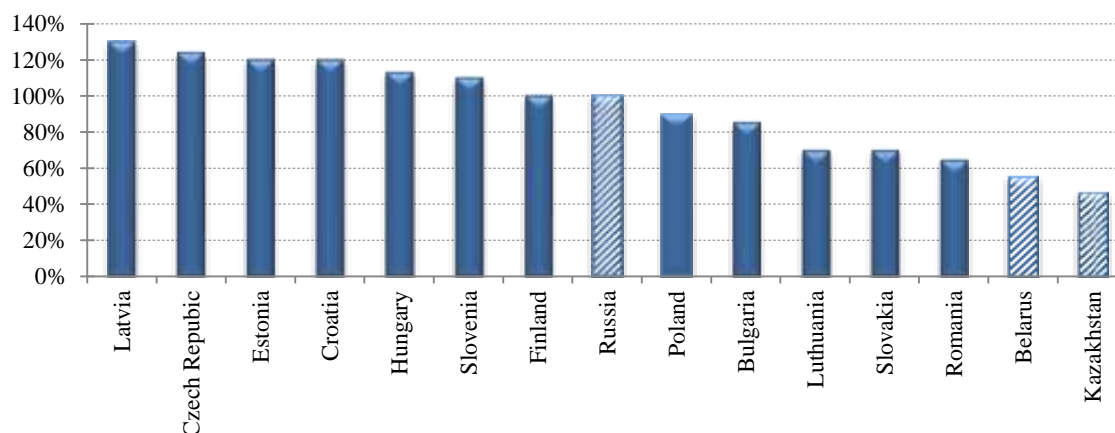


Figure presents the ratio of total assets of domestic banks and foreign subsidiaries and branches to GDP for CEE, Baltic and EAEU banks as of 1 January 2015. Data for Romanian banks is as of 1 January 2014.  
 Data source for Eurozone countries: ECB report on financial structures, October 2015.  
 Data source for non-Eurozone countries: <http://www.helgilibrary.com/indicators/bank-assets-as-of-gdp/>  
 Data source for EAEU countries: CBR, NBK, NBRB.

## 2.2.2 Concentration and ownership

Analysis of ownership and concentration plays an important role in explaining structural features of the banking sectors. Table 2.1 reports the number of banks, concentration ratios and ownership characteristics of the Russian, Kazakhstani and Belarusian banking sectors.

The number of Russian credit institutions fell from 1058 in 2009 to 783 in 2015 due to massive defaults of small and medium-size banks. Indeed, 214 banks left the market in 2014 as their licenses were revoked by the Central Bank of Russia (248 banks and 342 bank licenses were withdrawn in 2015 and 2016 respectively). The major reasons for license withdrawal, as reported by the CBR, were low asset quality and underestimated

loan loss provisions that led to overstated bank capitalization. The number of banks in Kazakhstan and Belarus remained relatively stable between 2009 and 2015. However, the waves of consolidation in the sector resulted in the decrease from 38 to 35 banks in Kazakhstan and from 31 to 26 banks in Belarus during 2015 - 2016.

**Table 2.1 Market concentration and ownership of banks in the EAEU**

	1.01.2009	1.01.2011	1.01.2013	1.01.2015
<b>Russia</b>				
Assets of top 5 banks	46.2%	47.7%	50.3%	53.6%
Loans of top 5 banks	48.8%	49.9%	52.9%	59.1%
Deposits of top 5 banks	57.1%	53.1%	56.1%	59.9%
Number of licensed banks	1058	955	897	783
Number of banks with foreign participation*	221	220	244	225
Market share of banks with foreign participation*	10.6%	9.3%	9.2%	7.6%
Number of banks with state participation **	n/a	n/a	n/a	n/a
Market share of banks with state participation**	47.3%	50.4%	52.3%	52.3%
<b>Kazakhstan</b>				
Assets of top 5 banks	74.8%	71.8%	60.0%	52.4%
Loans of top 5 banks	78.0%	74.8%	65.3%	58.9%
Deposits of top 5 banks	68.10%	69.7%	57.5%	51.0%
Number of licensed banks	37	39	38	38
Number of banks with foreign participation*	14	17	19	16
Market share of banks with foreign participation*	21.0%	27.5%	25.2%	20.1%
Number of banks with state participation **	1	5	4	1
Market share of banks with state participation **	0.01%	60.1%	37.8%	16.8%
<b>Belarus</b>				
Assets of top 5 banks	80.1%	82.5%	80.6%	79.1%
Loans of top 5 banks	81.8%	84.6%	83.3%	82.6%
Deposits of top 5 banks	85.0%	82.6%	79.5%	80.3%
Number of licensed banks	31	31	32	31
Number of banks with foreign participation*	20	23	23	20
Market share of banks with foreign participation*	20.5%	27.8%	34.2%	33.8%
Number of banks with state participation **	5	4	4	5
Market share of banks with state participation **	78.0%	71.2%	64.8%	65.0%

This table reports EAEU banking sectors' concentration based on total assets, loans and deposits of largest 5 banks out of total banks assets.

\* Foreign participation indicates a bank that has more than 20% of foreign shareholding in bank capital directly or indirectly.

\*\*State participation indicates that a bank has at least 20% of state ownership in bank capital directly or indirectly. Ownership definition is based on IAS 27 and IAS28.

Data source: Calculated by author using data from CBR, NBK, NBRB.

Assets of the largest five banks account for 53.6%, 52.4% and 79.1% of total bank assets in Russia, Kazakhstan and Belarus respectively as of January 2015. The three countries, however, demonstrate different trends in market concentration. The five largest Russian banks have gained more power over time as their market share increased from 42.3% to 53.6% between 2009 and 2015. Kazakhstani banks' concentration declined significantly from 74.8% in 2009 to 52.4% in 2015. The major reason was the rising market share of small and medium banks during the post-crisis period. The Belarusian banking sector has been historically highly concentrated as the top five banks control approximately 80% of total bank assets implying that smaller banks have limited influence on the sector's performance and risk profile.

The market share of banks with foreign participation falls in Russia and Kazakhstan while it rises in Belarus. Indeed, the largest Western banks have closed their businesses with high-risk Russia in an attempt to comply with the rules of the sanctions.<sup>35</sup> In Kazakhstan, some Western banks have also given up their market share. An increase in foreign ownership in Belarusian banking sector is largely driven by greater penetration of Russian banks in the sector.<sup>36</sup> Indeed, Russian banks express a strong intention to devastate their businesses with Ukraine and relocate their capital into politically friendly member countries.<sup>37</sup>

State-owned banks are important players in the Russian and Belarusian banking systems. The market share of public banks' assets in Russia increased from 47.3% in 2009 to 52.3% in 2015. Moreover, the largest four Russian banks are either directly or indirectly state-controlled.<sup>38</sup> The Kazakhstani banking sector has historically only one 100% state-owned bank, "Zhilstroysber Bank". The increase in the state's participation in Kazakhstani bank capital to 60.1% in 2011 was the result of the partial nationalization of

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<sup>35</sup> For example, Barclays (UK), KBC (Belgium), HSBC (UK) exited Russia in 2015.

<sup>36</sup> Such as Sber Bank of Russia, VTB bank and Alfa bank.

<sup>37</sup> Roman Olearchyk. Ukraine imposed sanctions on Russian-owned banks. Financial times, 16 March 2017. Accessed: <https://www.ft.com/content/45153bb8-c24e-34c1-b989-e9805671f7d3?mhq5j=e3>

<sup>38</sup> As of 1 January 2015, the largest Russian banks by assets are Sberbank of Russia, VTB bank, VTB 24 and GazProm bank.

three distressed banks in 2009.<sup>39</sup> The Kazakhstani government is gradually reducing its shareholding in those banks by arranging forced mergers with private credit institutions.<sup>40</sup> Belarus demonstrates the highest public and foreign participation in the banking sector. State ownership, however, declined from 78.0% in 2009 to 65.0% in 2015.

Figure 2.4 shows that five largest banks control more than 60% of bank assets in the majority of CEE and Baltic States. Banking sectors of Croatia, Hungary, and Estonia are the most concentrated and exhibit the ratio above of 90%. A concentration ratio of Belarusian banking sector (79%) is similar to that of Czech Republic (78%). The banking sectors of Russia and Kazakhstan show an average level of concentration that is slightly less than in Slovenia (56%) and Romania (55%), but greater than in Poland (48%). Although CEE and Baltic banking sectors remain highly concentrated (except for Slovenia, Romania and Poland), they face cross-border competition stipulated by the single market.<sup>41</sup>

The Herfindahl-Hirschman Index (HHI) index is another measure of market concentration and it also serves as a simplified proxy for competition. HHI is calculated as the sum of squared market shares of each bank giving the heavier weight to larger banks.<sup>42</sup> Figure 2.5 indicates that among three EAEU countries, Belarusian banking sector exhibits the least level of competition (HHI is 2190), followed by Kazakhstan (1402) and Russia (1080). Russian banks' HHI is close to Slovakia (1221) and Latvia's HHI (1037); Kazakhstani banks' HHI is comparable with Croatia (1384); Belarusian banks' HHI stands along less competitive markets of Estonia (2483) and Lithuania (1892).

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<sup>39</sup> Kazakhstani government became the largest shareholder of BTA bank (including its subsidiary Temir bank) and Alliance bank by controlling more than 70% of equity; Halyk Saving and KKB banks received capital injection from the state that controlled around 21% of equity in 2009.

<sup>40</sup> KKB bank acquired BTA bank by purchasing stocks from the Welfare State Fund "Samruk-Kazyna". The deal was completed in June 2015.

<sup>41</sup> ECB Report on financial structures, October 2015.

<sup>42</sup> If HHI is less than 1000, a market has low concentration and high competition; if HHI stands between 1000 and 1800, a market is moderately concentrated and has average level of competitiveness; if HHI is above 1800, market is highly concentrated and has low level of competition. Source: ECB Report on financial structures, October 2016 (p. 30).

Figure 2.6 compares foreign ownership characteristics of banks in the EAEU, CEE and Baltic States. We observe that most of CEE and Baltic States exhibit significant market share of foreign banks except for Slovenia (33% of total assets). A high share of foreign capital in CEE and Baltic banking sectors is associated with one-way penetration of foreign direct investments (FDIs) from advanced EU economies that is an inevitable consequence of removed entry barriers at the integrated market for financial services. Indeed, banks from developed EU countries earned greater net interest margin by investing in less developed EU member states. Among Baltic countries, Estonia experienced the surge of FDIs after its EU membership.<sup>43</sup> In exchange, CEE and Baltic States received benefits in the form of more advanced business models, technologies and management, which contributed to their banking sectors' development. Russian capital represents the largest foreign share in Belarusian banks. Russian and Kazakhstani banking sectors are still characterized by low level of foreign ownership compared to CEE and Baltic States.

Figure 2.7 presents public involvement in CEE, Baltic and EAEU banking sectors. All banks with state participation in ownership above of 20% are included in the group of public banks.<sup>44</sup> Unlike the most of CEE and Baltic banks, EAEU and Slovenian credit institutions continue to exhibit strong state influence. It seems that scope and speed of banking sectors' privatization have not been so intensive. The Slovenian banking sector is quite different compared to other CEE economies as it preserves strong state ownership (two largest banks in the country are state-owned) in spite of sharing the single market with the rest of the EU.

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<sup>43</sup> Majority of FDIs to Estonia came from Sweden and Finland, whereas Latvia and Lithuania received FDIs mainly from Denmark, Sweden and Germany (Hunya, 2004).

<sup>44</sup> Schmit et al. (2011) categorize all EU public banks in five groups: fully public (100% of state control), strong public influence (50% – 99.99% of state control), significant public participation (20% – 49.99% of state control), minor public participation (5% – 19.99% of state control) and no public involvement (less than 4.99% of state control).



**Figure 2.4 Assets of five largest banks out of total bank assets as of 1.01.2015**

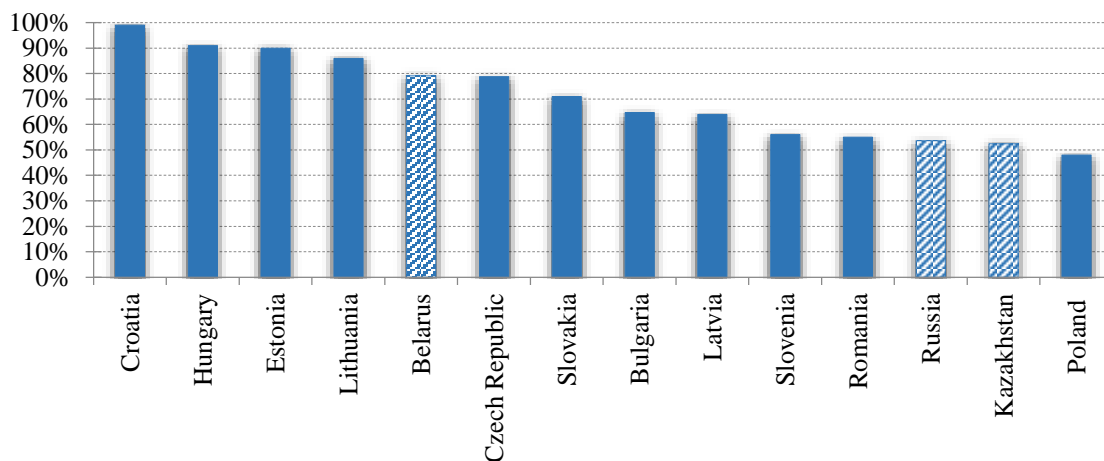


Figure presents percentage share of five largest banks' assets out of total bank assets as of 1 January 2015. Data for Bulgaria, Czech Republic, and Hungary are as of 1 January 2014.

Data for Eurozone countries: ECB report on financial structures, October 2015.

Data for other EU countries: Global Financial Development Database (GFDD), The World Bank.

Data for EAEU countries: CBR, NBK, NBRB.

**Figure 2.5 Herfindahl-Hirschman Index as of 1.01.2015**

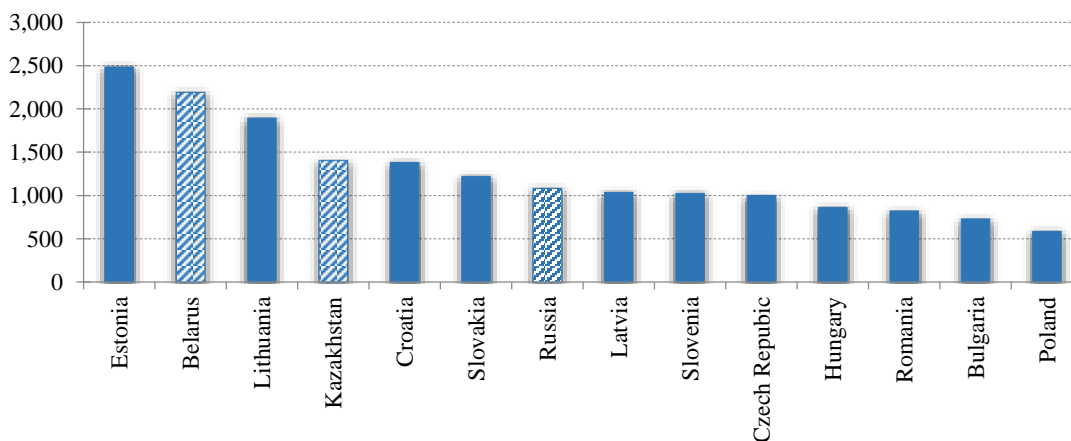


Figure presents Herfindahl-Hirschman Index of CEE, Baltic and EAEU banks as of 1 January 2015. HHI for Kazakhstan is as of 1 January 2014.

Data for Eurozone countries: ECB report on financial structures, October 2015.

Data for EAEU countries: CBR, NBK, NBRB.

**Figure 2.6 Assets of foreign subsidiaries and branches from total bank assets as of 1.01.2015**

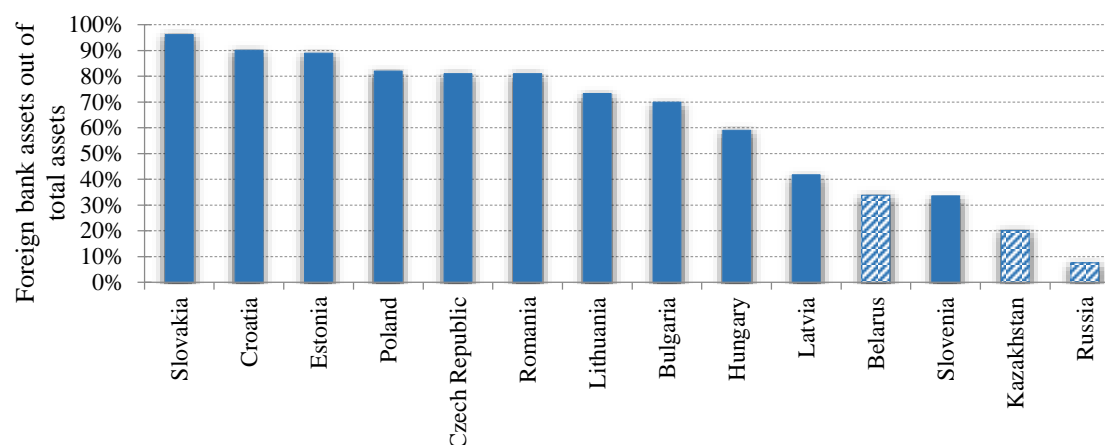


Figure presents percentage share of foreign bank assets out of total bank assets computed on a non-consolidated basis. For Eurozone countries, data is as of 1 January 2015. For other (non-Eurozone) countries, data are as of 1 January 2013. Data for Eurozone countries: ECB report on financial structures, October 2015. Data for other EU countries: Global Financial Development Database (GFDD), The World Bank. Number of foreign branches are collected from national banks' websites. Data for EAEU countries: CBR, NBK, NBRB.

**Figure 2.7 Asset of public banks out of total bank assets as of 1.01.2011<sup>45</sup>**

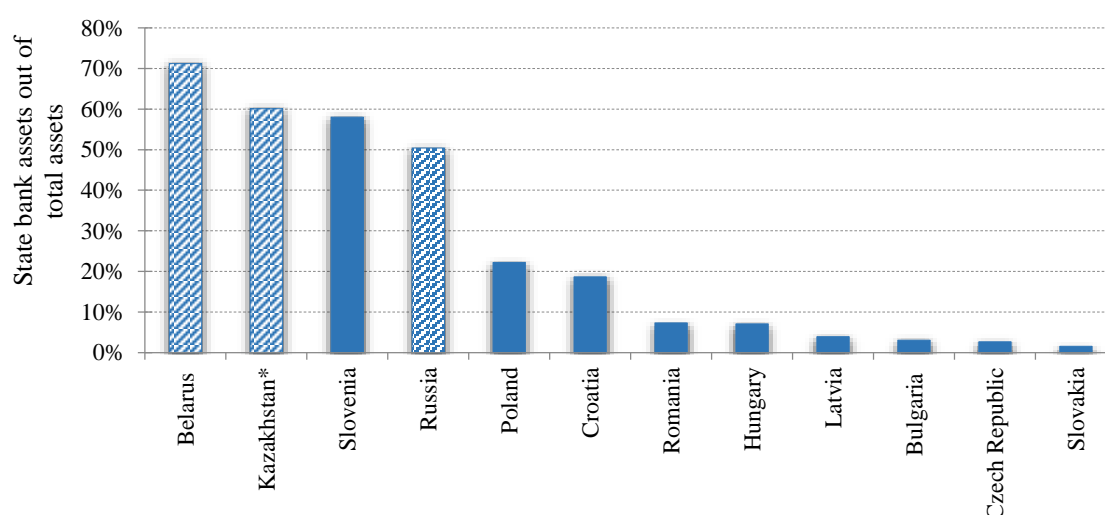


Figure presents percentage share of public bank assets out of total bank assets as of 1 January 2011. Estonia and Lithuania have less than 1% of state ownership and not included in the graph.

\*For Kazakhstan, the state ownership increases to 60% was a result of government intervention in distressed private banks. Before 2009, the market share of state-controlled banks was less than 1%.

Data for EU countries: Schmit et al. (2011). Public financial institutions in Europe. European Association of Public Banks (EAPB), Brussels.

Data for EAEU countries: CBR, NBK, NBRB.

<sup>45</sup> As later consistent data for public banks is not available.

### 2.2.3 Likely effects of financial integration on EAEU banking sectors' development

The creation of a single market for financial services will bring substantial benefits for the development of the EAEU region through increased investment capacity, liquidity and transparency among financial markets. The removal of cross-border barriers will improve competition, ensure more efficient asset allocation and lower transaction costs. However, we would like to discuss some potential effects of the financial integration that are specific for the EAEU region.

*First*, Russian banks' assets account for approximately 90% of all EAEU bank assets as of 1 January 2015 and represent a huge capacity for financial FDIs inflow into other EAEU member states. Indeed, Russian banks are the most likely buyers of public Belarusian banks since attraction of Western investors to the banking sector is impeded by macroeconomic instability and political tensions with the West. Jarosiewicz and Fisher (2015) state that for the Russian Federation, the EAEU is not only an economic but also a political project, through which Russia tries to reinforce its influence in the former Soviet region. The authors note that the EAEU will eventually deepen the economic and political dependence of smaller states on Russia. We expect that benefits of financial integration will be asymmetrically spread across EAEU member states and that Russia will gain even more power.

*Second*, most of CEE and Baltic banking sectors are still highly concentrated (except for Poland, Romania and Slovenia) despite of their longer experience in economic integration. Belarusian banking sector's concentration remains high and distorts fair competition in the country. However, the banking concentration has gradually increased in Russia and has substantially declined in Kazakhstan. We expect that credit institutions from smaller EAEU states will continue to consolidate in order to face growing cross-border competition from Russian banks. The consolidation within EAEU banking sectors is mainly driven by mergers and acquisitions.<sup>46</sup>

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<sup>46</sup> In Russian Federation, VTB Bank merged with Bank of Moscow in 2016. In Kazakhstan, ForteBank, Alliance Bank and Temirbank merged in 2014; Halyk Saving Bank acquired HSBC at the end of 2014 and merged with KKB in 2017.

*Third*, CEE and Baltic banking sectors (except for Latvia and Slovenia) are characterized by significant market share of foreign banks stipulated by one-way penetration of foreign investments from the developed member states. Domestic banks were under great competitive pressure to innovate their businesses and improve customer services (Bouzgarrow et al., 2018). The historically low level of foreign ownership in the EAEU signals high barriers to entry in Eurasian financial markets. Moreover, the Russian banks' expansion will contribute to improvements in innovations and corporate governance only to a limited extent as the technological and cultural gaps between the member states are not very high.

*Fourth*, due to initial privatization reforms and subsequent integration processes, CEE and Baltic banks have gradually turned into private credit institutions (except for Slovenia). However, dominating state control remains a unique feature of the EAEU banking sectors. The IMF (2016) assessed the financial system stability of the Russian Federation in 2016 and recommended legal reforms to improve ownership structure and governance of state-controlled banks.<sup>47</sup> The IMF also supports privatization of state banks in the medium-term horizon. The strategy on development of financial markets in Belarus targets reduction in the share of public ownership in the banking system and the volume of directed lending by 2020.<sup>48</sup> We expect that state control of the banking sectors will gradually diminish, as public banks will not be able to operate at the same level of efficiency and governance facing intense competition.

*Finally*, the financial integration will facilitate a spillover of specific banking risks across the national borders. The analysis of key stability indicators conducted the final section of the chapter reveals the following. During 2009-2015, Belarusian banks operated at lowest level of the net interest margin, Russian banks were exposed to greater structural liquidity risk, whereas Kazakhstani banks reported sizable credit losses. Moreover, some banks have systemic importance due to large market share, complexity and interconnectedness of their transactions with other financial institutions. Improvement of

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<sup>47</sup> International Monetary Fund. July 2016. Financial sector assessment program for the Russian Federation. IMF Country Report No. 16/231.

<sup>48</sup> The National Bank of the Republic of Belarus. 2017. On the strategy of the development of financial markets in the Republic of Belarus by 2020. Ordinance No. 229/6 dated 28 March 2017.

the national banking sectors' risk profile and effective implementation of micro and macro-prudential regulations are crucial for ensuring financial stability in the region.

## **2.3 Overview of the Basel III regulation on bank capitalization and liquidity**

De Larosiere Group's report (2009) draws comprehensive set of recommendations for building a sound and harmonized regulatory and supervisory architecture across the EU single market.<sup>49</sup> The Five Presidents' report (2015) outlines two major phases towards more resilient and integrated Economic and Monetary Union to be completed by 2025. The foremost step in the current stage is the completion of the Financial Union comprised of the Banking Union and Capital Markets Union. The Banking Union is a new regulatory and supervisory system of EU area banks (and other future members) executed at micro and macro levels under a single rulebook. The single rulebook ensures that legal and administrative rules apply consistently across all EU countries. Effective implementation of these legal acts, however, depends on properly designed supervisory processes to oversee financial institutions and intervene at early warning signals to maintain financial stability. The Banking Union comprises three pillars: the Single Supervisory Mechanism (SSM), the Single Resolution Mechanism (SRM) and the European Deposit Insurance Scheme (EDIS). Three pillars cover banks of the Banking Union's participating countries.<sup>50</sup> The SSM ensures effective supervision of EU area credit institutions using Basel III capital requirements. The SRM allows timely intervention of a Single Resolution Board into a distress bank and provides recovery tools through the Single Resolution Fund. The EDIS is still in the process of development and it will gradually replace the harmonized Deposit Guarantee Scheme (DGS).<sup>51</sup> Since the SRM and EDIS are beyond

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<sup>49</sup> European Commission. February 2009. The high-level group on financial supervision in the EU. The de Larosiere Group, Brussels.

<sup>50</sup> All Eurozone countries participate in the Banking Union automatically. Other EU member states may join the Banking Union; however, regardless of the current non-participating status, they are subject to the single rulebook's directives.

<sup>51</sup> The introduction of the European Deposit Insurance Scheme is proposed on 25 November 2015 as a third pillar of the Banking Union. EDIS will start working as a re-insurance system for harmonized national

the scope of this research work, the primary focus of this section is on the single rulebook's capital and liquidity requirements and the Single Supervisory Mechanism.

In December 2010, the Basel Committee on Banking Supervision (BCBS) issued the Basel III global framework with aim to strengthen bank capital and liquidity regulation, supervision and risk management practices.<sup>52</sup> All recommendations of the BCBS towards more resilient banking system were introduced in the European legislation as the Capital Requirements Regulation (CRR) and the Capital Requirements Directive IV (CRD IV) and effective since 1 January 2014 (with full implementation deadline 1 January 2019). The CRR/CRD IV along with the Bank Recovery and Resolution Directive (BRRD) and the Deposit Guarantee Scheme Directive (DGSD) formed the Single Rulebook of the Banking Union. The CRD IV package introduced enhanced prudential regulation, which is briefly discussed next.

Basel III strongly focuses on quality of bank capital by restricting the list of eligible instruments and introducing a Common Equity Tier 1 capital (CET1).<sup>53</sup> A new definition of the regulatory capital includes the following three elements: CET1, additional Tier 1 capital and Tier 2 capital. The minimum capital requirements are tightened and set at 4.5% for CET 1, 6% for Tier 1 and 8% for total regulatory capital out of Risk-weighted assets (RWAs). In addition, a non-risk-based leverage ratio (calculated as Tier 1 capital divided by total on- and off-balance sheet assets) is introduced to constrain excessive bank deleveraging.<sup>54</sup> It works as a trigger to take regulatory actions if a bank breaks the 3% minimum threshold. Basel III also requires stronger risk assessment methodologies, greater risk coverage and higher risk-weights for complex securitization structures, trading book, derivative activities, and counterparty credit risk.

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Deposit Guarantee Scheme since 2019 and subsequently become a full and direct deposit insurance system for countries in EU Financial Union.

<sup>52</sup> The Basel Committee on Banking Supervision. December 2010. Basel III: A global regulatory framework for more resilient banks and banking systems.

<sup>53</sup> For instance, non-cumulative perpetual preferred stocks are excluded from Tier 1 capital. Tier 3 capital is abolished since it represented low-quality capital in the form of subordinated short-term bonds.

<sup>54</sup> The Basel Committee on Banking Supervision. January 2014. Basel III leverage ratio framework and disclosure requirements.

The BCBS Basel III introduces *macro-prudential* capital adequacy requirements in the form of a capital conservation buffer and a countercyclical capital buffer.<sup>55</sup> The capital conservation buffer is set at 2.5% of RWAs in addition to a CET1 minimum level of 4.5%. It obliges banks to build more capital during economic booms and draw it down when systemic losses are realized. The countercyclical capital buffer is imposed individually for each bank by national authorities and varies between 0% and 2.5% of RWAs. It extends the conservation buffer and ensures that bank capitalization is sufficient to absorb losses from an adverse macroeconomic environment. Risks of some financial institutions have *systemic* importance due to sizable market share, complexity and interconnectedness of their transactions. Basel III requires systemically important banks (SIBs) to maintain greater capitalization. According to the BCBS recommendations, national regulators should establish a methodology for assessing the degree to which a bank is systemically important in a domestic (or global) context.<sup>56</sup>

Inappropriate funding structures and insufficient asset liquidity may lead to bank failures and costly public support, which consequently may destabilize financial sector and prevent economic growth. As a response, the BCBS introduces liquidity standards that require banks to comply with a 100% threshold for both the Liquidity Coverage ratio (LCR) as of 1 January 2015 and the Net Stable Funding ratio (NSFR) as of 1 January 2018. The LCR ensures that a bank holds sufficient amount of High-Quality Liquid Assets that is easily converted into cash. This allows a bank to sustain under a liquidity stress scenario within 30 days.<sup>57</sup> The NSFR estimates whether a bank's amount of available stable funding (mainly long-term liabilities) corresponds to the amount of required stable

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<sup>55</sup> The implementation deadline is 1 January 2019.

<sup>56</sup> The Basel Committee on Banking Supervision. October 2012. A framework for dealing with domestic systemically important banks.

Note: In this document, BCBS recommends the following bank-specific factors for defining the systemic importance: size, interconnectedness with other financial institutions, banking sector concentration and complexity including cross-border activities.

<sup>57</sup> The Basel Committee on Banking Supervision. January 2013. Basel III: The liquidity coverage ratio and liquidity risk monitoring tools.

Funding (mainly illiquid assets and off-balance sheet activities). The closer matching between two amounts indicates stronger funding stability within one year.<sup>58</sup>

Pillar 2 on risk management and supervision is an integral part of Basel III capital requirements. It ensures that banks operate at capitalization in excess of minimum standards and have properly set risk management and mitigation systems. Banks are required to develop internal capital adequacy assessment processes (ICAAP) and internal liquidity adequacy assessment processes (ILAAP) for capital planning and potential losses' coverage revealed by stress testing. Supervisory review and evaluation process (SREP) oversee the internal assessments (and procedures) and take actions if a level of capitalization does not commensurate with a bank's risk profile.

Pillar 3 on market discipline is the third key element of Basel III regulation. It ensures that disclosure standards are sufficiently comparable between banks, consistent over time, meaningful and comprehensive for users.<sup>59</sup> Clear and detailed information on capital adequacy, risk assessment and risk management should be available to market participants on the timely basis. The EU CRD IV package sets disclosure requirements according to size and complexity of a credit institution's business activities: smaller banks are subject to less detailed and frequent disclosures.

## **2.4 Regulatory framework of EAEU banks**

The success in effective functioning of the single market for financial services depends on harmonization of financial and prudential regulations within the EAEU and with the best international practices. The Central Banks of EAEU member states have been carrying out rectification of domestic banking regulations in line with Basel III capital standards. It is obvious, however, that the Russian Federation has the most advanced prudential framework. Kazakhstani and Belarusian bank regulations lag behind and lack appropriate disclosure.

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<sup>58</sup> The Basel Committee on Banking Supervision. October 2014. Basel III: The net stable funding ratio.

<sup>59</sup> The Basel Committee on Banking Supervision. January 2015. Standards. Revised Pillar 3 disclosure requirements.



**Table 2.2 EAEU banks' compliance with the Basel III regulation**

	Russia	Kazakhstan	Belarus
<b>A. Pillar 1</b>			
Definition of capital	In force (Jan. 2016)	In force	In force
Credit risk: SA	In force (Jan. 2013)	In force	In force
Credit risk: IRBA	In force (Oct. 2015)	Not issued draft	Not issued draft*
Securitization: SA	In force	In force	Not issued draft*
Securitization: IRBA	Not issued draft	Not issued draft	Not issued draft*
Market risk: SA	In force (Jan. 2013)	In force	In force
Market risk: IMA	Not issued draft	Not issued draft	Not issued draft*
Operational risk: BIA	In force (Jan. 2013)	In force	In force
Operational risk: AMA	Not issued draft	Not issued draft	Not issued draft*
Conservation buffer	In force (Jan. 2016 with graduate implementation till Jan. 2019)	In force (Jan. 2015 with graduate implementation till Jan. 2017)	in force (Jan. 2017 with graduate implementation till Jan. 2019)
Countercyclical buffer	In force (Jan. 2016)	In force (Jan. 2015)	In force (May 2017)
Leverage ratio	In force (Jan. 2018) Note: from Jan. 2015, for reporting purpose	Not issued draft	In force (Jan. 2016)
<b>B. Pillar 2</b>			
SPER	In force	Not issued draft	In force (2013)
ICAAP	Issued draft	Not issued draft	Issued draft*
ILAAP	Not issued draft	Not issued draft	Not issued draft
<b>C. Pillar 3</b>			
Disclosure requirements	In force (Jan. 2016)	Issued draft	In force (2013) Note: revised in 2016
<b>D. Liquidity standards</b>			
Liquidity: LCR	In force (Jan. 2016 with graduate implementation till Jan. 2019) Note: applied only for D-SIBs.	In force (Jul. 2016 with graduate implementation till 2021)	Issued draft Note: Implementation deadline is Jan. 2018, applied for all banks.
Liquidity: NSFR	In force (Jan. 2018) Note: applied only for D-SIBs	In force (Jan. 2018) Note: applied for all banks	In force (Jan. 2018) Note: applied for all banks.
<b>E. Systemically important banks</b>			
Systemic buffer for Domestic SIBs	In force (Jan. 2016 with graduate implementation till Jan. 2019)	In force (Jan. 2017)	In force (May 2017 with graduate implementation till Jan. 2019)
Systemic buffer for Global SIBs	No G-SIBs	No G-SIBs	No G-SIBs*

This table provides information on compliance with Basel II, II.5 and Basel III regulations as of 1 January 2016. The date of implementation is given in brackets. SA – standardized approach; IRBA – internal rating-based approach; Securitization refers to the revised framework in December 2014 and July 2016; IMA – internal measurement approach; BIA – basic indicator approach; AMA – advanced measurement approach. SPER - supervisory review and evaluation process; ICAAP – internal capital assessment process; ILAAP – internal liquidity assessment process; LCR – liquidity coverage ratio; NSFR – Net stable funding ratio; Domestic SIBs – domestic systemically important banks; Global SIBs – global systemically important banks.

\* based on BIS Financial Stability Institute Survey. Basel II, II.5 and III Implementation. July 2015

Table 2.2 summarizes the major developments in building a new regulatory framework across three sample EAEU countries. Definition of capital (Pillar 1), supervisory practices (Pillar 2) and disclosure requirements (Pillar 3) are according to Basel III latest amendments. The following classification is applied to describe the adoption status of the BCBS recommendations as of 1 January 2016: “*In force*” (the regulation has been implemented); “*Issued draft*” (a draft of the regulation is publicly available but has not been implemented); “*Not issued draft*” (a draft of the regulation has not been issued publicly). A month and a year of the regulation’s adoption is given in brackets where available.

#### 2.4.1 Russian Federation

In March 2016, the BCBS assessed the compliance of Russian banking regulation with the Basel III risk-based capital framework under the Regulatory Consistency Assessment Programme (RCAP).<sup>60</sup> The Central Bank of Russia (CBR) fully introduced Basel III definition of capital and simplified approaches for measuring credit, market and operational risks. In 2015, the CBR also implemented the Internal Ratings-Based approach (IRBA) for credit risk assessment as an option for the largest banks. However, few banks have expressed their intention to transfer to the IRBA methodology. An exposure to securitization is measured by a standardized approach due to a low volume and relative simplicity of securitization structures. To comply with Basel III, the CBR reduced the minimum capital requirements from 10% to 8% for Total capital ratio and from 5% to 4.5% for CET 1 ratio. The threshold for Tier 1 capital ratio was increased from 5.5% to 6%. Since January 2015, the leverage ratio is calculated by Russian banks for reporting purposes only. In June 2017, CBR made amendments to the prudential regulation that require banks to meet 3% minimum level of leverage ratio starting from 1 January 2018.<sup>61</sup>

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<sup>60</sup> The Basel Committee on Banking Supervision. March 2016. Assessment of Basel III risk-based capital regulation – Russia. Regulatory consistency assessment programme.

<sup>61</sup> The Central Bank of the Russian Federation, Press Service. On introducing of international approaches to regulate the activities of credit institutions in order to improve the stability of the banking sector. 7 October 2013.

In Russia, the capital conservation and countercyclical buffers are required for all credit institutions from 1 January 2016. The capital conservation buffer is set at 0.625% of RWAs and increases annually by an additional 0.625% reaching 2.5% of RWAs as of 1 January 2019. Credit institutions that do not meet the minimum requirements for the conservation buffer are subject to restrictions on earnings distribution. The CBR keeps the countercyclical capital buffer at 0% of RWAs since its introduction in 2016.<sup>62</sup> The decision reflects an uneven recovery across lending sectors with greater growth in mortgages and unsecured loans. A Capital buffer for systemically important banks in the domestic context has been in effect since 1 January 2016 and set at 0.15% of RWAs. The level will gradually increase to 0.35% in 2017, 0.65% in 2018, and 1% in 2019.<sup>63</sup> The CBR also reports that there are no global systemically important banks (G-SIBs) in Russia.

The CBR introduced Basel III LCR from 1 January 2016 at a minimum threshold of 70% with an annual 10% increase so that the ratio will reach 100% by 1 January 2019.<sup>64</sup> When setting up the level of the ratio, the CBR took into account the liquidity issues of Russian banks. The regulation on the NSFR was published only in July 2017 and adopted by banks from 1 January 2018. Requirements for the LCR and the NSFR are applicable only for systemically important banks listed by the CBR.<sup>65</sup>

In terms of Pillar 2, the CBR required banks to prepare their first ICAAP in 2017 using data for the year 2016. The CBR has significantly improved the methodologies for stress testing. Banks that fail to conduct stress tests properly are subject to greater capitalization. By January 2016, the CBR had already revised and implemented Pillar 3 disclosure requirements to provide market participants with timely and comprehensive assessment of capital adequacy. In particular, the CBR introduced recommendations of

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<sup>62</sup> The Central Bank of the Russian Federation, Press Service. On countercyclical buffer to capital adequacy ratio. 27 June 2017.

<sup>63</sup> The Central Bank of the Russian Federation, Press Service. On measures to implement Basel III and to regulate systemically important banks. 17 July 2015.

<sup>64</sup> The Central Bank of the Russian Federation, Press Service. On introducing liquidity coverage ratio. 7 September 2015.

<sup>65</sup> The Central Bank of the Russian Federation, Press Service. On the approved list of systemically important credit institutions. 20 October 2015. On measures to implement Basel III and to regulate systemically important banks. 17 July 2015. Note: four out of ten SIBs are state-controlled.

the BSBC to disclose the composition of bank capital and calculation of the liquidity requirements on both an individual and consolidated basis.

#### **2.4.2 Republic of Kazakhstan**

The National Bank of Kazakhstan (NBK) introduced the Basel III definition of capitalization and has adopted standardized approaches for measuring credit and market risks, and a basic indicator approach for operational risk. From 1 January 2015, CET 1, Tier 1 and Total capitalization ratios were set at 5%, 6% and 7.5% of RWAs respectively. However, on 1 January 2017, the ratios were raised to 5.5% for CET1, 6.5% for Tier 1 ratio and 8% for the Total capitalization ratio. It appears that the NBK implements tighter requirements for Kazakhstani banks compared to Russian and internationally accepted standards with respect to the first two ratios. The Basel III leverage ratio has not yet been introduced.

A capital conservation buffer has been in effect from January 2015 at the levels of 2.5% for systemically important banks and at 1% for other banks. On 1 January 2017, the buffer was increased to 3% and 2% for systemic and non-systemic banks respectively. The countercyclical capital buffer ranges between 0% and 3% of RWAs and will be introduced by the NBK during times of fast lending expansion. The NBK will notify regarding the size and deadline for the buffer twelve months prior to its implementation. On 24 December 2014, the NBK issued rules on determination of systemically important financial institutions. Each bank is assessed based on eleven criteria and considered as systemically important if a weighted index of these indicators exceeds 10%. A bank with the index below 10% but greater than 5% is put on a watch list of potential SIBs.<sup>66</sup> All SIBs are required to have an additional capital buffer of 1% of RWAs starting from January 2017.

From July 2016, Kazakhstani banks daily calculate the LCR and report to the NBK on the monthly basis. The initial threshold for the LCR was 60% as of 1 July 2016 and it

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<sup>66</sup> The National Bank of Kazakhstan. On approval of rules for classifying financial organizations as systemically important. Ordinance of the National Bank of Kazakhstan No. 257 dated 24.12.2014.

is subject to 10% annual increase reaching 100% as of 1 January 2021. The NSFR is set at 100% starting from January 2018.<sup>67</sup>

On 26 February 2014, the NBK introduced rules on risk management systems, internal control and reporting requirements. However, according to the IMF financial system stability assessment (2014), supervisors of Kazakhstani banks mainly verify compliance with rules and pay less attention to risk assessment processes. The reporting standards for ICAAP and ILAAP have not been officially issued. With respect to Pillar 3, the market discipline is guided by several legislative acts that require reporting on corporate governance, audit and financial disclosure, management hiring etc.

It is important to note that a full adoption of the Basel III standards has been postponed to 2021. Mr. Daniyar Akishev, chairman of the NBK, reports that the delay in the Basel III standards implementation is associated with specific problems in the Kazakhstani banking sector. Unless the issues are solved, the introduction of Basel III does not seem effective.

### **2.4.3 Republic of Belarus**

Between 2012 and 2016, the National Bank of the Republic of Belarus (NBRB) undertook considerable efforts to enhance prudential regulation of Belarusian banks. The Basel III definition of capital, minimum capital requirements, leverage ratio and simplified approaches for measurement of credit, market and operational risks were fully adopted according to the BCBS recommendations. The minimum level of Total capital ratio, however, is set at 10% of RWAs compared to 8% in Basel III standards. As of 1 January 2016, Belarusian banks reported the absence of securitization exposures. Drafts of regulations on advanced approaches for measurement of credit, market and operational risks (IRBA, IMA and AMA) have not been issued. The methodology for the Basel III leverage ratio was introduced in 2012. At first stage, Belarusian banks were required to

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<sup>67</sup> The National Bank of Kazakhstan. On the establishment of normative values and methods for calculating prudential standards and other mandatory norms and limits for the size of the bank's capital at a certain date and the Rules and limits for an open currency position. The Decree of the Board No. 147 dated 29.05. 2016.

calculate and report the ratio to the NBRB on a quarterly basis. Starting from 2016, all banks must meet a 3% threshold for the leverage ratio.

A capital conservation buffer for Belarusian banks is set at 1.25% of RWAs and has been in effect since January 2017. It is subject to a graduate annual increase by 0.625% and should reach 2.5% as of 1 January 2019. The methodology to calculate a countercyclical capital buffer was issued in December 2013. The buffer varies between 0% and 2.5% of RWAs and is applied by national regulators to constrain excess lending growth.<sup>68</sup> The current level of the countercyclical buffer is zero. In May 2017, the NBRB issued the methodology on definition of systemically important banks at the domestic level. Each bank is assessed using an aggregated index of systemic importance constructed from nine indicators. A bank is then categorized in either group I or II. Banks from the first group have greater systemic influence and are subject to an additional capital buffer of 0.75% from January 2018 and 1.5% from January 2019. Banks from the second group are required to build a buffer of 0.5% and 1% starting from the years 2018 and 2019 respectively.<sup>69</sup> There are no global systemically important banks in Belarus.

The methodologies for the LCR and NSFR were issued in December 2015. However, the implementation of new rules is postponed till January 2018. The minimum level for both liquidity ratios complies with 100% threshold of the Basel Committee.<sup>70,71</sup> In contrast to Russian banks, the LCR and NSFR should be met by all banks (not only by SIBs).

In terms of Pillar 2, during 2012 the NBRB developed several instructions that organize SPER and regulate risk management systems, corporate governance and internal

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<sup>68</sup> The National Bank of the Republic of Belarus. Methodology for calculation of a countercyclical capital buffer. Instruction No. 784 dated 26.12.2013.

<sup>69</sup> The National Bank of the Republic of Belarus. Methodology on determination of systemically important banks and non-banking credit organizations. Instruction No.180 dated 18.05.2017.

<sup>70</sup> The National Bank of the Republic of Belarus. Methodology for liquidity ratios and monitoring tools of liquidity risk according to Basel III international standards. Instruction No. 787 dated 31.12.2015.

<sup>71</sup> The National Bank of the Republic of Belarus. Reporting on the NSFR and liquidity risk monitoring in accordance to Basel III international standards. Order No. 23-13/114 as of 09.11.2016.

control in banks and non-bank credit institutions.<sup>72</sup> The rules were amended in 2016 for closer compliance with Basel III standards. In January 2013, the NBRB revised disclosure requirements according to Pillar 3 principals and obliged banks to deliver more detailed, timely and accessible information to market participants.<sup>73</sup>

## **2.5 Stability assessment of EAEU banks relative to the banking sectors of CEE and Baltic States**

ECB Single Supervisory Mechanism focuses on assessment of key risks that may threaten EU banking stability: they are business models and profitability risk, credit risk, capital adequacy and liquidity.<sup>74</sup> Among risks, business models and profitability risks are ranked by ECB as the most important. EAEU, CEE and Baltic banks' stability is assessed for each type of risk. Most of risks, however, are closely interrelated.

### **2.5.1 Profitability**

Prolonged weak profitability contributes to bank fragility by several ways. It constrains bank growth through retained earnings and increases the cost of new debt (or equity). It shortens time for banks to use their capital (rather than earnings) to cover asset losses. Low profitability also motivates banks' engagement in riskier activities to generate higher returns. Figures 2.8 and 2.9 present NIM and ROA of CEE, Baltic and EAEU banks during 2009 – 2015.

Figure 2.8 shows that the NIM of Latvian, Lithuanian and Slovenian banks were the lowest among the countries and varied around 2% on average (NIM reached 0.77% in Slovenia by 2015). The NIMs of Romanian, Bulgarian and Hungarian banks were the strongest in spite of their graduate decline. It appears that CEE and Baltic banks experienced the same pressure as banks from Western Europe. Low interest rates and slow economic growth suppressed profitability of EU banks and primarily affected credit

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<sup>72</sup> The National Bank of the Republic of Belarus. Instruction No. 550 dated 29.10.2012; Instruction #557 dated 30.10.2012; Instruction # 625 dated 30.11.2012; Instruction No. 641 dated 7.12.2012.

<sup>73</sup> National Bank of the Republic of Belarus. Instruction No. 19 dated 11.01.2013.

<sup>74</sup> ECB Banking Supervision: SSM supervisory priorities 2017. ECB, January 2017.

institutions with traditional business models. At the same time, bank structural challenges such as sizable Non-performing loans (NPLs) and high operating costs undermined EU banks' NIM from inside. It is also obvious that NIMs of the EU banks have been merging to average under high competition and implementation of common regulation. Russian and Kazakhstani banking sectors operated at comparatively high level of NIMs between 2009 and 2013. However, the NIMs of EAEU banks have been pressured by GDP contraction, reduced demand for credits, high inflation, and accumulated stocks of non-performing loans on banks' balance sheets.

**Figure 2.8 Net interest margin of CEE, Baltic and EAEU banks, 2009 - 2015**

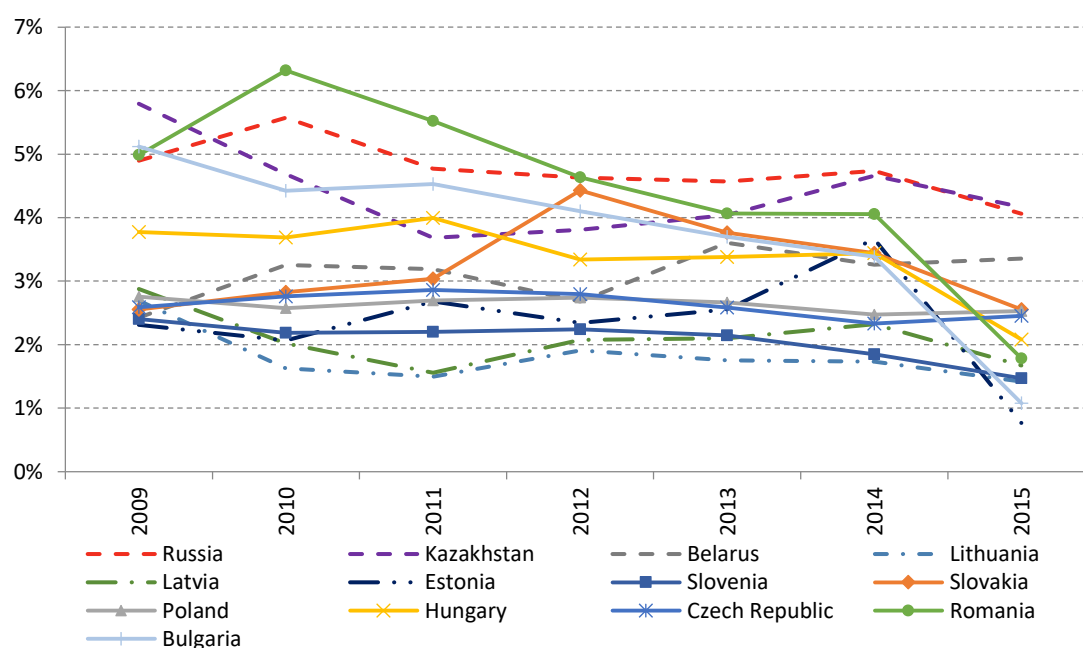


Figure shows the Net interest margin of CEE, Baltic and EAEU banks. Net interest margin is calculated as the ratio of net interest income before provisions for loan losses to total assets. Croatia is not included in the graph due to lack of data. All data are as of 1 January of a given year.

Source for EU banks: ECB, Statistical Data Warehouse.

Source for EAEU banks: calculated by author using data from CBR, NBK and NBRB.

Figure 2.9 shows that Baltic banks experienced the most dramatic decline in the ROA during 2009 - 2010. Latvian and Lithuanian banks' ROA was negative between 2009 and 2012 and reached the bottom level of (-4.0%) and (-4.7%) respectively as of January 2010. The trend was mainly driven by sizable credit losses realized during this period. Greater involvement of Estonian banks in non-interest generating activities



contributed to ROA improvement post-crisis period as it surged from (-1.9%) in 2010 to 4.4% in 2012. Slovenian banks experienced prolong and the most severe profitability risk during 2010 - 2014. In spite of different patterns in ROA of CEE and Baltic banks, the profitability gap between countries narrowed by 2015. Rostango et al. (2016) point out some benefits of low interest rate environment for overall EU bank performance such as lending growth, increase in borrowers' repayment probability, and low refinancing costs. ECB financial stability report (November 2015) states that EU banks' improvement in ROA was mainly driven by a decline in loan losses and a shift of business models towards non-interest generating activities. EAEU banks' ROA recovered after 2010 and remained at relatively high and stable level within the range of 1% - 2%. Only Russian banks reported a decrease in ROA to 0.65% in 2015 that was mainly associated with overall adverse economic environment in the country.

**Figure 2.9 Return on assets of CEE, Baltic and EAEU banks, 2009 - 2015**

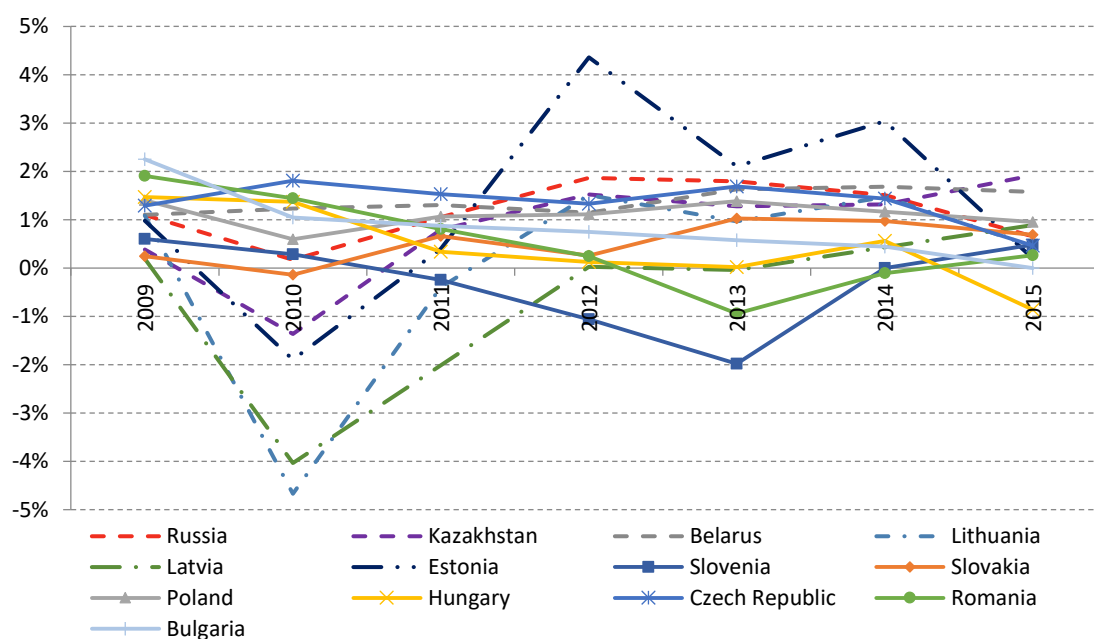


Figure shows the Return on assets of CEE, Baltic and EAEU banks. Return on assets is the ratio of after-tax net income to total assets. Croatia is not included in the graph due to lack of data. All data are as of 1 January of a given year.

Source for EU banks: ECB, Statistical Data Warehouse.

Source for EAEU banks: calculated by author using data from CBR, NBK and NBRB.

## 2.5.2 Credit risk

NPLs seriously undermine bank stability through several channels. They negatively affect bank profitability through uncollected loan payments and accumulated loan loss provisions. NPLs shorten a distance to insolvency by wiping out bank capitalization. NPLs also affect bank liquidity as resources are tied up by impaired assets for a long time. High level of NPLs is one of major obstacles for economic recovery because they constrain bank ability to finance growth and provide new loans to a real sector. According to ECB Financial stability review (November 2016), 130 largest EU banks held around 1 trillion Euros of NPLs, although the concentration of distressed assets was mainly in the crisis-hit countries (Cyprus, Greece, Ireland, Italy and Portugal). Credit losses were not evenly distributed: the most of losses were concentrated in a real estate, corporate and SMEs' segments. Figure 2.10 presents the NPLs of CEE, Baltic and EAEU banks during 2009 – 2015.

**Figure 2.10 NPLs ratio of CEE, Baltic and EAEU banks, 2009 - 2015**

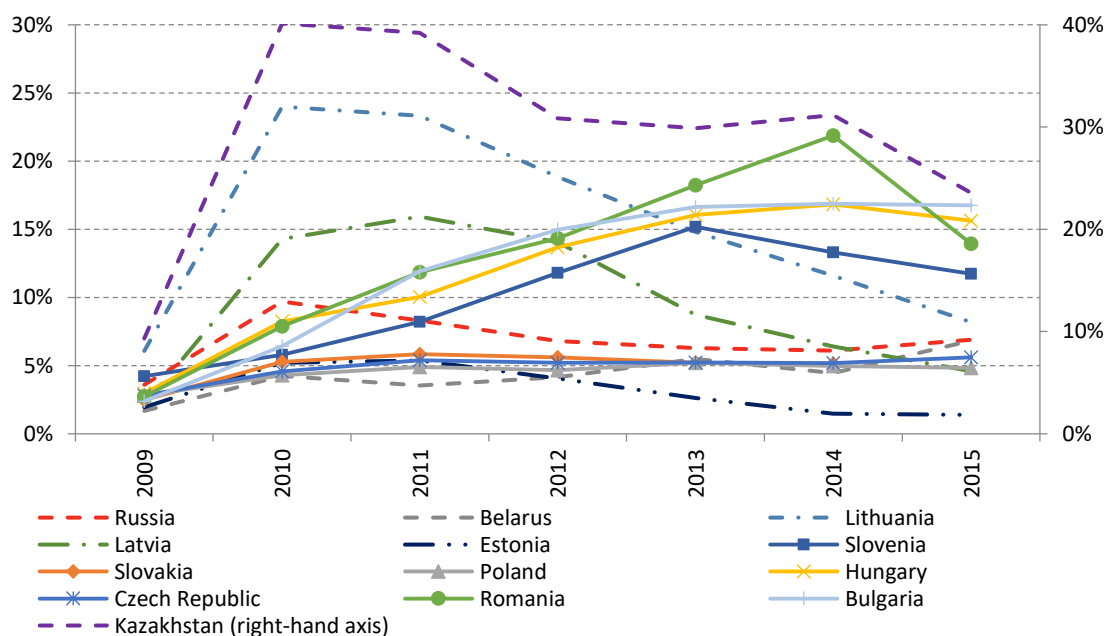


Figure shows the ratio of NPLs to total gross loans of CEE, Baltic and EAEU banks. The ratio of NPLs for Kazakhstan banks is scaled on the right-hand secondary axis. Non-performing loans are 90 days overdue on interest or a part of principal. All data are as of 1 January of a given year.

Source for EU banks: Global Financial Development Database (GFDD), The World Bank.

Source for EAEU banks: calculated by author using data from CBR, NBK and NBRB.

Figure 2.10 shows that Latvian and Lithuanian banks' loan losses sharply rose from 2.1% and 6.1% in 2009 to 14.3% and 23.9% respectively in 2010. The reasons were the fast lending growth and prevalence of foreign currency borrowing by households in those countries prior to the crisis period. The introduction of Euro in Latvia (in 2011) and Lithuania (in 2015) partially mitigated credit losses in both Baltic States. Estonian banks exhibited the lowest level of NPLs that fell to 1.4% by 2015. Romanian banks' NPLs rose from 2.7% in 2009 to 21.8% in 2014 and represented the sizable credit losses in CEE and Baltic States during post-crisis period. Bulgarian, Hungarian and Slovenian banking sectors experienced graduate increase in NPLs that reached the maximum level in 2013 within the range of 15% - 16%. Since 2013, the realization of credit losses slowed down in those countries. Other CEE countries showed moderate increase in NPLs within the range of 4% - 6% of total gross loans. In Russian Federation, problem loans increased more than three times from 2.1% in 2009 to 9.7% in 2010, and then gradually fell to 6.9% of total gross loans in 2015. Kazakhstani banks experienced the greatest credit risk realization with NPLs surged from 9.3% in 2009 to 40.1% in 2010.<sup>75</sup> Subsequently, the ratio of NPLs improved but remained at quite dangerous level of 23.5% in 2015. Belarusian banks reported NPLs increase from 1.7% to 6.8% of gross loans between 2009 and 2015.<sup>76</sup> More than 70% of NPLs of EAEU banks were accumulated in a corporate sector and were highly concentrated in the largest banks.

One deficiency of NPLs ratio is that it does not take into account provisioning and collateralization of an impaired asset. Figure 2.11 presents the coverage of NPLs with Loan loss reserves. The ratio serves as an important indicator of bank preparedness to cover credit losses. Coverage ratios varied significantly across CEE and Baltic banks ranging from 21% to 90%. However, the overall loan loss provisions increased over time in CEE and Baltic banking sectors, except for Lithuania and Estonia. Coverage ratios of EAEU banks were much above of CEE and Baltic banks' levels, which was associated with methodological differences in accounting and provisioning practices. Among three

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<sup>75</sup> Most of NPLs were concentrated in five largest Kazakhstani banks.

<sup>76</sup> Belarusian banks' NPLs increased to 12% in 2016.

countries, Russian banks showed stable NPLs' coverage, whereas Kazakhstani and Belarusian banks had increased their loss reserves relative to NPLs.

**Figure 2.11 Coverage ratio of CEE, Baltic and EAEU banks, 2009 - 2015**

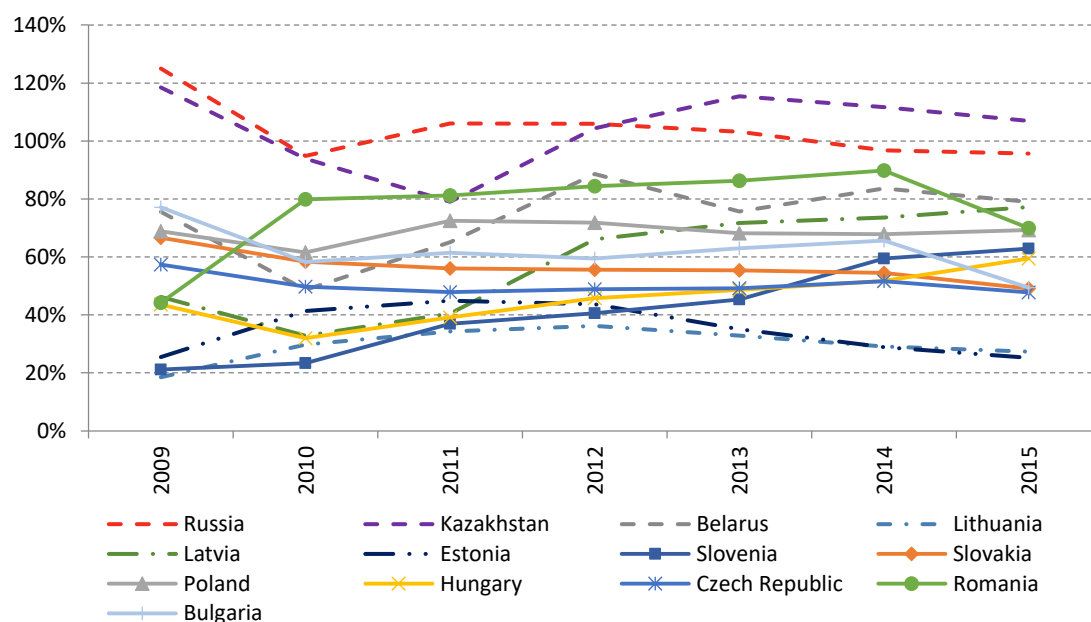


Figure shows the Coverage ratio of CEE, Baltic and EAEU banks that is calculated as Loan loss reserves to NPLs. All data are as of 1 January of a given year.

Source for EU banks: Global Financial Development Database (GFDD), The World Bank.

Source for EAEU banks: calculated by author using data from CBR, NBK and NBRB.

The progress in solving NPLs issues remains slow and requires actions taken at the EU and national levels. The priority tasks include harmonization of the definition and accounting treatment of NPLs, improvement of NPL management practices, and review of distressed assets' valuation methodologies. Other options to address NPLs use asset protection schemes, securitization, and creation of asset management companies. The longer-term challenge is development of the liquid secondary market for impaired assets.<sup>77</sup> The most affected EU member states have issued special national programs to tackle

<sup>77</sup> ECB issued a guidance to banks on resolution of non-performing loans that recommends banks to set up and implement reasonable plans to reduce NPLs levels. See ECB Banking supervision (March 2016) Guidance to banks on non-performing loans.

sizable stocks of NPLs, which are supported by the European Commission through Structural Reform Support Service.<sup>78</sup>

In the EAEU, NPLs are mainly managed through debt restructuring and banks' consolidations. Russian banks sell their non-performing loans to closed-ended credit investment companies, which have been actively operating at the secondary loan market in Russia since 2010. Stabilization Fund of Russian Federation also injected capital into distressed state banks to absorb their credit losses. In January 2012, Kazakhstani government established a Fund of distressed loans entitled to purchase impaired assets from commercial banks.

### 2.5.3 Capital adequacy

Capitalization is a critical metric of bank stability due to its direct loss-absorbing capacity and ability to enhance resilience to external shocks. Apart from existing CET1, Tier 1 and Total capital ratios, the BCBS introduced a leverage ratio with the minimum threshold of 3%.<sup>79</sup> The leverage ratio aims to constrain banks from building of excess leverage. Indeed, ECB empirical analysis of 500 European banks provides evidence that the Leverage ratio significantly reduces bank default probabilities; however, benefits diminish when the leverage ratio reaches 5%.<sup>80</sup> Figures 2.12 and 2.13 present Equity to assets ratio and Total capitalization ratio of CEE, Baltic and EAEU banks during 2009 – 2015.

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<sup>78</sup> Structural Reform Support Service helps EU member states to design and implement structural reforms to promote economic growth. For details, please see [https://ec.europa.eu/info/departments/structural-reform-support-service\\_en](https://ec.europa.eu/info/departments/structural-reform-support-service_en)

<sup>79</sup> Basel Committee on Banking Supervision, "Basel III leverage ratio framework and disclosure requirements", January 2014.

<sup>80</sup> ECB Financial Stability Review, Special features A: "The impact of the Basel III leverage ratio on risk-taking and bank stability", November 2015.

Haq and Heaney (2012) also support this view stating that increase in equity capitalization reduces bank risk-taking up to some level and then creates a reversed effect motivating banks to accept more risk.

**Figure 2.12 Equity to total assets of CEE, Baltic and EAEU banks, 2009 - 2015**

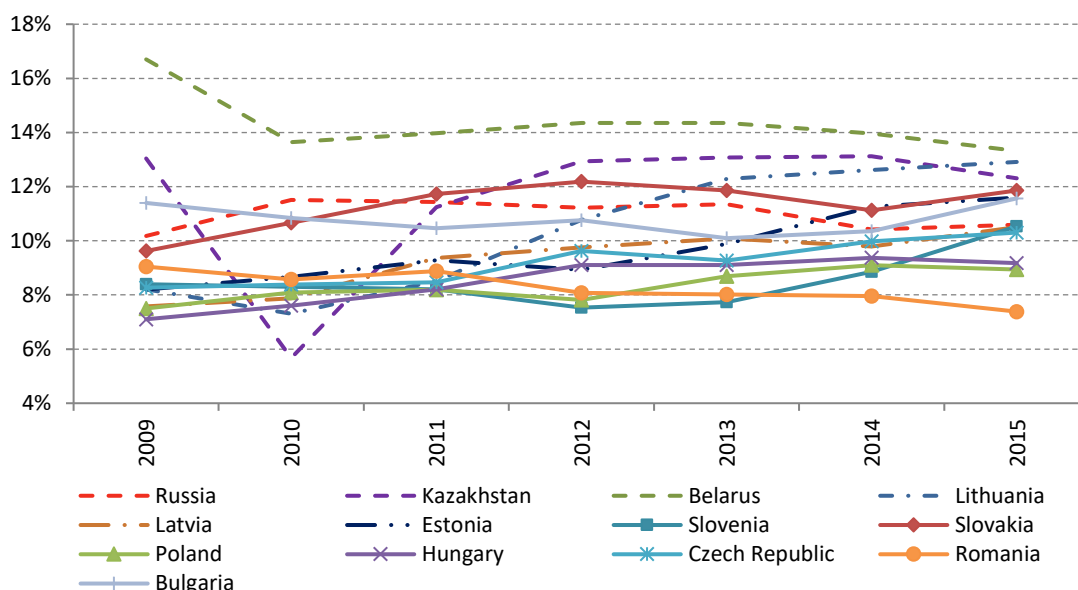


Figure shows Equity to assets ratio of CEE, Baltic and EAEU banks. All data are as of 1 January of a given year.

Data source for EU banks: Global Financial Development Database (GFDD), The World Bank.

Data source for EAEU banks: calculated by author using data from CBR, NBK and NBRB.

Figure 2.12 shows that equity capitalization of CEE and Baltic banks (except for Romania) has been improving steadily starting from 2011. The trend was mainly driven by greater capital requirements imposed by Basel III standards. Despite of uniform bank regulations across the EU, the equity capitalization of Romanian banks was eroded by significant credit losses. Russian banks' equity ratio was broadly stable due to state capital injection and regulatory forbearance.<sup>81</sup> In Kazakhstan, four largest banks became insolvent in 2009 and were subsequently recovered through Kazakhstani government capitalization program at the cost accounted for 6% of GDP.<sup>82</sup> Belarusian banks' equity

<sup>81</sup> The CBR recapitalized around 30 state-owned banks with the cost of 1% of GDP in 2015.

<sup>82</sup> BTA bank, Halyk bank, KKB bank and Alliance bank became insolvent in 2009 and received the state support, which resulted in partial nationalization of those banks. See Standard&Poors, May 2016. Kazakh banks face high risks in 2016 from thinning capital cushions as the economy stagnates. World Finance Review, pp. 38-41.

capitalization declined gradually since 2013 under the pressure of increasing NPLs and depleted profitability.<sup>83</sup>

**Figure 2.13 Total capitalization ratio of CEE, Baltic and EAEU banks, 2009 - 2015**

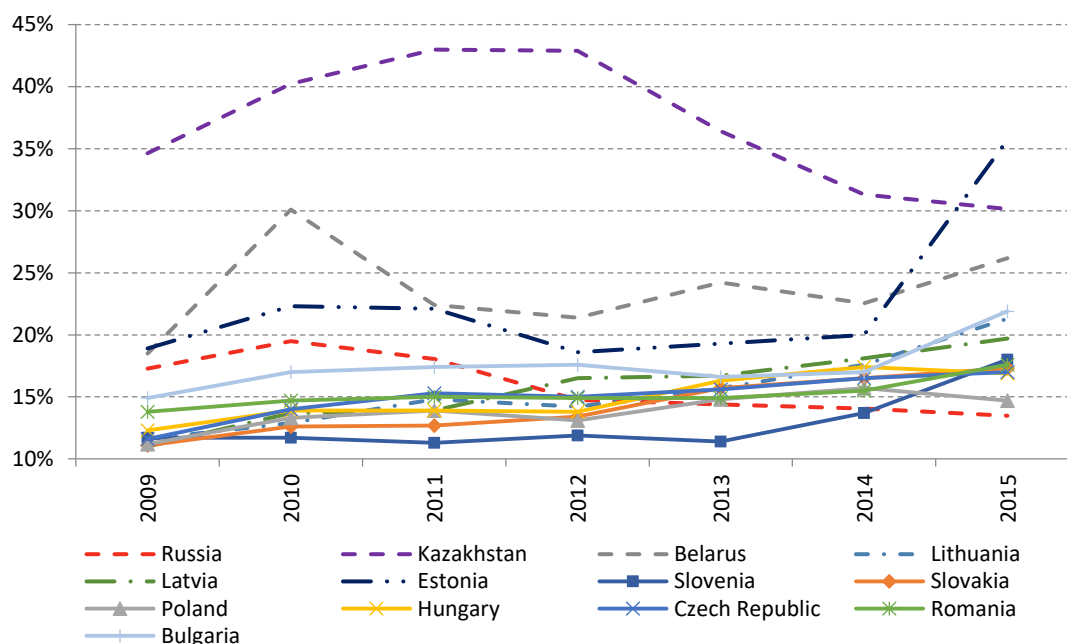


Figure shows Total capitalization ratios of CEE, Baltic and EAEU banks. Total capitalization ratio is calculated as total regulatory capital divided by total risk-weighted assets. All data are as of 1 January of a given year.

Data source for EU banks: Global Financial Development Database (GFDD), The World Bank.

Data source for EAEU banks: calculated by author using data from CBR, NBK and NBRB.

Figure 2.13 presents the Total capitalization ratios (TCR) of CEE, Baltic and EAEU banks. In contrast to an equity ratio, TCR is calculated on the risk-adjusted basis and includes capital items of lower quality (Tier 2 and Tier 3 capital using Basel II definition of bank capitalization applied up to the year 2014). Figure 2.13 shows that TCR of CEE and Baltic banks had been reinforced through reduction of risk-adjusted assets and graduate implementation of Basel III conservation buffer and capital buffer for systemically important banks. Estonian banks' TCR reached 35.7% in 2015 that was twice more than required. Russian banks' TCR initially corresponded with CEE banks' level but declined to 13.5% in 2015. The TCR of Kazakhstani banks was considerably greater

<sup>83</sup> The NBRB's capital injection in three largest banks (which are also state-owned) improved capital adequacy to 18% at the end of 2015.

than in Russia and Belarus reaching the maximum value of 42.9% as at January 2011. It appears that underestimated asset risks inflated the TCR of Kazakhstani banks. Consequently, TCR of Kazakhstani banks fell to 30.1% in 2015. Belarusian banks' capitalization improved to 26.2%. The comparability of the capital ratios among EAEU banks has been complicated by methodological differences in the national capital regulations.

### **2.5.4 Funding liquidity risk**

Inappropriate funding structures and insufficient asset liquidity led to bank failures and costly state (or public) support during the crisis years, which, in turn, destabilized financial sector and prevented economic growth. Altunbas et al. (2011), Lopez-Espinoza et al. (2013) provide evidence that excessive reliance on wholesale funding contributes to bank insolvency and vulnerability to liquidity shocks. Demirgüç-Kunt and Huizinga (2010) suggest that modest level of non-deposit funding is able to reduce risk and improve profitability through a better diversification of funding structures.

Post-crisis Basel III regulation introduced two complement measures for enhancing existing liquidity rules: the Liquidity coverage ratio and the Net Stable Funding ratio. Since historical data for the LCR and the NSFR are not publicly available for CEE, Baltic and EAEU, we proxy bank funding liquidity by the Loan to deposit (LTD) ratio. DeYoung and Jang (2016) point out that, similar to the NSFR, the LTD ratio compares an amount of loans (illiquid assets) relative to an amount of core deposits (stable funding).<sup>84</sup> LTD ratio, however, has never been used as a binding liquidity measure by regulators. A prudent level of the LTD ratio is 1 (or 100%). If the LTD ratio is greater than 1, a bank is exposed to high funding liquidity risk. Figure 2.14 presents Loan to deposit ratios for CEE, Baltic and EAEU banks during 2009 – 2015.

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<sup>84</sup> Core deposits include demand deposits, saving deposits, other non-transaction deposits that are fully insured (except for brokered deposits). These deposits are considered as stable due to their low sensitivity to interest rates and high customer loyalty.



**Figure 2.14 Loan to deposit ratio of CEE, Baltic and EAEU banks, 2009 - 2015**

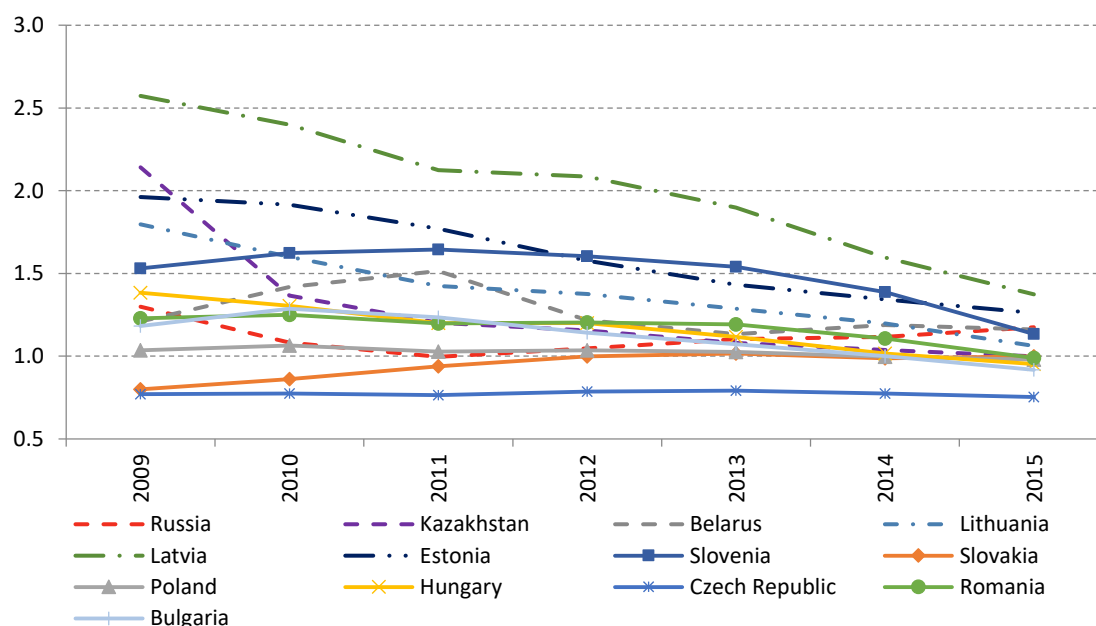


Figure shows the Loan to deposit ratios of CEE, Baltic and EAEU banks. Loan to deposit ratio is a simplified measure of funding liquidity risk. All data are as of 1 January of a given year.

Source for EU banks: ECB statistical data warehouse.

Source for EAEU banks: calculated by author using data from CBR, NBK, and NBRB.

Figure 2.14 shows that banks in Poland, Slovakia and Czech Republic historically operated at prudent funding liquidity as their LTD ratios were below one. Latvian, Lithuanian and Estonian banking sectors are dominated by Scandinavian banking groups, which control around 54%, 89% and 95% of shareholder capital in each country respectively. As a result, the foreign deposits represented significant share of the total financing structure. Indeed, the LTD of Latvian banks stood at 2.6 in 2009 and then fell to 1.4 in 2015. Slovenian banks' LTD grew steadily and reached 1.65 in 2011. Romanian, Bulgarian, and Hungarian banks improved their financing structures by moving away from wholesale toward deposit funding. Changes in the EU bank financing patterns are mainly driven by market conditions and regulatory reforms towards prudent funding liquidity. Russian banks' LTD ratio deteriorated starting from 2012 and reached 1.2 in 2015. Kazakhstani banks' LTD ratio stood at 2.1 in 2009 indicating aggressive funding strategies prior to the crisis and then fell to a prudent level of 1.0 in 2015. Belarusian

banks' funding structure moved away from a safe level when the LTD reached 1.5 in during 2010-2011. The ratio consequently fell to 1.2 in 2015.

### **2.5.5 Business models' diversification**

Financial sector's deregulation and financial innovations allowed banks to mix traditional lending with capital market instruments and fee-generating activities. Empirical literature, however, suggests mixed effects of these activities on bank stability. Stiroh and Rumble (2006) report that income from non-interest generating activities is more volatile due to its stronger dependence on market conditions. DeYoung and Torna (2013) find that greater engagement in pure non-traditional businesses (such as investment banking, venture capital or securitization) increases stability of healthy banks and probability of failure of distressed banks. According to ECB Financial Stability Review (November 2016), engagement in fee-generating activities may improve EU banks' profitability in low interest rate environment.

Figure 2.15 presents the ratio of Non-interest income to total operating revenue (Non-II) of CEE, Baltic and EAEU banks during 2009 – 2015. Baltic banks tended to pursue much stronger business diversification. For example, a share of Non-II of Latvian banks was around 50% of total operating revenue during 2013 - 2015. Estonian banks, however, exhibited very unstable Non-II ratio as it doubled from 31.8% to 62.7% between 2009 and 2012, and then sharply fell down to 20.8 in 2015. The Non-II ratio of Lithuanian, Romanian, Bulgarian, and Slovenian banks continued to increase and stayed within the range of 32.9% and 47.8% in 2015. It appears that CEE and Baltic banks have adjusted their business models in order to compensate a loss from the squeezed interest margins. Russian banks did not show significant changes in the Non-II ratio that stood on average at 11% of total operating revenue. The Non-II of Kazakhstani banks rose from 7.8% to 16.9% of total operating revenue over the period of study. Belarusian banks' Non-II reached 15.9% as at January 2015.

**Figure 2.15 Non-interest income to total operating revenue of CEE, Baltic and EAEU banks, 2009 - 2015**

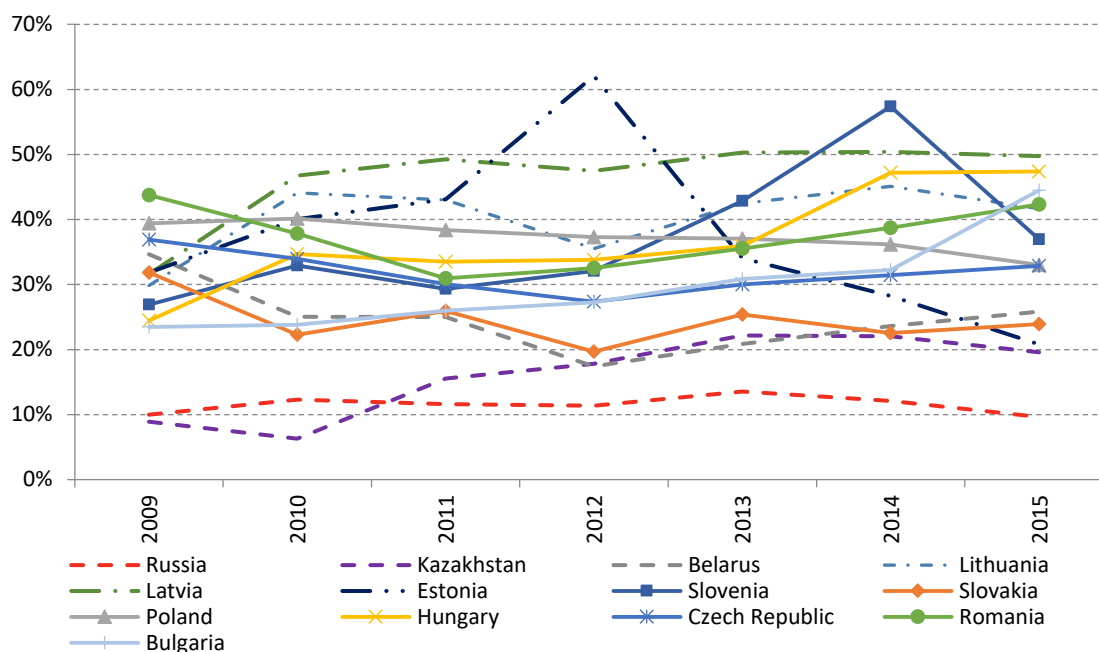


Figure shows Non-interest income to total operating revenue that is a proxy for business diversification of CEE, Baltic and EAEU banks. All data are as of 1 January of a given year.

Source for EU banks: ECB statistical data warehouse. All data are as of 1 January of a given year.

Source for EAEU banks: calculated by author using data from CBR, NBK, and NBRB.

## 2.6 Summary

The European Union is the most successful example of economic integration, which has significantly contributed to development and prosperity of the member states. CEE and Baltic countries have received substantial benefits through foreign direct investments as well as a transfer of technology, knowledge and governance.<sup>85</sup> Deepening integration processes in Europe through completion of the Banking Union and establishment of the Capital Markets Union is the first task on agenda for EU authorities towards the EU 27 future.

Although the EAEU has been in existence only from 1 January 2015, the Eurasian Commission expresses strong intention to create a single financial market by 2025.

<sup>85</sup> Moghadam (2014, p. 10) reports that average GDP per capital across Eastern Europe relative to Western Europe rose by around 50% between 1995 – 2013.

European experience has shown that stability of the national banking systems is an essential condition for achieving the single market for financial services. The chapter aims to fill in the gap in existing research works on Eurasian integration and compares the structures, regulatory frameworks and stability indicators of banking sectors of Russia, Kazakhstan and Belarus prior to the integration. The analysis is performed in comparison with CEE and Baltic States that are currently at the later stage of integration processes compared to the EAEU.

The results are summarized as follows. Despite of common features (low competition, high influence of state and low market share of foreign banks), we observe that the development of EAEU banking sectors is quite diverse (e.g. Belarusian banking sector is the most highly concentrated and state-controlled compared to other states). The Russian banking system dominates in the EAEU and accounts for approximately 90% of all EAEU bank assets as of 1 January 2015. The findings posit that removal of cross-border barriers for financial services will increase competition through the penetration of Russian banks' capital into smaller EAEU member states and reinforce the influence of Russia in the region. Russian banking system also operates at more advanced regulatory framework, whereas Kazakhstani and Belarusian banking sectors lag behind in compliance with the Basel III requirements for capital adequacy and liquidity. Not completed and divergent regulations will create unequal regulatory burden for EAEU banks. Finally, the assessment of key stability indicators shows that risk distribution in EAEU banking systems varies. Russian banks experience high funding liquidity risk, Kazakhstani banks' stability is undermined by sizable credit losses, whereas Belarusian banks operate at depressed profitability. These risks should be urgently addressed by each EAEU member state before the financial integration in order to prevent their spread across the national borders. Sound empirical analysis is required to complete the inferences between business models and stability indicators controlling for macroeconomic environment, regulatory development, and market structures.

## **CHAPTER 3 The Impact of State Ownership and Business Models on Bank Stability in the Eurasian Economic Union**

### **3.1 Introduction**

The global financial crisis clearly demonstrates that banks failed due to two major reasons: capital inadequacy against asset risks and improper liquidity management (Imbierowicz and Rauch, 2014; Bologna, 2015). Bank insolvency is related to the deterioration of asset quality, which wipes out capitalization. Liquidity risk arises when a bank is unable to settle its financial obligations on time, which triggers the failure of even a solvent bank (Jean-Loup, 2017). In the context of micro-prudential regulation, both types of risks result from imprudent investment and funding decisions. Mergaerts and Vennet (2016) strongly suggest that a deeper integration of a systemic analysis of business models into post-crisis regulatory and supervisory practices is crucial to ensure the long-term viability of banking firms in Europe.

This chapter provides unique insight into the determinants of bank stability in the nascent Eurasian Economic Union (EAEU) established on 1 January 2015 by Russia, Kazakhstan and Belarus.<sup>86</sup> The EAEU member states aim to enhance their economies through shared resources, wider trade and closer technological and financial cooperation. However, a severe decline in oil prices from 2014 to 2016 and imposed sanctions on Russia contributed to GDP contractions in the EAEU and seriously undermined the regional economic development. Pak and Kretzchmar (2016) report that the stability of the EAEU banking sector is under great pressure from sizable post-crisis credit losses and squeezed profitability. Moreover, the economic sanctions limit the access of Russian banks to foreign capital markets and restrict foreign borrowing with a maturity longer than

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<sup>86</sup> Russia, Kazakhstan and Belarus signed a treaty to establish the EAEU on 29 May 2014, effective 1 January 2015. Armenia and Kyrgyzstan joined the EAEU on 2 January 2015 and 12 August 2015, respectively.

30 days.<sup>87</sup> Aalto and Forsberg (2016) note that Western sanctions seriously affected the liquidity of Russian banks. In 2015, the Russian government recapitalized 27 banks by injecting \$15 bn from the National Welfare fund.<sup>88</sup> However, the current level of support has not been sufficient, and other stabilization tools are required to mitigate systemic vulnerabilities of the Russian financial sector. The banking sectors of other EAEU member states may have also been impacted by the economic downturn and sanctions as the result of their interconnectedness with Russia.

This chapter analyzes the effect of state ownership and business models on the financial and funding stability of Russian, Kazakhstani and Belarusian banks during times of crisis and sanctions.<sup>89</sup> The effect is investigated separately for state, private and foreign banks and in three regional economies. The Z-score serves as a proxy of bank financial stability from profitability and capitalization perspectives, scaled by the standard deviation of return on assets. Bank funding stability is measured using the novel Net Stable Funding ratio (NSFR), which is an indicator of prudent structural liquidity if the ratio is greater than or equal to 100%.<sup>90</sup> Bank business activities are determined by key ratios to differentiate broad business categories. This approach is consistent with most studies on business models and bank risk-taking, including Demircuc-Kunt and Huisinga (2010), Altunbas et al. (2011), Kohler (2015), Mergaerts and Vennet (2016).

The remainder of the chapter is structured as follows. Section two presents the EAEU bank samples and descriptive data analysis. Section three describes the model specifications and methodology applied. Section four reports the empirical results. Section five summarizes the chapter.

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<sup>87</sup> Council Regulation (EU) 833/2014. [http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:LJOL\\_2014\\_229\\_R\\_0001&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:LJOL_2014_229_R_0001&from=EN). Accessed 22 April 2018. Note: a 30-day maturity limit was imposed after 12 September 2014.

<sup>88</sup> The Economist. 26 January 2015. Russia provides Rb 1 trn injection of capital to banks. <http://www.eiu.com/industry/article/1242752508/russia-provides-rb1trn-capital-injection-to-banks/2015-01-26> Accessed 20 April 2018.

<sup>89</sup> Although Armenia and Kyrgyzstan joined the EAEU later in 2015, they are not included in this research work due to lack of consistent bank data.

<sup>90</sup> Basel Committee on Banking Supervision. October 2014. Basel III: the net stable funding ratio.

## **3.2 Data and descriptive analysis**

### **3.2.1 Sample composition**

The financial and ownership data for Russian, Kazakhstani and Belarusian banks was hand-collected from the audited annual reports that were prepared according to the International Financial Reporting Standards (IFRS). In addition to active banks, the sample included banks that defaulted during the sample period from January 2008 to January 2016 if a defaulted bank had data at least for five consecutive years prior to its failure. Banks that experienced mergers and acquisitions (M&As) during the sample period were treated as follows. A bank was included in the sample if it had data for at least 5 consecutive years prior to or after a merger or an acquisition. Our final unbalanced panel dataset consists of 97 Russian, 28 Kazakhstani and 25 Belarusian banks of different sizes and ownership types. Bank defaults and the effects of M&As resulted in 83, 26, and 24 banks which account for 70.7%, 96.7% and 99.1%, respectively, of the sample banks' assets out of the total bank assets in their respective country as of 1 January 2016.<sup>91</sup> Table 3.1 summarizes the regional samples.

The full sample of EAEU banks is split into three subsamples according to broad ownership characteristics: state-controlled, private and foreign banks. Following Dietrich et al. (2014), state (or foreign) status is assigned to a bank if a state (or a foreign) shareholder controls more than 50% of bank ownership originally or through changes in ownership due to M&As; a bank is treated as privately-owned otherwise.

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<sup>91</sup> For the representative sample constrictions, a 70% minimum benchmark was used for the ratio of the total assets of sampled banks to the total bank assets in each country. In the Russian bank sample, the inclusion of 100 additional banks improves the ratio by only 4.5%.

**Table 3.1 The regional samples**

Criteria	Russian banks	Kazakhstani banks	Belarusian banks
Period of study	Jan 2008 – Jan 2016	Jan 2008 – Jan 2016	Jan 2008 – Jan 2016
Number of sample banks during the sample period:	92	28	25
- State-owned	15	4	6
- Private	58	13	3
- Foreign	19	12	16
- Large	30	9	6
- Medium	31	10	5
- Small	31	9	14
Number of sample banks as of 1.01.2017	83	26	24
Total assets of sample banks (USD, millions) as of 1.01.2016	805 211.5	67 528.9	33 382.9
Number of operating banks as of 1.01.2016	733	35	26
Total assets of operating banks (USD, millions) as of 1.01.2016	1 138 812.2	70 051.1	33 135.9
Sample banks' assets out of total bank assets as of 1.01.2016	70.7%	96.4%	99.2%
Assets of top five banks out of total bank assets as of 1.01.2016	54.1%	59.2%	79.5%
Data frequency	Annual	Annual	Annual
Total observations	814	248	223

The table shows compositions of the regional samples. The sample includes defaulted banks and banks that experienced M&As during the sample period. A state (foreign) bank has more than 50% of government (foreign) shareholding; a bank is privately-owned otherwise. The following criteria define size groups. Russia: large banks (total assets  $\geq$  RUR 250 bn), medium banks (250 RUR bn < total assets  $\leq$  RUR 100 bn), small banks (total assets < RUR 100 bn); Kazakhstan: large banks (total assets  $\geq$  KZT 1000 bn), medium banks (KZT 1000 bn < total assets  $\leq$  KZT 200 bn), small banks (total assets < KZT 200 bn); Belarus: large banks (total assets  $\geq$  BYR 30000 bn), medium banks (BYR 30000 bn < total assets  $\leq$  BYR 5000 bn), small banks (total assets < BYR 5000 bn).

Source: [www.cbr.ru](http://www.cbr.ru), [www.nationalbank.kz](http://www.nationalbank.kz), [www.nbrb.by](http://www.nbrb.by)

The major reason for separating EAEU banks in ownership clusters is the specific features and structural changes occurring in each banking sector. The state ownership concentration in the Russian banking sector continues to expand and was 58.8% as of 1 January 2016. The market share of foreign banks declined from 18.0% in 2011 to 13.0% in 2016 due to foreign banks' withdrawal of capital from high-risk Russia. In contrast, Kazakhstan is characterized by relatively low involvement of the government in the



banking sector.<sup>92</sup> The assets of privately-owned credit institutions account for 85.0% of total bank assets. Despite this, implicit state support has been always in place, as the Kazakhstani government bailed out three largest private banks in 2009.<sup>93</sup> The market share of foreign banks has gradually declined in Kazakhstan, from 27.5% in 2011 to 13.0% in 2016. The Belarusian banking sector is the most concentrated, as the largest five banks control 79.5% of all assets. The sector is also dominated by state and foreign ownership types, which represent 71.1% and 26.2% of total bank assets, respectively. Most of the large foreign banks in Belarus are owned by state Russian banks, indicating the strong influence of Russian capital on the performance of the Belarusian banking sector.

### 3.2.2 Measures of bank financial and funding stability

Bank stability was measured by two alternative variables that analyze bank soundness from two important perspectives: financial stability and funding stability. A classic Z-score is a proxy for bank financial stability, calculated for a bank  $i$  at time  $t$  as the sum of return on assets ( $ROA_{it}$ ) and equity to assets ( $E/A_{it}$ ) ratios divided by the standard deviation of return on assets  $\delta(ROA)_{it}$ . Following Delis et al. (2014), we calculate the  $\delta(ROA)_{it}$  using a rolling window for three consecutive years.<sup>94</sup>

$$Z_{it} = \frac{ROA_{it} + E / A_{it}}{\delta(ROA)_{it}}$$

A higher Z-score indicates a stronger mix of bank profitability and capitalization which reduces the likelihood of bank failure. However, excessive volatility of bank

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<sup>92</sup> There is only one 100% state-owned bank in Kazakhstan, Zhilstroyberbank, which held approximately 2% of the market share by asset size as of 1 January 2016.

<sup>93</sup> In February 2009, the Kazakhstani government announced the acquisition of 78% of BTA bank and 76% of Alliance bank. Later in 2009, government support of Halyk Saving Bank of Kazakhstan resulted in 21% state ownership.

<sup>94</sup> Delis et al. (2014) also used four- and five-year rolling windows for the standard deviation of the ROA and found consistent results. Bertay et al. (2013) calculated the Z-score with a standard deviation of the ROA using data for the preceding four years. Bhagat et al. (2015) estimated the standard deviation of the ROA over the preceding five-year window. Baselga-Pascual et al. (2015) used two-year previous data to calculate the standard deviation of the ROA. Their results are consistent with the three- and four-year rolling windows.

earnings (resulting from business models and the macroeconomic environment) decreases the Z-score. Figure 3.1 presents the Z-scores of EAEU banks by ownership type and region.

**Figure 3.1 Z-score of EAEU banks, 2008-2016**

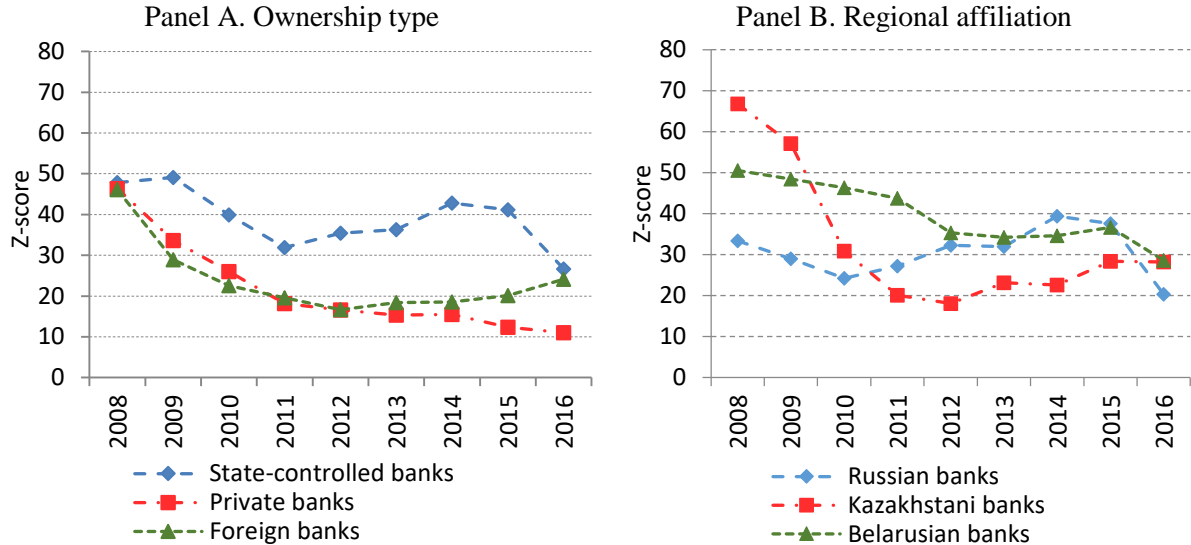


Figure presents an average Z – score for EAEU banks across ownership type (Panel A) and region (Panel B) during January 2008 – January 2016. A higher Z-score indicates stronger financial stability (or lower likelihood of bank failure). A state (foreign) bank has more than 50% of government (foreign) shareholding; a bank is privately-owned otherwise.

Panel A of Figure 3.1 indicates that state-controlled banks generally had better financial stability than foreign and private banks. The Z-score of state banks exhibits a fluctuating trend, deteriorating from 47.8 to 31.9 during the crisis period and decreasing from 42.8 in 2014 to 26.6 in 2016. Foreign banks also experienced distress in their financial stability, as their Z-score decreased from 46.1 to 16.6 during 2008 – 2012, consequently improving to 24.1 in 2016. In contrast to state and foreign banks, private banks' Z-scores exhibited a dramatic decline from 46.4 in 2008 to 11.0 in 2016, with no signs of recovery over the study period. Panel B of Figure 3.1 shows that Russian banks generally have the lowest Z-scores among three countries. Despite post-crisis improvement in Russian banks' Z-score, it reached a historical minimum of 20.3 as of January 2016. Kazakhstani banks' Z-score decreased sharply from 66.7 in 2008 to 18.1 in 2012 and then slowly increased to 28.6 in 2016. Belarusian banks' Z-score gradually declined from 48.6 in 2008 to 28.6 in 2016.

Funding stability is measured by the Net Stable Funding Ratio. The ratio is defined by the BCBS and calculated as a weighted sum of the *Available* amount of stable funding divided by a weighted sum of the *Required* amount of stable funding.<sup>95</sup> For the *Available* amount of stable funding (AASF), the weights increase with longer maturities of liabilities. For the *Required* amount of stable funding (RASf), the weights are greater for less liquid assets<sup>96</sup>. Banks with an NSFR of 100% or more indicate strong structural liquidity and can sustain a liquidity crisis without selling assets at short notice or borrowing additional funds. We explain the methodology for the NSFR's proxy next, as this is the first research work that calculates the NSFR for EAEU banks using public bank data.

The calculation of the NSFR (as defined by the BCBS) is not possible for Russian, Kazakhstani and Belarusian banks due to several limitations in the public data. *First*, off-balance sheet data is not available for banks in these three countries. Following Distinguin et al. (2013), we calculated the NSFR using only on-balance sheet information. This approach narrows the definition of liquidity because a large portion of required liquidity arises from off-balance sheet unused loan commitments. For example, Berger and Bowman (2009) indicate that loan commitments account for a significant proportion of total liquidity creation, especially in large banks. *Second*, a detailed breakdown by asset classes and maturities is not disclosed in the EAEU sample data. Following the work of King (2013) for 15 developed countries, Distinguin et al. (2013) for large US and EU banks, and Dietrich et al. (2014) for Western European banks, we calculated a simplified version of the NSFR for EAEU banks using broad asset categories to weight the available and required amounts of stable funds.

Table 3.2 presents the balance sheet items and weights assigned to each category based on the final version of the BCBS proposal for the NSFR issued in October 2014.

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<sup>95</sup> Basel Committee on Banking Supervision. October 2014. Basel III: the net stable funding ratio.

<sup>96</sup> The weights are assigned within the 0% - 100% range; however, the sum of the weights should not be 100%.

Our proposal for weights uses a conservative principle: a greater weight is assigned if detailed information on an asset or liability is not available.

**Table 3.2 Weights for the NSFR calculated for EAEU banks**

<b>Available Amount of Stable Funding</b>	<b>Corresponding BCBS explanation</b>	<b>AASF factor: BCBS weight</b>	<b>AASF factor: Proposed weight</b>
Borrowing from the Central bank	Funding provided by central banks and financial institutions with maturity up to 6 months	0	0
Interbank borrowing	Funding provided by central banks and financial institutions with maturity up to 6 months	0	0
Customer deposits	Various weights by class (demand, term, operational etc.) and maturity	0.50–0.95	0.70
Long-term borrowing	Other capital instruments and liabilities with maturity of one year or more	1	1
Other long-term liabilities	Other capital instruments and liabilities with maturity of one year or more	1	1
Shareholders' capital	Total regulatory capital (excluding Tier 2 instruments with maturity less than 1 year)	1	1
<b>Required Amount of Stable Funding</b>	<b>Corresponding BCBS explanation</b>	<b>RASF factor: BCBS weight</b>	<b>RASF factor: Proposed weight</b>
Cash and cash equivalents	Coins and banknotes, all Central banks' reserves	0	0
Deposits at the Central bank	Claims on Central banks with maturity less than 6 months	0	0
Deposits in banks	Loans to and deposits held at financial institutions (including deposits held for operational purposes) with maturity between 6 months and 1 year	0.50	0.50
Securities	Various weights by class and rating	0.15 – 0.50	0.50
Loans	Various weights by class (retail and SMEs, mortgages, corporate etc.) and maturity	0.50 – 0.85	0.85
Fixed and Intangible assets	All other assets not included in above categories with the maturity one year or more	1	1
Other assets	All other assets not included in above categories with the maturity one year or more	1	1

This table presents the balance sheet items and weights to estimate the Net Stable Funding Ratio for Russian, Kazakhstani and Belarusian banks. BCBS weights are defined in the final proposal of the BCBS on the Basel III NSFR (October 2014). Proposed weights are assigned using the conservative principal: a greater weight is assigned if a detailed information on an asset or a liability is not available. AASF is an available amount of stable funding. RASF is a required amount of stable funding.

We assumed that the maturity of borrowing from central banks and financial institutions was less than 6 months, customer deposits were assigned the middle weight of 0.70 (between 0.50 and 0.95), deposits in banks were assumed to have a maturity between 6 months and 1 year, and all securities and loans were assigned the highest weight.<sup>97</sup> The formula below was used to calculate the NSFR for EAEU banks, applying the proposed weights from Table 3.2:

$$NSFR_{it} = \frac{\text{Required amount of stable funding}_{it}}{\text{Available amount of stable funding}_{it}} = \frac{\sum(w_j * \text{Funding amount}_{it})}{\sum(w_j * \text{Asset amount}_{it})}$$

where  $NSFR_{it}$  is the Net Stable Funding Ratio of bank  $i$  at time  $t$ ;  $\text{Funding amount}_{it}$  is a balance sheet amount of a relevant funding category of bank  $i$  at time  $t$ ;  $\text{Asset amount}_{it}$  is a balance sheet amount of a relevant asset category of bank  $i$  at time  $t$ ; and  $w_j$  is the appropriate RASF or AASF proposed weights for a relevant category of bank  $i$  at time  $t$ . A higher NSFR indicates stronger structural liquidity within one year (or a lower likelihood of bank failure caused by the funding risk). Figure 3.2 presents the average NSFR of EAEU banks by ownership type and region.

Panel A of Figure 3.2 shows that the NSFR of EAEU state and private banks was 92.9% and 91.0%, respectively, as of January 2016.<sup>98</sup> However, foreign banks have been able to improve their structural liquidity towards compliance with the Basel III liquidity requirements. Panel B of Figure 3.2 demonstrates that Russian and Belarusian banks have historically operated at very weak structural liquidity. The improvement in the NSFR of Belarusian banks from its lowest level of 76.2% in 2009 to 98.3% in 2012 was only temporal, as the funding stability continued to worsen during the post-crisis and sanction periods. Kazakhstani banks have operated at prudent structural liquidity since 2011.

<sup>97</sup> If the maturity of borrowing from central banks and financial institutions is more than 6 months but less than 1 year, the weight is 50% according to the BCBS final report (October 2014).

<sup>98</sup> The deadline for the full implementation of the NSFR with the minimum level of 100% in Russia, Kazakhstan and Belarus is 1 January 2018.

**Figure 3.2 The Net Stable Funding Ratio of EAEU banks, 2008-2016**

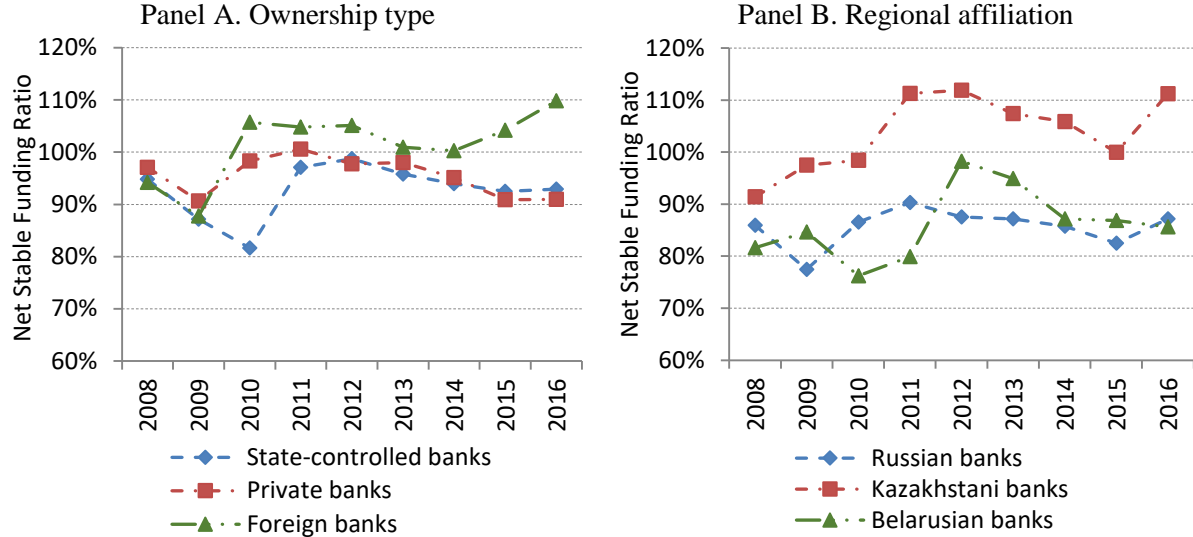


Figure presents the NSFR for EAEU banks across ownership type (Panel A) and region (Panel B) during January 2008 – January 2016. The minimum level of the Basel III NSFR is 100%. The higher NSFR indicates more prudent funding structure. A state (foreign) bank has more than 50% of government (foreign) shareholding; a bank is privately-owned otherwise.

### 3.2.3 Descriptive analysis across bank ownership type and region

The descriptive statistics present a summary of EAEU bank data and the general differences between samples grouped by ownership and country characteristics. Table 3.3 reports the mean and median values of stability and business variables of the full, state-controlled, private and foreign bank samples during 2008-2016. Because our data are not normally distributed, the Kruskal-Wallis H rank nonparametric test is more efficient, as it compares the medians between ownership groups. State-controlled banks in the EAEU region have a considerably higher Z-score (19.302), followed by foreign (17.797) and privately-owned banks (14.755). Regarding the NSFR, there are no significant differences in the medians of state, private and foreign bank samples. State-controlled banks have larger size in the EAEU region (18.873) and invest more in securities (0.095). The lending growth rates of state, private and foreign banks do not show significant differences in the medians. Foreign banks engage in more fee-generating activities (0.156) than private (0.120) or state banks (0.088). Foreign banks also show a greater reliance on short-term market funding (0.121) and better capitalization (0.146) than state or private banks. The capitalization of private banks is the lowest of all the samples (0.110).

**Table 3.3 Means and medians of bank stability and business variables for the full sample of EAEU banks, 2008-2016**

Sample type:	Full		State-owned		Private		Foreign		Full	
Statistical measure:	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Shapiro-Wilk test	Kruskal-Wallis H
<b>Bank stability variables</b>										
Z-score	27.251	16.172	32.353	19.302	24.998	14.755	27.874	17.797	0.437***	22.021***
NSFR	1.019	0.944	0.934	0.929	0.959	0.946	1.120	0.933	0.086***	2.202
<b>Bank business variables</b>										
Size	17.583	18.006	18.751	18.873	17.743	18.034	16.737	17.498	0.950***	89.118***
Loan growth	0.844	0.254	0.508	0.284	0.491	0.229	1.601	0.282	0.207***	2.905
Securities/Assets	0.086	0.057	0.114	0.095	0.083	0.054	0.074	0.039	0.828***	56.815***
Fee income/TOR	0.154	0.122	0.107	0.088	0.147	0.120	0.188	0.156	0.865***	124.93***
Borrowing/Assets	0.129	0.083	0.130	0.087	0.057	0.093	0.163	0.121	0.779***	124.91***
Equity/Assets	0.171	0.142	0.117	0.142	0.153	0.110	0.215	0.146	0.648***	98.331***
Observations	1285	1285	222	222	653	653	410	410	1285	1285

This table shows the mean and median values of bank-specific variables for the full sample and the ownership subsamples of EAEU banks. The *Z-score* is a proxy for bank financial stability. The *NSFR* is the Net Stable Funding Ratio and a measure of bank funding stability. *Size* is defined as the  $\ln(\text{Total Assets})$ . *Securities* include held-to-maturity and available-for-sale securities. *TOR* is the total operating revenue. *Borrowing* represents short-term market funding. The *Shapiro-Wilk* normality test was conducted for variables using the full bank sample. The *Kruskal-Wallis H* rank test determines the differences in medians between state-owned, private and foreign bank samples. P-values are as follows: \*\*\*Significant at 1%, \*\*Significant at 5%, \*Significant at 10%.

Table 3.4 presents the means, medians and interquartile ranges between 75<sup>th</sup> and 25<sup>th</sup> percentile for bank business variables for the regional samples. The Kruskal-Wallis H rank test determines significant differences in the medians among country groups. For example, the Z-score of Belarusian banks (25.618) is considerably greater than those of Russian (14.542) and Kazakhstani banks (15.586). The median NSFRs of Russian (0.910) and Belarusian (0.960) banks show that more than half of the sample banks in these countries do not meet the minimum 100% threshold for the ratio. Belarusian banks are relatively smaller in size (13.941) than Russian (18.252) and Kazakhstani (18.764) banks. Belarusian banks also show faster lending growth (0.379), a greater share of fee and commission income in total operating revenue (0.224), higher short-term borrowing (0.142) and better capitalization (0.185). The median values of securities' portfolios represent only 5.3%, 8.7% and 3.7% of total assets in Russian, Kazakhstani and Belarusian

banks, respectively. The more detailed analysis of EAEU bank business models' development over time is presented in Appendix B.

**Table 3.4 Means and medians of bank stability and business variables for the regional samples of EAEU banks, 2008-2016**

Sample type:	Russian banks			Kazakhstani banks			Belarusian banks			
Statistical measure:	Mean	Median	IQR	Mean	Median	IQR	Mean	Median	IQR	Kruskal-Wallis H
<b>Bank stability variables</b>										
Z-score	21.300	14.542	15.549	33.854	15.586	0.175	41.614	25.618	27.194	91.729***
NSFR	0.892	0.910	0.175	1.247	1.090	0.335	1.234	0.960	0.311	232.66***
<b>Bank business variables</b>										
Size	18.276	18.252	1.594	18.531	18.764	2.959	14.014	13.947	2.911	488.74***
Loan growth	0.374	0.226	0.436	0.538	0.258	0.565	2.898	0.379	0.577	31.336***
Securities/Assets	0.084	0.053	0.117	0.109	0.087	0.116	0.065	0.037	0.084	42.270***
Fee income/TOR	0.132	0.107	0.106	0.138	0.119	0.104	0.250	0.224	0.156	204.58***
Borrowing/Assets	0.132	0.081	0.140	0.083	0.041	0.115	0.167	0.142	0.153	96.469***
Equity/Assets	0.123	0.107	0.049	0.252	0.154	0.223	0.256	0.185	0.175	274.73***
Observations	814	814	814	248	248	248	223	223	223	1285

This table shows the means, medians and interquartile ranges between the 75<sup>th</sup> and 25<sup>th</sup> percentile (IQR) of bank-specific variables for Russian, Kazakhstani and Belarusian bank samples. The *Z-score* is a proxy for bank financial stability. The *NSFR* is the Net Stable Funding Ratio and a measure of bank funding stability. *Size* is defined as the ln(Total Assets). *Securities* include held-to-maturity and available-for-sale securities. *TOR* is the total operating revenue. *Borrowing* represents short-term market funding. The *Kruskal-Wallis H* rank test determines the differences in medians between Russian, Kazakhstani and Belarusian bank samples. P-values are as follows: \*\*\*Significant at 1%, \*\*Significant at 5%, \*Significant at 10%.

Table 3.5 shows the Spearman's rank correlation coefficients of stability measures and bank-specific variables for the full EAEU bank sample. The Z-score of EAEU banks is negatively correlated with bank size (-0.425) and positively correlated with bank equity (0.410). The NSFR indicates a weak negative correlation with bank size (-0.236) and a positive correlation with fee-generating activities (0.253) and equity capitalization (0.318). The correlation between the NSFR and short-term borrowing is strongly negative (-0.670). Bank size is positively correlated with investments in securities (0.274) and negatively correlated with fee-generating activities (-0.383) and capitalization (-0.507). Fee-generating activities are weakly positively associated with equity financing (0.222).



**Table 3.5 Correlation between bank-specific variables of EAEU banks, 2008– 2016**

	Z-score	NSFR	Size	Loan growth	<u>Securities</u> Assets	<u>Fee income</u> TOR	<u>Borrowing</u> Assets	<u>Equity</u> Assets
Z-score	1							
NSFR	0.106	1						
Size	-0.425	-0.236	1					
Loan growth	0.036	-0.052	-0.147	1				
<u>Securities</u> Assets	-0.064	0.068	0.274	-0.123	1			
<u>Fee income</u> Assets	0.142	0.253	-0.383	0.116	-0.191	1		
<u>Borrowing</u> Assets	0.034	-0.670	0.068	0.087	-0.118	-0.109	1	
<u>Equity</u> Assets	0.410	0.318	-0.507	-0.053	-0.138	0.222	-0.074	1

This table presents the Spearman correlation coefficients between stability and business-specific variables. The *Z-score* is a proxy for financial stability. The *NSFR* is the Net Stable Funding Ratio that measures funding stability. *Size* is defined as the  $\ln(\text{Total assets})$ . *Securities* include held-to-maturity and available-for-sale securities. *TOR* is the total operating revenue. *Borrowing* represents short-term market funding. The correlation criteria are as follows: 0–0.2 scarcely correlated; 0.2–0.4 weakly correlated; 0.4–0.6 correlated; 0.6–1.0 strongly correlated.

### 3.3 Model and methodology

This research work analyzes the impact of ownership, sanctions and business characteristics on the financial and funding stability of banks in the EAEU region. Each *Stability* dependent variable, the Z-score or the NSFR, was regressed against bank-specific and macroeconomic control variables. In line with the literature (e.g., Altunbas et al. 2011; Dietrich et al., 2014), the empirical investigation was based on the following baseline model specification, which was applied for the EAEU subsamples by bank ownership type and regional affiliation:

$$\begin{aligned}
 STABILITY_{i,t} = & C_i + \gamma Sanctions_t + \beta_1 Size_{i,t} + \beta_2 Growth_{i,t} + \beta_3 Invest_{i,t} + \beta_4 Fee_{i,t} \\
 & + \beta_5 Borrow_{i,t} + \beta_6 Equity_{i,t} + \sum_{m=1}^M X_t^m + \omega_{i,t}
 \end{aligned} \tag{eq. 1}$$

$C_i$  is a bank-specific unobservable constant characteristic.  $Sanctions_t$  is a dummy variable set to “1” for 2015 and 2016 since the first sanctions against Russian banks were imposed

in July 2014.<sup>99</sup>  $Size_{i,t}$  is the natural logarithm of the total assets of bank  $i$  time  $t$ .  $Growth_{i,t}$  is the annual lending growth rate.  $Invest_{i,t}$  is the ratio of held-to-maturity and available-for-sale securities to total assets.  $Fee_{i,t}$  is the ratio of fee income to total operating revenue.  $Borrow_{i,t}$  is the ratio of short-term market borrowing to total assets.  $Equity_{i,t}$  is the ratio of equity to total assets.  $\sum_{m=1}^M X_t^m$  is the set of macroeconomic control variables.  $\omega_{i,t}$  is the disturbance term comprised of the unobserved bank-specific effect ( $\theta_{i,t}$ ) and idiosyncratic error ( $\varepsilon_{i,t}$ ).

Economic stress and cycles may impact bank stability in various manners. Guidara et al. (2013) report that economic upturns are associated with better capitalization and performance and motivate banks' more aggressive risk-taking. Bank profitability is usually eroded through realization of accumulated risks in times of economic contagion. Following the research of Imbierowicz and Rauch (2014), Dietrich et al. (2014) and Bhagat et al. (2015), the model includes a dummy variable, *Crisis*, set to "1" for 2008, 2009 and 2010.<sup>100</sup> A real *GDP growth* controls for economic cycle and its effect on bank stability. Tan and Floros (2012) suggest that *inflation* is an important factor that impacts bank performance in developing economies. The authors report a positive association between inflation and the profitability of Chinese banks. In contrast, Baselga-Pascual et al. (2015) show that high inflation negatively impacts the loan quality and Z-score of European banks.

A dummy variable of state ownership ( $State_{it}$ ) was added to the model to analyze the full sample of EAEU banks. This variable accounts for a specific feature of state-controlled banks: easier access to government capital and liquidity funding. Davydov (2016) reports that state-owned Russian banks had greater capitalization during the crisis period of 2008 – 2010 than private banks. The author notes that government support appears effective, as it causes countercyclical behavior of Russian state-owned banks

<sup>99</sup> The sanctions on Russian banks began in July 2014 when Vnesheconombank and Gazprombank received restrictions to foreign borrowing for longer than 90 days. RIA News. <https://ria.ru/spravka/20151125/1328470681.html>. Accessed 12 April 2018.

<sup>100</sup> The crisis years are defined by Lehman Brothers' bankruptcy in September 2008. The post-crisis period in the EAEU region is associated with recovery of bank asset growth and slowdown in reported credit losses after 2010.

during times of financial distress. Pak and Kretzschmar (2016) provide evidence that the positive effect of state support across the banks of Russia's economic union is unsustainable and has been eroded by weak credit management. The second model (applied solely to the full EAEU sample) is presented by equation 2:

$$STABILITY_{i,t} = C_i + \varphi State_{i,t} + \gamma Sanctions_t + \beta_1 Size_{i,t} + \beta_2 Growth_{i,t} + \beta_3 Invest_{i,t} \\ + \beta_4 Fee_{i,t} + \beta_5 Borrow_{i,t} + \beta_6 Equity_{i,t} + \sum_{m=1}^M X_t^m + \omega_{i,t} \quad (eq. 2)$$

where  $State_{it}$  is a dummy variable set to "1" if a bank has more than 50% government shareholding (originally or through changes in ownership due to government bailouts of distressed private banks) and is set to "0" otherwise. A significant coefficient of the state variable,  $\varphi$ , implies strong influence of government on financial and funding stability of state-controlled banks in the region.

We introduce all bank-specific variables in the model without a lag for two reasons. First, we follow the work of Delis et al. (2014), who allow for their risk measure (a variance of profit function) to be endogenous to other variables. Delis et al. (2014) argue that a decision on risk-taking is made by financial institutions by considering the expected profitability, liquidity and capitalization simultaneously. Moreover, Dietrich et al. (2014) analyze the contemporaneous relationship between bank-specific variables and the NSFR and note that the bank balance sheet structure remains relatively stable from year to year. Second, the Durbin-Wu-Hausman (DWH) specification error test confirms the absence of a strong endogeneity issue (see Table 3.6). In the Russian bank sample, lending growth (*Growth*) is endogenous at a 5% level of significance with respect to the Z-score. In the full sample of EAEU banks, the equity to assets ratio (*Equity*) is endogenous at 5% with respect to the NSFR.<sup>101</sup>

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<sup>101</sup> Potential endogeneity problems arise when at least one explanatory variable is correlated with an error term  $\omega_{i,t}$ , which violates the zero-mean assumption of a disturbance term (Wooldridge, 2002).

**Table 3.6 Durbin-Wu-Hausman endogeneity test for EAEU samples, 2008 - 2016**

Method: The Generalized Method of Moments.								
Endogenous variables to treat as exogenous: Growth and Equity								
Dependent variable ( $Stability_{it}$ ) is represented by two measures: Z-score or NSFR								
	Full EAEU sample		Russian banks		Kazakhstani banks		Belarusian banks	
Variable	Z-score	NSFR	Z-score	NSFR	Z-score	NSFR	Z-score	NSFR
Growth	1.057	0.059	9.496**	0.001	2.592	2.290	0.013	0.006
Equity	1.219	5.786**	0.117	0.823	2.849	0.699	0.594	0.833

This table shows the results of the Hausman specification test for endogeneity under the following Null hypothesis: a variable is exogenous. The numbers report differences in J-statistics. P-values are as follows:

\* Significant at 10%, \*\* Significant at 5%, \*\*\*Significant at 1%

The effect of business activities on the bank stability modeled by equations 1 and 2 was analyzed using two methods: the Panel least squares and the Generalized method of moments (GMM). Panel fixed and random effects address the problem of omitted variables that may significantly influence bank stability. For example, management quality or corporate governance may impact bank risk-taking (Laeven and Levin, 2009; Bhagat et al., 2015). The Hausman specification test checks the condition of zero correlation between an individual effect ( $C_i$ ) and the explanatory variables,  $\rho(C_i, \beta_{it})=0$  (Hausman, 1978).<sup>102</sup> The data was examined for the presence of the unit root, which may create a spurious relationship between variables. Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests confirmed that all the variables are stationary at level (see Table 3.7). Regarding the bank size in the Kazakhstani banks' sample, GDP growth and inflation in the full EAEU sample, the ADF and PP tests report conflicting results. The additional Levin, Lin and Chu panel unit root test confirmed the stationarity of these variables at 1% significance. In the context of a panel study, the absence of the unit root has an important implication because it justifies the use of a fixed effect rather than the first difference effect.

<sup>102</sup> If this condition is violated, the appropriate estimation model is a fixed effect; otherwise, both fixed effect and random effect models produce consistent estimates.

**Table 3.7 Unit root test for EAEU bank-specific and macroeconomic variables, 2008 – 2016**

	Full EAEU sample		Russian banks		Kazakhstani banks		Belarusian banks	
Variable	ADF	PP	ADF	PP	ADF	PP	ADF	PP
Z-score	-10.98***	-11.11***	-9.32***	-9.58***	-5.21***	-5.36***	-4.87***	-4.58***
NSFR	-33.79***	-33.94***	-11.65***	-11.85***	-8.95***	-9.41***	-6.02***	-5.91***
Size	-2.78*	-8.24***	-4.89***	-9.03***	-1.83	-3.45**	-3.05***	-4.95***
Growth	-35.00***	-35.00***	-19.66***	-22.97***	-13.57***	-13.59***	-6.40***	-8.78***
Invest	-16.04***	-15.88***	-12.68***	-12.68***	-7.36***	-7.41***	-6.67***	-6.72***
Fee	-11.74***	-14.77***	-10.21***	-12.79***	-7.34***	-7.38***	-8.18***	-8.10***
Borrow	-12.97***	-17.29***	-9.47***	-9.54***	-12.31***	-12.56***	-7.33***	-7.36***
Equity	-10.61***	-12.55***	-9.43***	-11.79***	-5.96***	-5.82***	-5.91***	-5.90***
GDPG	-1.27	-42.84***	n/a	-79.74***	-14.22***	-96.12***	-3.93***	-38.88**
Inflation	-0.53	-24.85***	n/a	-123.19***	-4.37***	-82.31***	-7.74***	-28.22***

This table presents the results of Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests. The null hypothesis: a variable is non-stationary. *Size* is measured by the  $\ln(\text{Total assets})$ . *Growth* is the lending growth rate. *Invest* is the ratio of available for sale and held to maturity securities to total assets. *Fee* is a fee and commission income to total operating revenue. *Borrow* is short-term market borrowing to total assets. *Equity* is equity to total assets. *GDPG* is annual real GDP growth rate. Inflation is annual inflation rate calculated from the CPI index. P-values are marked by asterisks as follows: \* Significant at 10%, \*\* Significant at 5%, \*\*\* Significant at 1%.

The Generalized Method of Moments verifies the robustness of panel regression results as it accounts for potential endogeneity issues and effectively accommodates the heteroscedasticity problems. The GMM also controls for unobserved bank heterogeneity. The Sargan-Hansen J statistic checks the validity of instrumental variables in the GMM system equation. Instrumental variables were carefully selected from previous research and are specified in the tables with the empirical results.

### 3.4 Empirical results

#### 3.4.1 Financial stability of EAEU banks by ownership type and region

Tables 3.8 and 3.9 present the effects of state ownership, sanctions and bank business activities on the Z-score of EAEU banks by ownership characteristics (Table 3.8) and country (Table 3.9) using model equation 1. The results from the full EAEU bank

sample are based on equation 2, which includes the additional control variable of *State ownership*. The GMM confirms the robustness of the major findings.

In the full sample of EAEU banks, *State ownership* has significant positive effect on bank financial stability across all model specifications. This finding complies with Iannotta et al. (2013), who report that European public banks are less prone to default due to their easier access to government funding. The impact of *Sanctions* on state and foreign banks is not material whereas there is a weak negative effect of sanctions on the Z-score of private banks. It appears that the funding support available for state-owned banks buffers the destabilizing effect of sanctions. Moreover, sanctions undermined public trust in private banks and triggered an outflow of deposits from private to state-owned credit institutions.

*Bank size* has significant negative impact on the Z-score of state and private Russian and Kazakhstani banks, implying that large banks tend to accept greater business risks. This finding represents a significant departure from most Western studies. For example, Hughes and Mester (2013), Kohler (2015), and Baselga-Pascual et al. (2015) report a positive relationship between bank size and bank stability because large banks have better ability to diversify their specific business risks. The results from the Belarusian bank sample are in line with Western studies and confirm the significant positive effect of size on the Z-score. *Lending growth* consistently reduces the Z-score of private and foreign EAEU banks across all three regional samples. It appears that aggressive credit growth is strongly associated with lower lending standards, which contribute to the overall riskiness of banking firms through greater credit losses (Foos et al. 2010; Vazquez and Federico, 2015; Fahlenbrach et al., 2016).<sup>103</sup> The coefficient of lending growth of state banks is not significant. *Investments in securities* positively contribute to state banks' financial stability in the EAEU. This result complies with Kohler (2015), who reports that capital market activities provide some advantageous diversification that improves a bank's

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<sup>103</sup> Following the work of Altunbas et al. (2011), we replaced *lending growth* with the *excess* lending growth rate by calculating the difference between each bank's loan growth and sample mean. We also re-ran a regression using one lag for lending growth. The significance of main results remained the same.

soundness. The effect of securities investments on private and Kazakhstani banks' Z-score is negative. DeYoung and Torna (2013) note that non-traditional asset-based activities (such as trading or investment banking) are associated with a higher default probability of US banks. Greater *engagement in fee-generating businesses* has a significant negative influence on the Z-score of private EAEU and Russian banks; however, the effect on the Z-score of foreign banks is positive. It appears that benefits from more diversified business activities highlighted by Demirgüç-Kunt and Huizinga (2010), Altunbas et al. (2011), Kohler (2015) are less explored by EAEU state and private local banks than foreign banks. *Short-term market borrowing* is positively associated with financial stability in all bank samples except for foreign banks (no effect is observed) and the Belarusian bank sample (weak negative effect). This finding contrasts with those of most studies from developed countries, which provide evidence of the reverse effect. The primary reason for this is that the current level of short-term borrowing is relatively low, providing banks with more diversified funding structures. Demirgüç-Kunt and Huizinga (2010) found a non-linear relationship between US and EU banks' non-deposit funding and stability. They note that a low share of short-term market borrowing brings benefits from funding diversification. However, additional reliance on market funding increases a bank's risk profile. *Bank capitalization* has a significant positive effect on the Z-score among all the model specifications and across all the samples, indicating the crucial role of bank capital in improving banks' stability regardless of bank ownership and regional affiliation (Berger and Bowman, 2013; Vazques and Federiko, 2015).

Among the macroeconomic variables, the coefficient for *Crisis* is negative and significant in the sample of Kazakhstani banks, implying that bank stability was seriously undermined during the crisis period. An increase in *real GDP growth* has a negative effect on Z-score in the full and Kazakhstani bank samples, confirming banks' countercyclical behavior (Davidov, 2016). *Inflation* is negatively associated with the stability of

Belarusian banks.<sup>104</sup> Baselga-Pascual et al. (2015) showed that high inflation reduced the credit quality and Z-score of European banks.

### 3.4.2 Funding stability of EAEU banks by ownership type and region

Tables 3.10 and 3.11 report the effects of state control, sanctions and business activities on the NSFR of EAEU banks by ownership type (Table 3.10) and regional samples (Table 3.11). In contrast to the Z-score, there is no influence of *State ownership* on EAEU banks' funding stability. Jean-Loup (2017) and Dietrich et al. (2014) found the similar results for European banks. The *economic sanctions* affect Russian and Belarusian banks' NSFRs and are not material for the Kazakhstani banks and ownership groups. Under the US and EU sanctions, the Russian and Belarusian banks are not able to attract long-term foreign financing and invest in foreign capital markets. Moreover, the majority of foreign banks in the Belarusian banking sector are Russian, which amplifies the effect of sanctions in Belarus.

Larger *bank size* is associated with weaker funding stability in the full, Russian and Kazakhstani bank samples. The effect of bank size on the NSFR of Belarusian banks is positive. It appears that bigger banks tend to have a greater maturity gap between liabilities and assets that results in a lower NSFR. Jean-Loup (2017) shows that large size is mainly associated with a lower liquidity risk of EU banks. *Lending growth* and *investments in securities* are not material to explain the NSFR of EAEU banks whereas Dietrich et al. (2014) indicate a negative impact of aggressive lending on the NSFR of European banks. *Fee and commission income* has a weak negative influence on the funding stability of Belarusian banks. Dietrich et al. (2014) finds that the NSFR decreases with a greater share of non-interest income of European banks. The negative effect is explained by the fact that European banks use short-term borrowing to finance their fee-generating business. *Short-term borrowing* has a significant negative impact on the NSFR across all samples, implying that a heavy reliance on wholesale market borrowing

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<sup>104</sup> The medians of the annual inflation rates are 13.8%, 14.4% and 17.8% for Russia, Kazakhstan and Belarus, respectively, during the sample period of 2008 – 2016.



threatens banks' funding stability. *Equity capitalization* considerably improves the NSFRs of EAEU banks in all samples. This result confirms the importance of equity financing for stronger bank resistance to liquidity shocks.

Analysis of macroeconomic variables shows that *Crisis* period is associated with a lower level of the NSFR, except for foreign banks. *Real GDP growth* improves structural liquidity of privately-owned banks. It appears that it is easier for private banks to manage their asset-liability maturity mismatch during an economic upturn. The effect of the GDP on the NSFR of state-owned and Russian banks is weakly positive. Greater *Inflation* is associated with a lower NSFR in the full, state-owned, private and Russian bank samples. Notably, foreign banks' NSFR is not driven by the economic conditions of the host country due to available financing from their parent companies.

Finally, the Hausman test favors a fixed effect model specification to explain EAEU banks' financial and funding stability; however, both fixed and random specifications provide consistent estimates for the Kazakhstani and Belarusian bank samples. The F-test statistics indicate the overall model significance. The Sargan-Hansen test shows the validity of the instrumental variables in the GMM system equation across all samples.

**Table 3.8 Business activities and financial stability of EAEU banks by ownership type, 2008 – 2016**

Dependent variable: Z-score stability index (Z-score)

Method: Panel least squares fixed effect and cross-section random effect. GMM is the panel Generalized Methods of Moments estimated with fixed effect.

	Full EAEU sample			State-owned banks			Private banks			Foreign banks		
	Fixed	Random	GMM	Fixed	Random	GMM	Fixed	Random	GMM	Fixed	Random	GMM
State	4.982*** (3.647)	6.544*** (4.180)	8.364*** (3.208)									
Sanctions	-1.384** (-2.268)	-1.018* (-1.693)	-8.009 (-1.568)	-1.412 (-0.918)	-1.039 (-0.703)	-2.243 (1.033)	-2.224** (-2.255)	-1.402 (-1.451)	-3.538* (-1.711)	0.468 (0.668)	0.496 (0.716)	1.183 (1.361)
Size	-2.653*** (-6.959)	-1.795*** (-5.968)	-2.693*** (-2.745)	-3.028*** (-2.959)	-3.228*** (-4.270)	-3.390*** (-2.761)	-3.258*** (-5.513)	-2.028*** (-4.115)	-2.184*** (-4.429)	0.036 (0.067)	-0.168 (-0.431)	-0.368 (-1.587)
<i>Growth</i>	-0.045*** (-3.304)	-0.046*** (-3.373)	-0.055* (-3.641)	-0.172 (-0.404)	0.155 (0.368)	-0.189 (-0.133)	-0.184** (-1.977)	-0.211** (-2.274)	-0.185*** (-2.731)	-0.033*** (-3.408)	-0.034*** (-3.441)	-0.047** (-2.128)
Invest	-1.880 (-0.720)	-1.837 (-0.717)	0.507 (0.158)	13.445** (1.968)	11.920* (1.763)	15.844** (1.936)	-6.827* (-1.645)	-5.882 (-1.451)	-5.088* (-1.622)	0.672 (0.218)	0.228 (0.075)	-8.135 (0.756)
Fee	0.140 (0.057)	-0.697 (-0.290)	-8.895 (-1.175)	-6.659* (-0.674)	-4.453 (-0.474)	-7.332 (-0.688)	-10.397*** (-2.597)	-10.894*** (-2.776)	-9.536* (-1.784)	6.627*** (2.639)	5.979** (2.453)	9.289* (1.833)
<i>Borrow</i>	13.214*** (6.503)	11.721*** (5.965)	23.479*** (2.733)	13.018*** (2.705)	11.876** (2.570)	19.537*** (3.125)	18.348*** (5.023)	16.205*** (4.588)	19.752*** (3.631)	-3.278 (-1.415)	-2.626 (-1.177)	-6.462 (-1.204)
<i>Equity</i>	53.254*** (22.268)	52.697*** (23.736)	63.801*** (9.404)	32.378*** (5.751)	30.829*** (5.637)	33.542*** (3.542)	68.930*** (17.026)	68.742*** (18.374)	71.241*** (17.054)	48.696*** (17.304)	46.034*** (17.439)	32.744*** (2.739)
Crisis	-0.692 (-1.169)	-0.195 (-0.353)	-1.292 (-0.829)	-0.719 (-0.504)	-0.860 (-0.649)	-0.583 (-0.632)	-1.120 (-1.303)	-0.107 (-0.128)	-1.240 (-0.924)	0.771 (0.958)	0.587 (0.833)	1.014 (0.387)
<i>GDPG</i>	-44.091** (-2.204)	-7.208 (-1.457)	-15.317*** (-2.703)	8.137 (0.673)	9.672 (0.816)	3.112 (0.874)	-13.841* (-1.896)	-11.742 (-1.618)	-9.162 (-1.398)	4.664 (0.676)	3.852 (0.590)	5.407 (0.918)
Inflation	1.792* (1.840)	1.797* (1.133)	6.748* (1.729)	-0.103 (-0.044)	0.111 (0.047)	2.585* (1.681)	2.702* (1.799)	2.314 (1.552)	1.984 (1.202)	0.033 (0.028)	-0.067 (-0.056)	9.851 (1.139)
Constant	51.179*** (7.083)	35.776*** (6.147)	45.088*** (2.634)	69.330*** (3.464)	73.198*** (4.820)	80.775*** (4.051)	61.431*** (5.503)	39.639*** (4.193)	33.001*** (4.323)	5.396 (0.561)	9.384 (1.287)	5.838* (1.709)
Adj. R <sup>2</sup>	0.848	0.451		0.814	0.274		0.825	0.522		0.870	0.553	
F-test	47.087***	96.710***		69.943***	8.626***		37.905***	72.220***		50.897***	51.581***	
Hausman Test (Chi-Sq, 10)		62.422***			37.156***			42.916***			35.759***	
Sargan-Hansen Test (J-stat)			1.064			3.114*			1.035			0.143
Observations	1285	1285	1285	222	222	222	653	653	653	410	410	410

This table presents the regression coefficients of models (1) and (2) for the full sample of Russian, Kazakhstani and Belarusian banks and its subsamples of ownership type. All variables are defined in Table 3.6. The explanatory variables in *italics* are lagged by one and serve as instrumental variables in the GMM. T-statistics is given in parentheses. P-values are as follows: \*Significant at 10%; \*\*Significant at 5%; \*\*\*Significant at 1%.

**Table 3.9 Business activities and financial stability of the EAEU regional samples, 2008 – 2016**

Dependent variable: Z-score stability index (Z-score)

Method: Panel least squares fixed effect and cross-section random effect. GMM is the panel Generalized Methods of Moments estimated with fixed effect.

	Russia			Kazakhstan			Belarus		
	Fixed	Random	GMM	Fixed	Random	GMM	Fixed	Random	GMM
Sanctions	-0.128 (-0.277)	-0.095 (-0.207)	-3.395 (-0.619)	2.869 (1.574)	1.863 (1.034)	2.646 (0.982)	-2.350 (-1.387)	-3.310** (-1.998)	-5.463 (-1.460)
Size	-0.961*** (-3.511)	-0.950*** (-3.780)	-1.763** (-2.772)	-7.894*** (-7.730)	-5.873*** (-6.400)	-7.029*** (-7.303)	3.418** (2.156)	6.268*** (5.128)	12.136** (2.199)
<i>Growth</i>	-0.124** (-1.899)	-0.141 (-1.023)	-0.177** (-2.283)	-1.581*** (-3.099)	-1.769*** (-3.504)	-1.078*** (-4.033)	-0.033* (-1.923)	-0.033** (-1.961)	-0.873** (-2.427)
Invest	2.466 (1.546)	2.173 (1.374)	-0.826 (-0.150)	-24.493*** (-2.881)	-24.678** (-2.627)	-19.185** (-2.309)	2.574 (0.310)	3.814 (0.471)	9.395 (-0.635)
Fee	-4.869*** (-2.934)	-5.111*** (-3.109)	-7.829** (-2.171)	-5.615 (-0.622)	-3.329 (-0.379)	-5.521 (-0.214)	8.770* (1.647)	7.337 (1.395)	6.320* (1.937)
<i>Borrow</i>	4.093*** (3.129)	3.968*** (3.108)	4.304* (2.077)	45.139*** (8.110)	42.678*** (7.756)	42.779*** (5.209)	-12.051* (-1.886)	-16.676*** (-2.690)	-17.603* (-1.679)
<i>Equity</i>	40.148*** (18.935)	39.464*** (19.018)	36.496*** (6.111)	67.403*** (12.416)	67.009*** (12.638)	63.985*** (10.014)	46.773*** (7.284)	49.532*** (8.170)	49.562*** (8.286)
Crisis	0.431 (1.149)	0.433 (1.164)	1.650 (0.788)	-6.156*** (-3.904)	-4.121*** (-2.695)	-4.317*** (-2.723)	7.332** (2.383)	12.143*** (4.687)	5.250 (0.329)
<i>GDPG</i>	2.098 (0.734)	2.159 (0.756)	11.785 (0.755)	-49.100* (-1.855)	-36.940 (-1.402)	-45.492** (-2.036)	19.923 (1.073)	36.636** (2.059)	15.046 (0.844)
Inflation	1.177* (1.758)	1.150* (1.728)	4.547 (0.825)	-0.645 (-0.081)	1.087 (0.137)	1.508 (0.144)	-1.180** (-0.337)	-4.047** (-1.215)	-4.360** (-1.948)
Constant	24.613*** (4.771)	24.622*** (5.119)	38.373*** (2.525)	151.606*** (7.344)	112.190*** (5.957)	148.633*** (7.166)	36.822 (1.458)	80.021*** (4.017)	121.042 (1.485)
Adj. R <sup>2</sup>	0.889	0.428		0.866	0.669		0.865	0.362	
F-test	65.597***	61.737***		44.074***	51.005***		43.009***	13.611***	
Hausman Test (Chi-Sq, 10)		8.107			38.602**			40.584***	
Sargan-Hansen Test (J-stat)			2.427			0.866			0.444
Observations	814	814	814	248	248	248	223	223	223

This table presents the regression coefficients of model (1) for the samples of Russian, Kazakhstani and Belarusian banks. All variables are defined in Table 3.6. The explanatory variables in *italics* are lagged by one and serve as instrumental variables in the GMM. T-statistics is given in parentheses. P-values are as follows: \*Significant at 10%; \*\*Significant at 5%; \*\*\*Significant at 1%.

**Table 3.10 Business activities and funding stability of EAEU banks by ownership type, 2008 – 2016**

Dependent variable: the Net Stable Funding Ratio (NSFR)

Method: Panel least squares fixed effect and cross-section random effect. GMM is the panel Generalized Methods of Moments estimated with fixed effect.

	Full EAEU sample			State-owned banks			Private banks			Foreign banks		
	Fixed	Random	GMM	Fixed	Random	GMM	Fixed	Random	GMM	Fixed	Random	GMM
State	-0.043 (-0.459)	-0.030 (-0.750)	-0.527 (-1.124)									
Sanctions	-0.058** (-1.958)	-0.048* (-1.689)	-2.817** (-2.233)	-0.042 (-1.474)	-0.022 (-0.844)	-1.033 (-1.431)	-0.003 (-0.190)	-0.018 (-0.133)	-1.123 (-0.356)	0.007 (0.175)	0.006 (0.159)	1.738 (1.099)
Size	-0.050*** (-2.697)	-0.012** (-1.481)	-0.630** (-2.290)	0.036* (1.918)	-0.005 (-0.855)	-0.008 (-0.556)	-0.016 (-1.512)	-0.015*** (-3.621)	-0.044* (-1.762)	0.003 (0.104)	0.003 (0.256)	0.012 (0.874)
<i>Growth</i>	-0.003 (-0.608)	-0.001 (-0.792)	-0.014 (-1.233)	-0.010 (-1.237)	-0.006 (-0.825)	-0.022 (1.154)	0.002 (1.149)	0.003* (1.724)	0.025 (1.385)	-0.005 (-0.580)	-0.002 (-0.725)	-0.014 (-1.165)
Invest	-0.167 (-1.323)	-0.125 (-1.126)	-2.625** (-2.141)	0.187 (1.446)	0.151 (1.416)	0.784* (1.822)	-0.095 (1.325)	0.076 (1.285)	-0.018 (-1.057)	-0.121 (-0.695)	-0.095 (-0.604)	-1.342 (-0.712)
Fee	-0.080 (-0.680)	-0.027 (-0.252)	-1.728 (-1.609)	0.130 (0.712)	0.343** (2.578)	0.989* (1.759)	-0.078 (-1.128)	-0.050 (-0.870)	-0.126 (-0.773)	0.039 (0.299)	0.039 (0.299)	-0.242 (-1.056)
<i>Borrow</i>	-1.115*** (-11.367)	-1.130*** (-14.386)	-3.704*** (-3.010)	-0.985*** (-11.074)	-1.087*** (-16.352)	-0.952*** (-5.230)	-1.109*** (-17.496)	-1.014*** (-21.380)	-1.255*** (-19.067)	-1.356*** (-10.399)	-1.392*** (-12.382)	-4.460*** (-2.528)
<i>Equity</i>	0.368*** (3.396)	0.523*** (6.124)	3.234** (2.276)	0.431*** (4.144)	0.261*** (3.147)	0.082** (2.293)	0.245*** (3.486)	0.360*** (8.325)	0.419*** (5.349)	0.556*** (3.510)	0.586*** (4.543)	4.265** (2.174)
Crisis	-0.091*** (-3.172)	-0.068*** (-2.793)	-0.565* (-1.831)	-0.020 (-0.747)	-0.057** (-2.562)	-0.502*** (-2.759)	-0.028* (-1.870)	-0.037*** (-2.728)	-0.067** (-1.982)	-0.052** (-2.146)	-0.062* (-1.803)	-0.146 (-0.338)
GDPG	0.293 (1.207)	0.684*** (2.980)	6.133* (1.814)	0.452** (2.019)	0.294 (1.414)	3.193* (1.916)	0.706*** (5.573)	0.819*** (6.732)	1.219*** (5.446)	0.117 (0.303)	0.379* (1.098)	0.542 (0.123)
Inflation	-0.022 (-0.477)	-0.063 (-1.375)	-2.123** (-2.227)	-0.068 (-1.565)	-0.071* (-1.668)	-0.868*** (-2.648)	-0.038 (-1.443)	-0.052** (-2.051)	-0.112** (-2.204)	-0.001 (-0.021)	-0.043 (-0.645)	-0.879 (-0.828)
Constant	1.991*** (5.705)	1.274*** (7.945)	8.691** (1.986)	0.304 (0.821)	1.122*** (8.150)	1.694*** (4.428)	1.325*** (6.839)	1.296*** (15.352)	1.538*** (5.722)	1.088** (2.010)	3.361** (2.278)	10.564*** (2.809)
Adj. R <sup>2</sup>	0.507	0.240		0.833	0.715		0.707	0.567		0.709	0.097	
F-test	9.516***	37.801***		33.496***	56.409***		19.931***	86.342***		19.103***	5.595***	
Hausman Test (Chi-Sq, 10)		43.035***			37.156***			42.511**			31.034***	
Sargan-Hansen Test (J-stat)			1.007			0.213			0.013			2.903
Observations	1285	1285	1285	222	222	222	653	653	653	410	410	410

This table presents the regression coefficients of models (1) and (2) for the full sample of Russian, Kazakhstani and Belarusian banks and its subsamples of ownership type. All variables are defined in Table 3.6. The explanatory variables in *italics* and additional variables of loan loss reserves and return on assets are lagged by one and serve as instrumental variables in the GMM. T-statistics is given in parentheses. P-values are as follows: \*Significant at 10%; \*\*Significant at 5%; \*\*\*Significant at 1%.

**Table 3.11 Business activities and funding stability of the regional EAEU samples, 2008 – 2016**

Dependent variable: the Net Stable Funding Ratio (NSFR)

Method: Panel least squares fixed effect and cross-section random effect. GMM is the panel Generalized Methods of Moments estimated with fixed effect.

	Russia			Kazakhstan			Belarus		
	Fixed	Random	GMM	Fixed	Random	GMM	Fixed	Random	GMM
Sanctions	-0.013 (-0.884)	-0.004 (-0.752)	-1.485** (-2.011)	0.210 (0.126)	0.155 (0.181)	0.838 (0.234)	-0.125*** (-4.038)	-0.087*** (-2.975)	-0.507*** (-3.245)
Size	-0.028*** (-3.312)	-0.015*** (-3.456)	-0.012*** (-2.776)	-0.179** (-2.332)	-0.092* (1.868)	-0.176** (-2.001)	0.078*** (2.684)	0.020 (1.541)	0.225** (2.265)
Growth	-0.003 (-0.686)	-0.003 (-0.609)	-0.006 (-0.392)	-0.039 (-1.026)	-0.060 (-1.632)	-0.051* (-1.801)	-0.001 (-0.078)	-0.002 (-0.089)	-0.007 (-0.483)
Invest	-0.073 (-1.490)	-0.044 (-1.002)	-0.615* (-1.760)	0.089 (0.139)	-0.231 (-0.432)	0.366 (0.772)	0.242 (1.588)	0.173 (1.307)	0.094 (1.530)
Fee	0.029 (0.561)	0.047 (1.044)	0.215 (0.972)	-0.392 (-0.578)	-0.394 (-0.675)	-0.557 (-0.948)	-0.230** (2.359)	-0.188** (-2.077)	-0.582* (-1.824)
Borrow	-1.067*** (-26.464)	-1.037*** (-33.635)	-1.093*** (-10.157)	-1.118*** (-2.671)	-1.286*** (-3.298)	-1.280*** (-2.773)	-1.494*** (-12.770)	-1.375*** (-13.334)	-2.085*** (-5.666)
Equity	0.225*** (3.441)	0.262*** (5.005)	0.116** (2.105)	0.332*** (2.813)	0.123** (2.349)	0.930*** (3.375)	0.661*** (5.622)	0.462*** (4.725)	0.995** (1.988)
Crisis	-0.041*** (-3.576)	-0.035*** (-3.169)	-0.852** (-2.072)	-0.324*** (-2.731)	-0.234** (-1.182)	-0.407** (-1.823)	-0.031 (-0.545)	-0.125*** (-3.374)	-0.103* (-1.793)
GDPG	0.662*** (7.515)	0.670*** (7.360)	4.544* (1.735)	-2.862 (-1.438)	-2.688 (-1.374)	-3.742 (-0.822)	0.170 (0.499)	0.372 (1.195)	0.521 (0.895)
Inflation	-0.053*** (-2.583)	-0.060*** (-2.987)	-1.574** (-2.081)	0.786 (1.317)	0.893 (1.514)	0.905 (1.246)	0.078 (1.219)	-0.020 (-0.351)	-0.042 (-0.345)
Constant	1.539*** (9.680)	1.290*** (15.300)	1.824*** (4.864)	4.762*** (3.069)	3.108*** (3.016)	2.745** (1.930)	0.032 (0.069)	1.548*** (6.850)	1.852 (1.165)
Adj. R <sup>2</sup>	0.800	0.636		0.351	0.148		0.789	0.615	
F-test	33.109***	143.277***		4.306***	5.288***		25.420***	36.414***	
Hausman Test (Chi-Sq, 9)		18.257**			8.534			20.224	
Sargan-Hansen Test (J-stat)			2.303			0.468			0.256
Observations	814	814	814	248	248	248	223	223	223

This table presents the regression coefficients of models (1) and (2) for the full sample of Russian, Kazakhstani and Belarusian banks and its subsamples of ownership type. All variables are defined in Table 3.6. The explanatory variables in *italics* and additional variables of loan loss reserves and return on assets are lagged by one and serve as instrumental variables in the GMM. T-statistics is given in parentheses. P-values are as follows: \*Significant at 10%; \*\*Significant at 5%; \*\*\*Significant at 1%.

### 3.5 Summary

Using annual bank data from 2008 to 2016, this chapter analyzes the effect of ownership and business model on bank financial (Z-score) and funding (the NSFR) stability in Russia, Kazakhstan and Belarus during periods of crisis and sanctions. EAEU banks' stability has deteriorated in the post-crisis period due to worsening external environment. Moreover, the imposed financial sanctions limited access of Russian banks to foreign capital markets, restricted the capital inflow and undermined the investors' confidence. Other EAEU member states have been experiencing a spillover effect from Russia's economic downturn.

The major results of the chapter are summarized next. From the data analysis, we observe a gradual decline in EAEU banks' financial stability starting from the crisis period. Although state banks have on average higher Z-score, their Z-score fell sharply by January 2016. In terms of funding liquidity, only foreign and Kazakhstani banks have been able to meet Basel III requirements for the NSFR. Russian and Belarusian banks, however, have been operating at weak structural liquidity.

The findings of the empirical analysis are as follows. *First*, consistent with Iannotta et al. (2013), we provide evidence that state ownership is strongly associated with a lower likelihood of EAEU banks' failure. The effect of sanctions is not material for the financial stability of state-owned banks (although the sanctions were mainly imposed on state banks). It seems that government support of state banks remains strong in the region. The impact of sanctions on the Z-score of private credit institutions is weakly negative. Indeed, sanctions have disrupted investment and public trust in private banks and triggered relocation of deposits to "safer" state financial institutions. *Second*, we do not find a significant effect of state ownership on the funding stability of EAEU banks, in agreement with Dietrich et al. (2014) and Jean-Loup (2017). We also provide empirical evidence that sanctions are strongly associated with lower NSFRs of Russian and Belarusian banks but do not affect the funding liquidity of Kazakhstani credit institutions. *Third*, in terms of business models, we report that the Z-score of EAEU banks deteriorates with larger bank

size and faster lending growth but improves with higher short-term borrowing and capitalization. In contrast to Demirgüç-Kunt and Huizinga (2010), Altunbas et al. (2011), and Kohler (2015), our results show a neutral or negative effect of securities investments and fee-generating activities on the financial stability of EAEU banks. *Finally*, with respect to business drivers of funding stability, we show that the NSFR is primarily explained by the liability side of the balance sheet as it persistently improves with higher equity and a lower reliance on short-term market debt.

## **CHAPTER 4 The Impact of Funding Liquidity and Systemic Importance on Bank Profitability in the Eurasian Economic Union**

### **4.1 Introduction**

Liquidity slump complemented credit crunch during the last Global Financial Crisis (GFC) and drew closer attention of researchers and regulators. The major source of liquidity risk was excessive reliance on short-term wholesale market borrowing in financing long-term investments. To address the revealed vulnerabilities, the BCBS introduced two novel liquidity ratios: the Liquidity Coverage ratio (LCR) and the Net Stable Funding ratio (NSFR).<sup>105</sup> This chapter focuses on post-crisis implementation of the NSFR and its impact on profitability of banks in Russia, Kazakhstan and Belarus using annual bank data for 2008 - 2017.

The NSFR aims to maintain prudent asset and liability structures to enhance an individual bank as well as an entire banking system's stability through lowering funding liquidity risk.<sup>106</sup> From a liability side, the NSFR discourages banks from short-term wholesale borrowing and motivates for greater reliance on stable deposits, bond issuance and capitalization. From an asset size, the NSFR requires banks to increase liquidity through investing in short-term loans and high-rated securities. The introduction of the NSFR, however, is not without costs. Gobat et al. (2014, p. 3) outline that the NSFR's implementation "may be too restrictive and undermine banks' traditional role in liquidity and maturity transformation, and could lead to shortage in long-term lending with real consequences for economic growth". King (2013) states that the compliance with the NSFR will adversely affect a bank interest margin. The negative consequences of the NSFR implementation may appear more severe for developing economies with weak financial markets and high reliance on traditional banking (Gobat et al., 2014).

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<sup>105</sup> In the United States, the new liquidity rules were adopted under the Dodd-Frank Act and Consumer Protection Act in July 2010.

<sup>106</sup> Drehman and Nikolaou (2013, p. 2174) define funding liquidity risk as "the possibility that over a specific horizon the bank will become unable to settle obligations with immediacy".



This chapter analyzes two research questions built on two complement strands in the literature. The first scope of studies examines the impact of the NSFR on banks' profitability. Persistent profitability is a vital component of bank stability. Prolong weak profitability contributes to bank fragility in several ways. First, it constrains bank growth through retained earnings. Second, it increases costs of new debt issuance. Third, it shortens time for banks to use their capital to cover asset losses. Bouzgarrou et al. (2018) state that profit persistence in a banking sector is an important determinant of financial stability. This chapter empirically investigates whether the introduction of the NSFR affects profitability of EAEU banks.

The second scope of studies is quite scarce as it analyzes the effect of systemic importance on bank profitability. The size of large financial institutions becomes a major driver of systemic risk at the domestic and global levels. The GFC showed that large banks operate at excessive leverage, greater risk-taking and less stable funding (Laeven et al., 2016). The analysis of regulatory literature reveals that implementation of the NSFR is not uniform across countries. For example, in the US, the NSFR is applied for global systemically important financial institutions, large BHC and regional banks. In Russian Federation, only systemically important banks are subject to the NSFR requirements. In the European Union, Kazakhstan and Belarus, all banks have to comply with the minimum level for the NSFR. This chapter explores whether profitability of EAEU banks depends on their systemic importance. We introduce a new variable, a systemically important bank (SIB), in the full sample and split the full sample in subsamples of SIBs and non-SIBs.

The rest of the chapter is organized as follows. Section two describes a sample composition, the major variables and stated hypothesis. It presents descriptive statistics and correlation analysis. Section three explains the model and methodology used to analyze the relationship between the NSFR, the systemic importance and profitability of EAEU banks. Section four discusses the empirical findings. Section five summarizes the chapter and major empirical results.

## 4.2 Data and descriptive analysis

### 4.2.1 Sample composition

Our original data for Russian, Kazakhstani and Belarusian banks was hand-collected from annual audited reports over the period of January 2006 – January 2017.<sup>107</sup> The construction of growth variables and use of lag effects have shorten the sample period to January 2008 – January 2017. The aim of this research work is to analyze the impact of the NSFR and systemic importance on profitability of EAEU banks. Therefore, we included only active banks as of 1 January 2017 because recent observations are more relevant for our study to capture the adjustment effect. We also removed outliers using thresholds for cumulative frequency below 1% or above 99%. This allows us to avoid influence of extreme factors on bank profits. Banks that experienced mergers and acquisitions (M&As) during the sample period were treated as follows. If a bank has at least 4 years of data prior to (or after) a merger or an acquisition, it remains in the sample as an old (or entered as a new) entity. As a result, we ended up with unbalanced panel dataset that includes 81 Russian, 25 Kazakhstani and 23 Belarusian banks as of 1 January 2017. Table 4.1 summarizes the final regional samples.

Systemically important banks (SIBs) are defined by the assessment methodologies developed by the Central bank of the respective country. A systemic status is assigned to a bank if the bank is in the list of SIBs (see Table 1.6, Chapter 1). Although the Russian bank sample includes only 81 banks out of 575 operating banks, the sample is representative as it contains almost equal number of large, medium and small banks and accounts for 79.8% of total bank assets as of 1 January 2017. Kazakhstani and Belarusian sample banks' assets represent 92.5% and 99.1% of total operating banks' assets respectively. State-owned banks have 50% and more of government shareholding, which is defined by Schmit et al. (2011) as banks subject to strong public control. To investigate the specific institutional differences of EAEU banking sector, we split our full sample in subsamples of SIBs and non-SIBs, and in regional samples of Russian, Kazakhstani and Belarusian banks.

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<sup>107</sup> We include only banks that directly engage in financial intermediation activities and exclude investment banks.

**Table 4.1 The regional samples' summary**

Criteria	Russian banks	Kazakhstani banks	Belarusian banks
Period of study	Jan 2008 – Jan 2017	Jan 2008 – Jan 2017	Jan 2008 – Jan 2017
Number of sample banks as of 1.01.2017, including:	81	25	23
- SIBs <sup>108</sup>	11	2	12
- Large banks	29	8	6
- Medium banks	26	9	5
- Small banks	26	8	12
- State-owned banks	15	1	6
Total assets of sample banks (USD, millions) as of 1.01.2017	1 060 408.5	70 923.0	32 099.5
Number of operating banks as of 1.01.2017	575	33	26
Total assets of operating banks (USD, millions) as of 1.01.2017	1 328 343.6	76 693.4	31 804.6
Sample banks' assets out of total bank assets as of 1.01.2017	79.8%	92.5%	99.1%
Assets of top five banks out of total bank assets as of 1.01.2017	55.3%	60.9%	79.5%
Data frequency	Annual	Annual	Annual
Total observations	808	248	187

The table shows compositions of the regional samples. The samples exclude defaulted banks but include banks that experienced M&As during the observation period. SIB status is assigned if a bank is in the list of SIBs disclosed by the Central banks of the respective country. A state-owned status is assigned if a bank has more than 50% of government shareholding. The following criteria define size groups. Russia: large banks (total assets  $\geq$  RUR 250 bn), medium banks (250 RUR bn < total assets  $\leq$  RUR 100 bn), small banks (total assets < RUR 100 bn); Kazakhstan: large banks (total assets  $\geq$  KZT 1000 bn), medium banks (KZT 1000 bn < total assets  $\leq$  KZT 200 bn), small banks (total assets < KZT 200 bn); Belarus: large banks (total assets  $\geq$  BYR 30000 bn), medium banks (BYR 30000 bn < total assets  $\leq$  BYR 5000 bn), small banks (total assets < BYR 5000 bn).

Source: [www.cbr.ru](http://www.cbr.ru), [www.nationalbank.kz](http://www.nationalbank.kz), [www.nbrb.by](http://www.nbrb.by)

## 4.2.2 Profitability indicators

We use two profitability indicators that measure bank performance from different perspectives: Net interest margin (NIM) and Return on assets (ROA). *NIM* is calculated as the ratio of pre-impairment net interest income to average assets. It captures bank profitability from intermediation activities. *NIM* measured at pre-provisional basis is more comparable profit estimator as it removes methodological differences in calculating provisions for impairments among countries (Garcia-Herrero et al., 2009). *ROA* is the

<sup>108</sup> Two largest banks, Kazkom bank and Halyk Saving bank, merged later in 2017.

ratio of net pre-tax income to average total assets. It reflects a bank's ability to generate profit from all types of business activities. The pre-tax net income is more accurate for calculating ROA since income tax rates vary between sample countries.<sup>109</sup> We disregard the Return on equity (ROE) in this research work as the aim is to analyze the banks' profitability from business (not shareholders) perspective. Dietrich and Wanzenried (2011) point out shortcomings of ROE such as its high volatility and strong inverse correlation with shareholders' equity.

Panel A of Figure 4.1 shows that EAEU banks operated at relatively high NIM, which consequently fell from 4.9% in 2010 to 2.9% in 2016 for Russian banks, from 5.7% in 2009 to 3.3% in 2016 for Kazakhstani bank, and improved from 2.4% in 2009 to 4.8% in 2017 for Belarusian banks. During 2009 – 2012, the NIMs of EAEU banks were constrained by reduced credit demand and huge stock of impaired assets on bank balance sheets. Banned access to cheaper foreign funding due to imposed Western sanctions contributed to further decrease in NIM of Russian banks. Panel B of Figure 4.1 shows dramatic decline in ROA of Russian and Kazakhstani banks post-crisis period. After 2011, their ROAs recovered due to state support and restructuring programs for NPLs. However, Kazakhstani and Russian banks' ROAs continue to decrease under adverse macroeconomic environment. The slight improvement in profitability has been associated with increased volume of retail lending and income from fee-generating activities.

Panels A and B of Figure 4.2 present profitability and the NSFR of EAEU banks across samples of SIBs and non-SIBs. It is evident that SIBs operated at much lower NIM, which varied between 3.2% and 4.5% during the sample period. The NIM of non-SIBs increased from 4.1% in 2008 to 5.9% in 2010, and then fluctuated within the range 4.4% and 5.3%. The ROA of SIBs fell from 2.7% to 1.6% post-crisis period and then from 2.5% to 1.3% during sanctions years 2014 - 2016. The ROA of non-SIBs is much more volatile and exhibits dramatic downturn between 2009 – 2010 and 2012 – 2017 periods. It appears that ROA of non-SIBs is more sensitive to adverse external environment associated with contraction of economic activities and imposed sanctions on Russian

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<sup>109</sup> Tax rate on corporate income in Russia and Kazakhstan is 20%, whereas the corporate tax rate is 25% for banks and insurance companies in Belarus.

banks. Another interesting observation is that SIBs have operated at high funding liquidity risk as their NSFR increased from 78.8% in 2009 to 90.5% by 2017. Non-SIBs, however, have been able to improve their structural liquidity so that the NSFR surged from 90.0% in 2009 to 129.7% by January 2017.

**Figure 4.1 Profitability of Russian, Kazakhstani and Belarusian banks, 2008 - 2017**

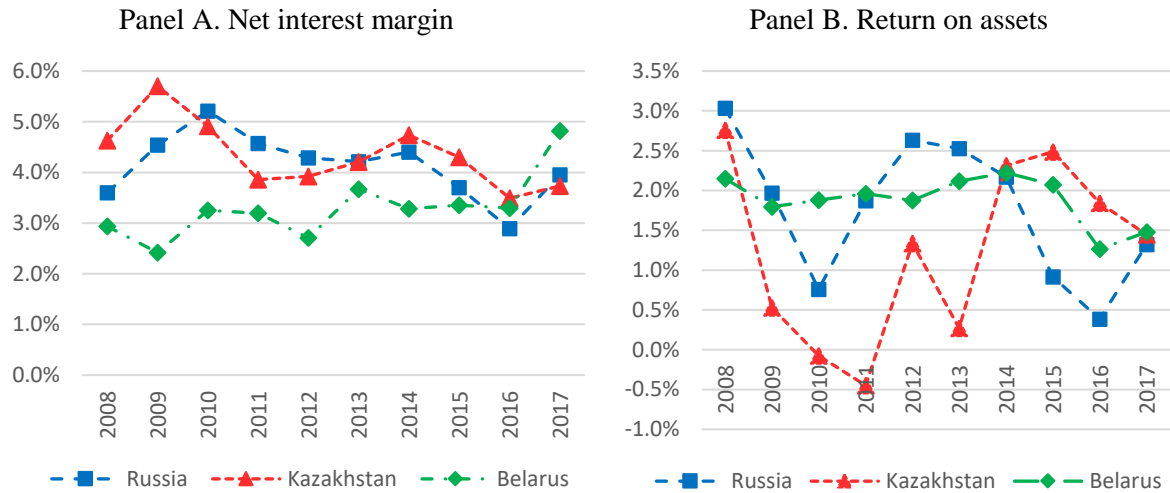


Figure shows average profitability of EAEU banks. NIM is the ratio of pre-provisional net interest income to total assets. ROA is the ratio of pre-tax net income to total assets.

Source for EAEU banks: calculated by author using data from CBR, NBK and NBRB.

**Figure 4.2 Profitability and the NSFR of SIBs and non-SIBs, 2008 - 2017**

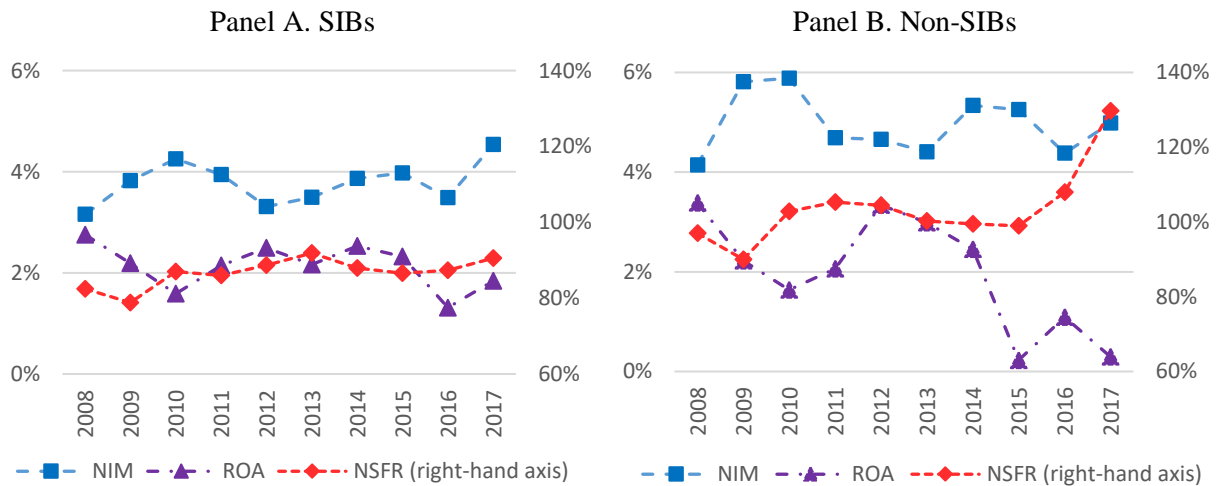


Figure shows average profitability and the NSFR of EAEU banks across SIBs and non-SIBs' samples. NIM is the ratio of pre-provisional net interest income to total assets. ROA is the ratio of pre-tax net income to total assets. NSFR is the net stable funding ratio that is scaled on the right-hand secondary axis. SIB status is defined from the list of SIBs issued by a Central bank of the respective country.

Source for EAEU banks: calculated by author using data from CBR, NBK and NBRB.

### 4.2.3 Explanatory variables and hypotheses development

#### 4.2.3.1 *The Net Stable Funding ratio*

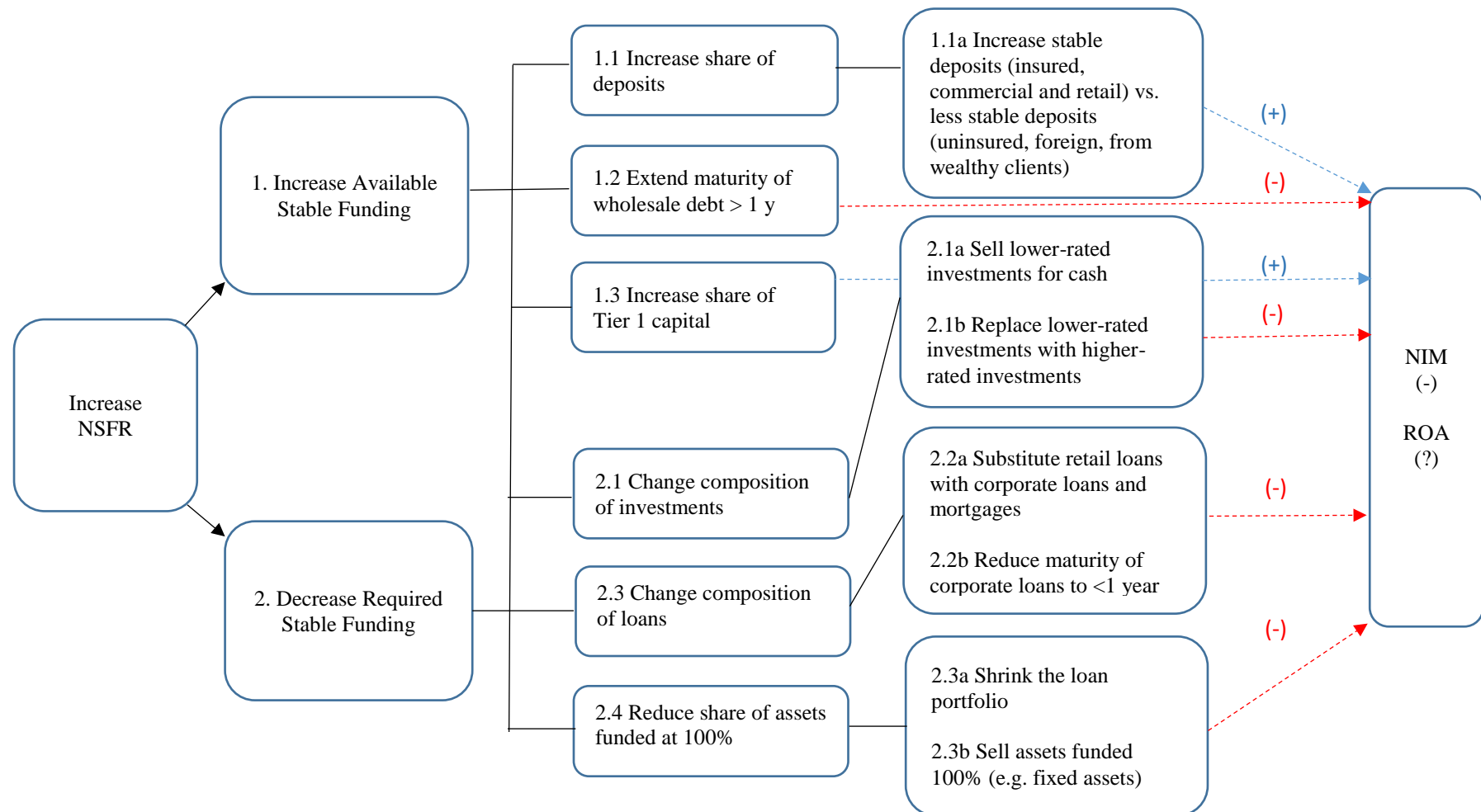
The major variable of interest is the NSFR. For EAEU banks, it is calculated using a weighting scheme for AASF and RASF explained in the Table 3.2.<sup>110</sup> The NSFR aims to reduce bank funding liquidity risk by narrowing the maturity mismatch between assets and sources of funds. Maturity transformation is the primary function of traditional commercial banks as it provides liquidity to market participants. It also serves as a major source of operating profitability measured by the NIM. King (2013) shows that most of adjustment strategies to comply with the target NSFR will decrease the NIM of banks from 10 out of 15 sample countries.

Figure 4.3 clearly demonstrates that most of strategies to meet a required level of the NSFR will reduce the NIM. Among the strategies, only stable deposits and Tier 1 capital improve both NIM and ROA. Indeed, banks with greater capitalization and reliance on deposits are more profitable. The reason is that core deposits represent relatively cheaper source of funding and positively contribute to the net interest income. Moreover, the greater deposit base allows generating more fee income through cross-selling products to a wider group of clients (Mergaerts and Vennet, 2016). Equity capitalization is associated with better risk profile and lower cost of borrowing.

The effect of the NSFR on overall bank profitability remains uncertain due to a combined effect. On the one hand, we expect negative impact of the NSFR on ROA if EAEU banks are not able to adjust their business strategies quickly to compensate the fall in their NIM. On the other hand, we expect neutral or positive effects of the NSFR on the ROA if banks' business models are sufficiently diversified to boost income from non-interest generating activities.

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<sup>110</sup> The detailed methodology for calculation of the NSFR for EAEU banks is explained in Chapter 3.

**Figure 4.3. Strategies to increase the Net Stable Funding Ratio**

This figure demonstrates the possible restructuring of a bank's balance sheet towards meeting the minimum level of the NSFR. The blue dashed arrows indicate the positive effect on profitability, whereas the red dashed arrows show the negative effects. Source: Retrieved from King (2013) with author's modifications.

#### 4.2.3.2 *Bank-specific determinants of profitability*

*Bank size and SIBs.* Bank size is measured in absolute terms by the natural logarithm of total assets. SIB's status is assigned to a bank if it belongs to the list of SIBs disclosed by the Central banks of a respective country. In general, the literature suggests that large banks have better product diversification and cheaper access to alternative funding sources, which positively influence on their profitability (Djalilov and Piesse, 2016). However, if a bank becomes extremely large, as in the case of SIBs, the negative relationship between size and profitability is expected due to greater operational costs, agency costs, and weak management efficiency.

*Bank growth.* We measure bank growth by calculating the percentage change in total assets relative to the previous year.<sup>111</sup> Faster growing banks are able to generate greater profit in the short-term horizon. However, these banks might be less profitable in the long-term perspective if their growth is achieved through targeting lower quality borrowers.

*Loans to total assets ratio.* The ratio measures the degree of engagement in traditional interest-generating activities that prevails in business models of EAEU banks. The literature states that the greater share of loans is mainly associated with better profitability.

*Loan loss reserves to total assets ratio.* The ratio captures credit quality of bank assets. Although, we generally assume negative relationship between profitability and credit risk, the actual effect is ambiguous as credit losses are highly sensitive to economic cycle. Credit risk tends to be accumulated during economic booms and then realized under adverse market conditions. Indeed, Dietrich and Wanzenried (2011) found that before the financial crisis 2007, there was a positive association between loan loss provisions and profitability. During the crisis period, the relationship turned to negative. In order to avoid a contemporaneous effect between profitability and loan losses, we introduce this variable with a one-year lag.

*Equity to asset ratio.* Equity capitalization plays two major roles in explaining the nature of bank business. Shareholders' equity is the most stable funding source due to its perpetual nature. Greater equity is also associated with lower insolvency risk. Higher

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<sup>111</sup> Lending growth and deposit growth are also widely used in the literature.



equity capitalization contributes to better risk profile and lower cost of market borrowing, which positively influence bank profitability. Dietrich & Wanzenried (2014) report that this effect is stronger in high-income countries with well-developed capital markets. Highly leveraged banks, however, may engage in riskier activities to boost their profits. From this point, lower capitalization should have positive effect on profitability (although the relationship may not be sustainable in the long run). Therefore, we expect positive impact of equity capitalization on bank profitability.

*Non-interest income to total operating revenue.* The ratio measures the level of business diversification through greater engagement in fee, trading and other non-interest generating activities. Relatively low share of non-interest income may positively influence on both NIM and ROA. Entrop et al. (2015), however, point out that excessive reliance of banks on non-interest income strongly reduces NIM.

*Operational efficiency.* A higher ratio of operating expenses to total operating revenue indicates operational inefficiency. In general, we expect negative effect of the ratio on profitability of EAEU banks. However, Entrop et al. (2015) state that operating expenses may positively impact on NIM as less efficient banks charge their operational inefficiency directly from intermediation fees.

*State ownership.* State continues to play a significant role in EAEU banking sectors and influences bank profitability through different channels. Directed lending programs suppress state-owned banks' interest margins. "State" status may also motivate banks to accept greater risk as they have easier access to liquidity and capital support in the case of their distress compared to private banks. Weak governance of state banks is another factor that may negatively affect their profitability. Micco et al. (2007) point out that the negative effect of state ownership on bank profitability is stronger in developing countries.

#### 4.2.3.3 External determinants of profitability

We introduce four external control variables in our model: banking sector's concentration, annual real GDP growth, annual inflation rate, and a dummy variable of Western sanctions against Russian banks.

*Concentration.* Sector concentration is measured by the ratio of five largest banks' assets to total assets of the banking system in the respective country. Sector concentration

is mainly associated with greater market power at the lending and deposit markets, which allows generating a higher net interest margin.<sup>112</sup> The empirical literature, however, shows mixed results depending on sample compositions. Athanasoglou et al. (2008) do not find the relationship between sector concentration and profitability of Greek banks. Mirzaei et al. (2013) report negative effect of concentration ratio on ROA of banks from emerging economies.

*Annual real GDP growth.* GDP growth is widely used in the prior literature as a proxy for a business cycle. It has anticipated positive impact on profitability. The economic booms are usually associated with greater demand for loans and supply of deposits as well as lower default probability of market participants. Some studies, however, indicate the countercyclical relationship between GDP growth and bank profitability (Entrop et al., 2015; Bouzgarrou et al., 2018)

*Inflation rate.* Inflation is an important macroeconomic indicator in the developing and transition economies as it captures the effect of nominal contracting (Entrop et al., 2015). If inflation is expected, it has a positive impact on profitability because banks are able to adjust their income more rapidly than costs. If inflation is high and unexpected, the effect is mainly negative as costs of bank liabilities increase quicker compared to assets' income (Djalilov and Piesse, 2016; Bouzgarrou et al., 2018).

*Sanctions.* We include a dummy variable of *sanctions* against Russian banks that is solely specific for our regional samples. Although financial sanctions have been mainly imposed on large Russian banks, other EAEU banking sectors may also be adversely affected through strong presence of Russian banks in those countries. We assign a value of “1” for years 2015, 2016, and 2017 to capture the effect of sanctions on profitability.

Table 4.2 summarizes each explanatory variable and its expected effect on a relevant profitability measure of EAEU banks. Some variables enter our model with a lag effect.

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<sup>112</sup> Structure-conduct-performance and relative-market-power hypotheses explain the positive relationship between market concentration and profitability.

**Table 4.2 List of explanatory variables and their expected effect on profitability**

Variable		Explanation	Proposed effect on	
			NIM	ROA
<b>A. Bank-specific variables:</b>				
L1.NSFR	Net Stable Funding Ratio is the ratio of available stable funding to required stable funding of bank $i$ at time $t-1$		(-)	(+/-)
Size	Bank size is measured by the natural logarithm of total assets of bank $i$ at time $t$		(+)/(-)	(+)/(-)
SIB	Systemically important status is set to “1” if a bank belongs to a group of systemically important banks; or “0” otherwise		(+)/(-)	(+)/(-)
L1.Growth	Bank growth is measured by an annual growth rate of total assets of bank $i$ at time $t-1$		(+)/(-)	(+)/(-)
Loan	Loans to total assets ratio of bank $i$ at time $t$		(+)	(+)
L1.LLR	Loan loss reserves to total assets ratio of bank $i$ at time $t-1$		(+/-)	(+/-)
Equity	Equity to total assets ratio of bank $i$ at time $t$		(+)	(+)
Diversify	Non-interest income to total operating revenue of bank $i$ at time $t$		(-)	(+)
Opex	Operating expense to total operating revenue of bank $i$ at time $t$		(-)	(-)
State	State-owned bank status is set to “1” if a state ownership in bank shareholding is 50% or more; or “0” otherwise		(+/-)	(+/-)
<b>B. External control variables:</b>				
CR5	Concentration ratio of five largest banks’ assets to total bank assets of country $j$ at time $t$		(+)	(+/-)
GDPG	Annual real GDP growth of country $j$ at time $t$		(+)	(+)
Inflation	Annual inflation rate based on CPI country $j$ at time $t$		(+/-)	(+/-)
Sanctions	Period of sanctions on Russian banks Set to “1” for years 2015, 2016, 2017; or “0” otherwise		(?)	(?)

This table summarizes explanatory bank-specific and external control variables used to explain the profitability of EAEU banks. L1.NSFR, L1.Growth and L1.LLR represent the variables with one-year lag effect.

#### 4.2.4 Descriptive statistics and correlation analysis

Tables 3.3 and 4.4 present descriptive statistics of bank-specific variables for full and regional samples respectively. The results from Shapiro-Wilk test show that our bank data is not normally distributed. Most of variables are skewed to the right except for ROA, bank size and loans to assets ratio that are skewed to the left. The Kruskal-Wallis nonparametric H rank test for multiple comparison reports the differences in medians between bank groups. In the full sample, the medians of the NIM and ROA are 0.04 and 0.018 respectively. The SIBs operate at significantly lower NIM (0.036) and higher ROA (0.020) compared to non-SIBs (NIM is 0.042 and ROA is 0.017). The median NSFR of the full sample is 0.940 indicating that more than 50 percent of banks still do not meet the minimum level of the ratio. The interesting fact is that the NSFR of SIBs (0.873) is significantly lower than the NSFR of non-SIBs (1.076). There is no significant difference

in medians of loan loss reserves between two samples. SIBs are larger by size (19.101 vs. 18.077), operate at faster asset growth (0.285 vs. 0.215), more lending (0.684 vs. 0.659), and greater non-interest income share in total operating revenue (0.224 vs. 0.193). SIBs are significantly more cost efficient (0.252 vs. 0.618) but less capitalized (0.119 vs. 0.123) than non-SIBs.

In the regional samples, Kazakhstani banks are more profitable in terms of NIM (0.043) compared to Russian (0.040) and Belarusian (0.039) banks. With respect to ROA, Belarusian banks (0.028) significantly outperform Russian (0.015) and Kazakhstani (0.016) banks. It is evident that only Kazakhstani banks operate at prudent structural liquidity (NSFR is 1.090) whereas the median NSFRs of Russian (0.886) and Belarusian banks (0.947) are still below the minimum level. The credit losses are higher in Russian banks (0.047), followed by Kazakhstani (0.040) and Belarusian (0.028) credit institutions. Belarusian banks are considerably smaller by size (14.317). Russian banks have greater median share of loans in total assets (0.690) than banks in Kazakhstan (0.637) and Belarus (0.583). Belarusian credit institutions, however, indicate faster asset growth (0.333), better capitalization (0.180) and business diversification (0.397). Kazakhstani banks are more cost efficient (0.283) than Russian (0.319) and Belarusian (0.338) banks.

Table 4.5 reports Spearman rank correlation coefficients between profitability, bank-specific and external control variables. NIM is weakly positively associated with lending activities, loan loss reserves, equity capitalization and state ownership. ROA is weakly negatively correlated with bank size and period of sanctions, but positively associated with non-interest generating activities and GDP growth. We also observe that there is a weak negative correlation of the NSFR with bank size and lending activities, and weak positive correlation of the NSFR with size, SIB's status, and loan to assets ratio. However, the correlation of the NSFR with equity, operating expenses and state ownership is weakly positive. Banks size is weakly negatively correlated with equity capitalization, operating expenses, state ownership and GDP growth.

**Table 4.3 Descriptive statistics for the full sample of EAEU banks, 2008 - 2017**

Sample:	Full sample						Sample of SIBs				Sample of non-SIBs				SIBs vs. non-SIBs
Variable	Obs	Mean	Median	IQR	Shapiro-Wilk W	Skew	Obs	Mean	Median	IQR	Obs	Mean	Median	IQR	Kruskal-Wallis H
Net interest margin	1415	0.047	0.040	0.027	0.758***	1.803	275	0.037	0.036	0.017	1140	0.049	0.042	0.030	20.042***
Return on assets	1408	0.021	0.018	0.025	0.489***	-7.923	275	0.022	0.020	0.021	1133	0.021	0.017	0.026	4.554**
Net Stable Funding ratio	1415	1.037	0.940	0.209	0.088***	26.703	275	0.873	0.882	0.166	1140	1.076	0.962	0.227	63.940***
Size	1415	17.730	18.097	2.520	0.959***	-0.735	275	18.381	19.101	5.207	1140	17.573	18.077	1.970	22.557***
Asset growth	1408	0.375	0.230	0.422	0.423***	11.046	275	0.361	0.285	0.367	1133	0.379	0.215	0.433	8.333***
Loans to assets	1415	0.636	0.665	0.190	0.941***	-1.027	275	0.676	0.684	0.140	1140	0.626	0.659	0.205	11.395***
Loan loss reserves to assets	1372	0.059	0.040	0.053	0.686***	3.644	256	0.050	0.037	0.038	1116	0.061	0.042	0.058	0.496
Equity to assets	1415	0.173	0.121	0.088	0.654***	2.569	275	0.130	0.119	0.050	1140	0.184	0.123	0.103	7.170***
Non-interest income to TOR	1415	0.228	0.201	0.195	0.945***	0.218	275	0.246	0.224	0.223	1140	0.223	0.193	0.207	5.308**
Operating expense to TOR	1415	0.347	0.315	0.185	0.572***	9.407	275	0.272	0.252	0.147	1140	0.356	0.618	0.305	67.867***

This table reports the summary statistics of bank profitability and business-specific variables for a full sample of Russian, Kazakhstani and Belarusian banks, samples of systemically important banks (SIBs) and non-systemically important banks (non-SIBs) using data for 2008 – 2017. IQR is the interquartile range between the 75<sup>th</sup> and the 25<sup>th</sup> percentile. Net interest margin is the pre-impairment net interest income to total assets. Return on assets is the pre-tax net income to average total assets. Size is measured by the natural logarithm of total assets. TOR stands for the total operating revenue. Shapiro – Wilk W test checks bank-specific variables for normality under the Null hypothesis: A variable is normally distributed. Kruskal-Wallis H rank test reports chi-squared statistics (1 d.f.) for difference in medians between variables of SIBs and non-SIBs under the Null hypothesis: there is no difference in medians. Significance is marked as follows: \* Significant at 10%, \*\* Significant at 5%, \*\*\* Significant at 1%.

**Table 4.4 Descriptive statistics for the regional samples of EAEU banks, 2008 - 2017**

Sample:	Russian banks				Kazakhstan banks				Belarusian banks				Kruskal-Wallis H
Variable	Obs	Mean	Median	IQR	Obs	Mean	Median	IQR	Obs	Mean	Median	IQR	
Net interest margin	889	0.047	0.040	0.026	273	0.050	0.043	0.030	253	0.042	0.039	0.022	2.909***
Return on assets	889	0.017	0.015	0.021	266	0.021	0.016	0.030	253	0.036	0.028	0.033	74.179***
Net Stable Funding ratio	889	0.886	0.905	0.187	273	1.368	1.090	0.330	253	1.206	0.947	0.251	237.263***
Size	889	18.720	18.376	1.638	273	18.190	18.264	2.891	253	14.317	14.165	2.940	475.401***
Asset growth	889	0.343	0.200	0.383	266	0.393	0.232	0.447	253	0.470	0.333	0.471	35.863***
Loans to assets	889	0.679	0.690	0.054	273	0.585	0.637	0.315	253	0.540	0.583	0.077	150.183***
Loan loss reserves to assets	889	0.064	0.047	0.055	273	0.065	0.040	0.069	210	0.032	0.028	0.023	54.127***
Equity to assets	889	0.129	0.109	0.054	273	0.261	0.154	0.218	253	0.236	0.180	0.160	238.012***
Non-interest income to TOR	889	0.168	0.159	0.173	273	0.241	0.191	0.206	253	0.422	0.397	0.223	337.617***
Operating expense to TOR	889	0.342	0.319	0.176	273	0.357	0.283	0.213	253	0.351	0.338	0.176	6.661**

This table reports the summary statistics of bank profitability and business-specific variables for a full sample of Russian, Kazakhstani and Belarusian banks using data for 2008 – 2017. IQR is the interquartile range between the 75<sup>th</sup> and the 25<sup>th</sup> percentile. Net interest margin is the pre-impairment net interest income to total assets. Return on assets is the pre-tax net income to average total assets. Size is measured by the natural logarithm of total assets. TOR stands for the total operating revenue. Kruskal-Wallis H rank test reports chi-squared statistics (1 d.f.) for difference in medians between variables under the Null hypothesis: there is no difference in medians. Significance is marked as follows: \* Significant at 10%, \*\* Significant at 5%, \*\*\* Significant at 1%.

**Table 4.5 Correlation matrix for bank specific variables of EAEU banks**

	NIM	ROA	L1.NSFR	Size	SIB	L1.Growth	Loan	L1.LLR	Equity	Diversify	Opex	State	GDPG	CR5	Inflation	Sanctions
NIM	1.000															
ROA	0.297	1.000														
L1.NSFR	0.028	0.120	1.000													
Size	-0.147	-0.293	-0.201	1.000												
SIB	-0.106	0.057	-0.207	0.158	1.000											
L1.Growth	0.011	0.081	-0.044	-0.034	0.071	1.000										
Loan	0.210	-0.018	-0.384	0.228	0.094	0.034	1.000									
L1.LLR	0.282	-0.074	-0.031	0.184	-0.022	-0.354	0.145	1.000								
Equity	0.341	0.336	0.234	-0.463	-0.069	-0.069	-0.146	-0.064	1.000							
Diversify	-0.014	0.337	0.248	-0.457	0.047	-0.009	-0.307	-0.103	0.263	1.000						
Opex	0.228	0.004	0.220	-0.326	-0.233	-0.134	-0.174	0.062	0.298	0.239	1.000					
State	-0.125	-0.123	-0.073	0.114	0.220	0.044	0.036	-0.042	0.010	-0.164	-0.113	1.000				
CR5	-0.002	-0.025	0.203	-0.167	0.219	0.039	-0.303	-0.080	0.274	0.214	-0.043	-0.024	1.000			
GDPG	-0.050	0.226	0.144	-0.223	0.013	-0.036	0.023	0.025	0.166	0.264	0.073	-0.035	-0.053	1.000		
Inflation	-0.014	0.141	0.020	-0.039	0.072	0.181	-0.019	-0.075	-0.009	-0.033	0.034	0.019	0.128	-0.102	1.000	
Sanctions	-0.036	-0.221	-0.033	0.214	0.012	-0.120	-0.108	0.080	-0.101	-0.103	-0.179	0.000	0.308	-0.568	-0.178	1.000

This table reports the Spearman correlation coefficients between profitability, bank-specific and market-specific variables. NIM is the pre-impairment net interest margin. ROA is the pretax return on average assets. L1.NSFR is the net stable funding ratio with one year lag. Size is the ln(Total assets). SIB is a systemically important bank. Growth is an annual asset growth rate with one year lag. Loan is the ratio of loans to total assets. L1.LLR is a ratio of loan loss reserves to total assets with one year lag. Equity is the ratio of equity to total assets. Diversify is the ratio of non-interest income to total operating revenue. Opex is the ratio of operating expense to total operating revenue. CR5 is the concentration ratio of five largest banks. State is a state ownership. GDPG is a real GDP growth. Inflation is an annual inflation rate. Sanctions is the years of sanctions against Russian banks. The correlation criteria are as follows: 0–0.2 scarcely correlated; 0.2–0.4 weakly correlated; 0.4–0.6 correlated; 0.6–1.0 strongly correlated.

### 4.3 Model and methodology

This chapter investigates the effect of the NSFR and systemic importance on profitability of Russian, Kazakhstani and Belarusian banks during 2008 – 2017. Profitability is defined by two distinct measures: a pre-impairment Net interest margin and a pre-tax Return on average assets. We test the key bank-specific determinants of profitability and control for sector concentration, business cycle, inflation and period of sanctions against Russian bank. The linear dynamic panel model includes a lagged dependent variable of profitability,  $NIM_{t-1}$  or  $ROA_{t-1}$ , as an explanatory variable. The major theoretical reason for the dynamic panel specification is that it models the partial adjustment-based approach. Significant coefficient  $\gamma$  ( $|\gamma| < 1$ ) indicates the speed of adjustment to the equilibrium that reflects the stability of NIM and ROA over time. If  $\gamma$  approaches to 1, it implies slow speed of adjustment and high level of profit protection due to low market competition. If the value of  $\gamma$  is closer to zero, the speed of adjustment is high and banks operate at relatively competitive environment (Bouzgarrou et al., 2018).

$$Profit_{i,t} = \gamma Profit_{i,t-1} + \alpha_1 NSFR_{i,t-1} + \alpha_2 SIB + \sum_{k=1}^K \beta_k X_{i,t}^k + \sum_{m=1}^M \beta_m X_{j,t}^m + \omega_{i,t} \quad (eq. 3)$$

where,  $Profit_{i,t}$  ( $Profit_{i,t-1}$ ) is either NIM or ROA of bank  $i$  at time  $t$  (and its lag value).  $NSFR_{i,t-1}$  is a lagged value of the Net Stable Funding Ratio. We hypothesize that balance sheet changes towards the required minimum threshold of 100% for the NSFR will reduce bank NIM. However, we expect a mixed effect of the NSFR on ROA as banks may adjust their business strategies in order to compensate the fall in the net interest income. SIB is a dummy variable that takes the value of “1” if a bank is in the list of the systemically important banks of the respective country.  $X_{i,t}^k$  is a vector of bank-specific variables of bank  $i$  at time  $t$ .  $X_{j,t}^m$  is a vector of external control variables of a country  $j$  at time  $t$ .  $C$  is a constant term.  $\omega_{i,t}$  is the disturbance term comprised of an unobserved bank-specific effect ( $\theta_{i,t}$ ) and an idiosyncratic error ( $\varepsilon_{i,t}$ ). All variables are carefully explained and defined in the Table 4.2 above. Although, there is no evidence of strong correlation between explanatory variables, we check our data for multicollinearity. Table 4.6 presents



the variance inflating factors for explanatory variables from the EAEU full and regional samples.

**Table 4.6 Variance inflating factors for explanatory variables of EAEU banks**

	Full sample	Russian banks	Kazakhstani banks	Belarusian banks
L1. NSFR	1.09	1.22	1.08	1.66
Size	2.02	1.43	3.76	3.57
SIB	1.33			
L1.Growth	1.03	1.05	1.13	1.13
Loan	1.32	1.20	1.93	1.87
L1. LLR	1.09	1.05	1.23	1.04
Equity	1.43	1.24	3.25	1.96
Diversify	1.46	1.15	1.76	2.23
Opex	1.19	1.10	1.91	2.67
State	1.10	1.18	1.25	1.81
CR5	1.83	1.30	1.22	1.59
GDPG	1.60	1.53	1.56	2.65
Inflation	1.18	1.31	1.08	1.49
Sanctions	1.81	1.90	1.61	2.32
Mean VIF	1.41	1.20	1.92	1.97

This table shows the Variance - inflating factors (VIF), which measure how much the variance of the estimated regression coefficients are inflated as compared to when the predictor variables are not linearly related. VIF that is equal to 1 indicates absence of collinearity.

\* Low multicollinearity (VIF lies between 1-5)

\*\* Moderate multicollinearity (VIF lies between 5-10)

\*\*\* High multicollinearity (VIF is more than 10)

Some critical issues have to be addressed when estimating the determinants of bank profitability. *First*, due to a dynamic specification of our model, the lagged dependent variable correlates with the unobserved bank-specific effect,  $\theta_{it}$ . Therefore, a panel least squared method generates biased and inconsistent coefficients. *Second*, our data are subject to endogeneity problems. For example, the causality goes to the reverse direction as bank profit may influence on asset growth and equity capitalization through retained earnings (Shehzad et al., 2013; Garcia-Herrero et al., 2009). We report the results of the Durbin-Wu-Hausman specification test for potential endogenous variables in Table 4.7. In the full sample of EAEU banks, lagged value of the NSFR and operating expense are endogenous with respect to NIM (p-value<5%). In the sample of Russian banks, only lagged NSFR is endogenous with respect to ROA (p-value < 5%). In Belarusian bank sample, lagged asset growth is endogenous with respect to ROA (p-value < 5%).

**Table 4.7 Durbin-Wu-Hausman specification test for endogeneity**

Variable	Full sample		Russian banks		Kazakhstani banks		Belarusian banks	
	NIM	ROA	NIM	ROA	NIM	ROA	NIM	ROA
L1.NSFR	2.79	1.84	0.18	5.32**	0.28	0.08	0.07	0.08
L1.Growth	1.58	0.04	0.04	0.67	2.72	0.01	0.03	7.21***
L1.LLR	6.20**	0.01	0.46	1.89	0.12	0.14	1.03	0.38
Opex	3.99**	0.69	1.53	0.77	0.88	0.47	0.15	0.33

This table shows the results for Hausman specification test for endogeneity under the Null hypothesis: A variable is exogenous. The numbers report differences in J-statistics. P-values are as follows:

\*\* Significant at 5%, \*\*\*Significant at 1%

*Third*, some of our explanatory variables contain a unit root. In particular, the variable of size of Kazakhstani banks and concentration ratios of Russian and Kazakhstani banking sectors are non-stationary at level but stationary at first difference. The GDP growth in Belarus also contains a unit root. We report the results of the panel Fisher-type Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests in Table 4.8. Both tests are appropriate for unbalanced panel data. The advantage of the PP test over ADF test is that it remains robust to serial correlation by using the Newey–West heteroskedasticity- and autocorrelation-consistent covariance matrix estimator (Newey and West, 1987).<sup>113</sup> *Fourth* issue is unobservable heterogeneity across banks in our sample that arise from differences in corporate governance, regulations or other variables that are not included in our models.

<sup>113</sup> The main disadvantage of the PP test is that it is based on asymptotic theory. Therefore, it works well only in large samples that are often not available for financial cross-sectional data. PP also shares disadvantages of ADF tests such as a sensitivity to structural breaks, weak power for small samples often results in unit root conclusions.

**Table 4.8 Unit root test for bank-specific and external control variables, 2008 - 2017**

	Full sample		Russian banks		Kazakhstani banks		Belarusian banks	
Variable	ADF	PP	ADF	PP	ADF	PP	ADF	PP
L1.NIM	-5.43***	-6.53***	-3.31***	-6.18***	-4.18***	-2.92***	-7.33***	-1.84**
L1.ROA	-2.40***	-9.22***	-1.64**	-8.22***	-1.60*	-3.72***	-3.20***	-3.32***
L1.NSFR	-1.89**	-14.97***	-1.69**	-11.76***	-2.60***	-9.39***	-3.82***	-2.85***
Size	-1.41*	-9.73***	-0.45	-13.24***	-0.29	-1.30	-5.33***	-1.81**
L1.Growth	-6.90***	-21.77***	-6.57***	-18.09***	-7.30***	-8.54***	-5.26***	-7.41***
Loan	-5.62***	-5.63***	-3.59***	-5.47***	-3.18***	-1.98**	-1.76**	-1.54*
L1.LLR	-3.01***	-17.87***	-1.22	-16.17***	-2.56***	-7.09***	-4.54***	-4.01***
Equity	-6.08***	-18.81***	-2.69***	-6.29***	-2.48***	-6.17***	-3.52***	-3.39***
Diversify	-1.63**	-12.23***	-4.33***	-9.36***	-6.25***	-6.39***	-4.47***	-4.73***
Opex	-3.92***	-7.48***	-3.44***	-4.92***	-3.11***	-2.65***	-2.49***	-4.46***
CR5	-0.77	-1.93**	-1.35	6.95	-0.28	1.88	-8.29***	-5.86***
GDPG	-13.83***	-14.02***	-14.82***	-16.60***	-10.32***	-3.36***	5.82	0.84
Inflation	-4.08***	-6.34***	-1.79**	-1.04	-7.81***	-10.62***	-4.79***	-2.49***

This table presents the results of the Fisher-type Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests. The Null hypothesis: All panels contain a unit root. P-values are marked as follows: \* Significant at 10%, \*\* Significant at 5%, \*\*\* Significant at 1%.

Following Garcia-Herrero et al. (2009), Dietrich et al. (2014), Kohler (2015), Djalilov and Piesse (2016), we address all four econometric challenges by employing Arellano and Bover (1995), Blundell and Bond (1998) Generalized Method of Moments that is also known as a system GMM estimator (SGMM). Similar to Arellano and Bond (1991) dynamic GMM (DGMM), this methodology is especially efficient for samples with many panels and relatively few periods ( $n > t$ ). It also controls for persistence of the dependent variable and unobserved heterogeneity. Both DGMM and SGMM effectively account for potential endogeneity as they use lagged values of the dependent variable in levels and in differences as well as lagged values of other explanatory variables as instruments. Arellano and Bond DGMM, however, works poorly for samples with relatively small number of cross-section units, which results in large ratio of a panel-level

effect's variance to an idiosyncratic error's variance.<sup>114</sup> Arellano and Bover SGMM is more superior as it uses additional moment conditions such as “lagged differences of dependent variable as instruments for equations in levels, in addition to lagged levels of dependent variable as instruments for the differenced equations” (Blundell and Bond, 1998, p.116). The approach produces efficient coefficients for a dataset with a large idiosyncratic error. Arellano - Bover SGMM is also better at modeling non-stationary data.<sup>115</sup> Blinder et al. (2005) confirms that Arellano and Bover SGMM produces consistent estimates in the presence of the unit root.

A post-estimation diagnostic is a critical requirement for checking validity of regression coefficients. *First*, the Wald test verifies the goodness of fit for estimated coefficients under the Null hypothesis: All coefficients (except for constant) are zero. *Second*, Sargan - Hansen test of over-identifying restrictions provides evidence of validity of moment restrictions under the Null hypothesis: Instrumental variables are valid. *Finally*, a crucial condition of our model is the absence of autocorrelation in error terms. More specifically,  $\Delta\omega_{i,t}$  should be uncorrelated with  $\Delta\omega_{i,t-1}$  that is examined by the Arellano-Bond test for first and second difference autoregressive process. If the test for the second-order autoregressive process is insignificant, the error terms are not serially correlated. This is an additional check for the appropriateness of instrumentations.

#### 4.4 Empirical results

We analyze the impact of new Basel III NSFR and other control variables on EAEU banks' profitability measured by the Net interest margin and the Return on equity. The effect is estimated based on Arellano and Bover (1995), Blundel and Bond (1998) system GMM. The empirical results are presented in Tables 4.9 and 4.10 for NIM and ROA respectively. The results of post-estimation diagnostic tests are as follows. The null hypothesis of the Wald test is rejected in all models and indicates the goodness of fit for

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<sup>114</sup> A potential weakness of Arellano and Bond DGMM estimator was revealed by Arellano and Bover (1995) and Blundell and Bond (1998).

<sup>115</sup> In fact, the issue of a unit root of the variables tends to be ignored as data length is mainly restricted to short-term series.

estimated coefficients. The null hypothesis of Hansen test of over-identifying restrictions is not rejected and proves validity of instruments. Furthermore, Arellano-Bond test for first and second-order autoregressive process confirms the absence of autocorrelation and consistency of our GMM estimators.

#### 4.4.1 Results for the Net interest margin of EAEU banks

Table 4.9 presents the results for the Net interest margin across full sample, its subsamples of SIBs and non-SIBs, and the results for the regional samples of EAEU banks using annual data for 2008 – 2017. The coefficient of *lagged NIM* is significant at 1% in all samples (except for Belarusian banks), which indicates a strong degree of stability of the NIM. The adjustment speed is slower for SIBs and Kazakhstani banks due to a lower level of competition among banks. The *lagged NSFR* has significant negative impact on NIM in full, non-SIBs and Russian bank samples (p-value < 1%). The results support King (2013) and Mergaerts and Vennet (2016) who found that NIM declined when banks tried to improve their structural funding liquidity. We also show no effect of the lagged NSFR on NIM of SIBs and Kazakhstani banks' samples that complies with Dietrich et al. (2014) who reported the absence of significant influence of the NSFR on NIM of Western European banks. The possible explanation of our results are as follows. The NSFR of SIBs is very low as they have not adjusted the ratio to the target so far. For Kazakhstani banks, however, the coefficient of the NSFR is not significant because the NSFR is already above of 100%. With respect to Belarusian banks, we find that the NSFR has positive impact on NIM (p-value < 5%) that is in contrast to our expectations. *Bank size* is negatively associated with NIM in non-SIBs and regional samples. Moreover, the *systemically important banks* are significantly less profitable in terms of interest margin that complies with Dietrich and Wanzenried (2011) and Mergaerts and Vennet (2016). *Faster growing* banks tend to have higher NIM in most of samples except for SIBs (p-value < 1%). The asset growth of Belarusian banks, however, negatively affects NIM (p-value < 1%). As expected, *lending activities* are positively associated with NIM in full, non-SIBs and Belarusian bank samples (p-value < 1%). However, the positive effect is undermined by *lagged credit losses* that negatively affect NIM in most of samples except for Kazakhstani

and Belarusian banks. Entrop et al. (2015) find that credit losses are not significant for NIM of German banks, whereas Dietrich et al. (2014) report negative effect of level loan losses on NIM. In contrast, Mergaerts and Vennet (2016) provide evidence that loan loss provisions are able to improve NIM of European banks. The effect, however, is temporal as loans extended to lower quality borrowers undermine profitability of European banks in the long run. *Equity* capitalization improves NIM in all samples (except for Kazakhstani banks) that is consistent with most of the prior studies (e.g. Dietrich and Wanzenried, 2011; Mergaerts and Vennet, 2016). Engagement in *non-interest generating activities* has negative impact on NIM (p-value < 1%) except for Russian banks for which the coefficient is not significant. Entrop et al. (2015) found the similar results for German banks. *Operating expense to revenue ratio* has weak negative effect on NIM in full, Kazakhstani and Belarusian bank samples (p-value < 10%), but strong positive impact on NIM of SIBs (p-value < 1%). It seems that SIBs charge their operational inefficiency directly from intermediation fees (Entrop et al., 2015). *State ownership* is negatively associated with NIM of SIBs, Russian and Belarusian banks in which state ownership prevails. Our findings comply with Micco et al. (2007), Iannotta et al. (2007), and Cornett et al. (2010) who also report that state-owned banks were less profitable than foreign and privately-owned banks.

Analysis of external control variables shows that greater *sector concentration* contributes to higher NIM in full and Russian bank samples (p-value < 1%). The result indicates that EAEU banks are able to increase NIM through traditional lending and deposit activities in less competitive markets. *GDP growth* is negatively associated with NIM in all samples except for Kazakhstani and Belarusian banks that report no effects. The results imply countercyclical behavior of banks' profits. Entrop et al. (2015) explain that the effect is driven by greater competition at the lending and deposit markets during economic booms that is also accompanied by lower lending standards. Greater *inflation* negatively affects NIM of Kazakhstani (p-value<10%) and Belarusian banks (p-value < 5%). The results reflect high inflation rates in Kazakhstan and Belarus, which raised the cost of funding quicker compared to interest income. The period of *sanctions* against Russia is positively associated with NIM of SIBs (p-value < 5%) and Belarusian banks

(p-value < 1%). These banks are still able to protect their major operating margin and adapt to adverse economic environment. However, the effect of sanctions on NIM of Russian banks is significantly negative (p-value < 1%), which confirms the overall destabilizing impact of sanctions associated with limited access to external financial markets and more expensive funding.

#### 4.4.2 Results for the Return on assets of EAEU banks

Table 4.10 reports the results for Return on assets across full sample, subsamples of SIBs and non-SIBs, and the regional samples of EAEU banks using annual data for 2008 – 2017. The coefficients of *lagged ROA* are significant only for Russian (p-value < 5%) and Kazakhstani (p-value < 1%) banks. The results clearly show that ROA is less persistent than NIM. Kazakhstani banks also indicate much slower speed of profit adjustment compared to Russian banks, which could be associated with lower competition at Kazakhstani banking sector. Goddard et al. (2011) note that banks from developing countries have weaker persistence in profitability compared to banks from developed economies. Our findings, however, are in contrast to Djalilov and Piesse (2016) who provide evidence that bank profitability, ROA, in late (CEE) and early (USSR) transition countries remains strongly persistent. There is no impact of *lagged NSFR* on ROA. The negative weak effect is observed only in the sample of Russian banks (p-value < 10%). Our results comply with works of Dietrich et al. (2014) and Mergaerts and Vennet (2016) who reported no influence of the NSFR on ROA of European banks. Larger *size* supports better performance of the full, non-SIBs and Russian banks and not material for Kazakhstani and Belarusian banks. *Systemic status* is not associated with ROA. However, larger SIBs are less profitable (p-value < 5%). Our results comply with Bertay et al. (2013) who noted that banks with large absolute size have greater ROA and ROE; but banks with large systemic size are less profitable. *Asset growth* is positively associated with ROA of full (p-value < 1%), non-SIBs (p-value < 5%) and Russian (p-value < 5%) bank samples. Shehzard et al. (2013), however, report the absence of relationship between the past bank growth and overall profitability. *Loan to assets ratio* has negative effect on ROA of Russian banks only. Moreover, *lagged loan loss reserves* are positively associated with

ROA in full, non-SIBs, Russian and Kazakhstani bank samples and negatively influence ROA of Belarusian banks. Mergaerts and Vennet (2016) report negative contemporaneous effect of loan provisions on ROA and ROE. Dietrich and Wanzenried (2011) state that the effect of loan loss provisions on ROA is positive in normal economic conditions and turned to negative during crisis periods. *Equity to asset ratio* has strong positive effect on ROA in most samples except for Kazakhstani and Belarusian banks. Garcia-Herrero et al. (2009) for Chinese banks, Demirguch-Kunt and Huizinga (2010) for international banks, Dietrich et al. (2014) and Mergaerts and Vennet (2016) for European banks found the similar results. They explain the effect by lower funding costs available for better-capitalized banks. According to our expectations, *non-interest generating activities* have strong positive effect on ROA in all samples except for SIBs. It seems that business diversification through engagement in fee and trading activities has favorable effect on overall bank profitability. Our results are consistent with Demirguch-Kunt and Huizinga (2010) who report that banks with faster growth and greater reliance on fee income have higher overall profitability. Dietrich et al. (2014) and Mergaerts and Vennet (2016) show the similar findings with respect to non-interest income share's effect on ROA. *Operating inefficiency* negatively affects ROA of all banks except for SIBs and Kazakhstani banks. The results meet our expectations and comply with most of prior studies. *State ownership* is positively associated with ROA of the full and Russian bank samples but negatively impacts ROA of SIBs.

Among external control variables, the higher *sector concentration* adversely affects ROA of full, non-SIBs and Russian bank samples, and is not material for other samples. Mirzaei et al. (2013) showed that de-concentration improves ROA and ROE of banks from 23 emerging economies. *GDP growth* negatively influences ROA of Russian banks. *Inflation* has strong positive effect on ROA in most samples except for Kazakhstani and Belarusian banks. The results comply with Demirguch-Kunt and Huizinga (2010) who found that banks from countries with inflationary economies tend to have greater ROA. Garcia-Herrero et al. (2009) also reported that inflation positively contributed to profitability of Chinese banks. The period of *sanctions* against Russian banks does not significantly influence overall profitability of EAEU banks.



**Table 4.9 Determinants of the Net Interest margin of EAEU banks, 2008-2017**

Dependent variable: NIM	Full sample			Regional sample		
	All	SIBs	Non-SIBs	Russia	Kazakhstan	Belarus
L1.NIM	0.456*** (0.032)	0.642*** (0.073)	0.416*** (0.035)	0.341*** (0.035)	0.520*** (0.060)	0.047 (0.054)
<i>L1.NSFR</i>	-0.009*** (0.003)	-0.007 (0.006)	-0.011*** (0.003)	-0.023*** (0.007)	-0.002 (0.003)	0.017** (0.009)
Size	-0.002 (0.002)	-0.001 (0.001)	-0.004** (0.002)	-0.012*** (0.003)	-0.016*** (0.004)	-0.005* (0.003)
SIB	-0.174*** (0.025)					
<i>L1. Growth</i>	0.003*** (0.001)	0.000 (0.002)	0.004*** (0.001)	0.003*** (0.001)	0.017*** (0.002)	-0.009*** (0.002)
Loan	0.026*** (0.009)	-0.001 (0.013)	0.029*** (0.010)	0.018 (0.011)	0.015 (0.016)	0.053*** (0.019)
<i>L1.LLR</i>	-0.158*** (0.018)	-0.052** (0.023)	-0.159*** (0.020)	-0.176*** (0.019)	0.016 (0.037)	0.074 (0.083)
<i>Equity</i>	0.069*** (0.013)	0.133*** (0.023)	0.060*** (0.014)	0.038** (0.016)	0.016 (0.024)	0.097*** (0.021)
Diversify	-0.022*** (0.006)	-0.031*** (0.008)	-0.020*** (0.007)	-0.001 (0.006)	-0.099*** (0.017)	-0.181*** (0.017)
<i>Opex</i>	-0.007* (0.004)	0.027*** (0.010)	-0.006 (0.004)	-0.002 (0.004)	-0.016* (0.009)	-0.029* (0.018)
State	-0.012 (0.019)	-0.010** (0.004)	-0.036 (0.027)	-0.084*** (0.027)	0.016 (0.051)	-0.025*** (0.009)
CR5	0.058*** (0.022)	0.015 (0.016)	0.027 (0.025)	0.352*** (0.053)	-0.047 (0.030)	-0.013 (0.113)
GDPG	-0.074*** (0.020)	-0.039** (0.018)	-0.087*** (0.024)	-0.061*** (0.021)	-0.097 (0.064)	0.037 (0.057)
Inflation	0.006 (0.004)	0.001 (0.003)	0.006 (0.005)	0.009 (0.006)	-0.022* (0.021)	-0.015** (0.008)
Sanctions	0.003 (0.002)	0.004** (0.018)	0.004 (0.003)	-0.013*** (0.005)	0.004 (0.005)	0.013*** (0.004)
Constant	0.062* (0.033)	0.023 (0.031)	0.091** (0.039)	0.123** (0.048)	0.372*** (0.092)	0.151 (0.125)
Observations	1236	232	1011	808	248	187
Number of banks	129	25	104	81	25	23
Wald-test (ch-sq)	523.61***	260.86***	396.19***	375.51***	397.88***	341.10***
Sargan test	1.318	1.100	2.858	2.942	1.275	1.903
AB test AR(1)	-3.595***	-3.276***	-3.017***	-3.731***	-1.475	-2.259**
AB test AR(2)	0.047	-1.989*	-0.027	1.612	-1.112	0.827

This table reports the effects of the NSFR, the systemic importance, bank-specific and external control variables on EAEU banks' Net interest margin (NIM) during 2008 - 2017. Detailed description of the variables is given in Table 4.2. Variables in italics are instrumented through the GMM procedure following Arellano and Bover (1995), with all instrumented variables lagged at 1. Robust standard errors are in brackets. Wald-test reports the goodness of fit for estimated coefficients under the Null hypothesis: All coefficients (except for constant) are zero. Hansen test of over-identifying restrictions reports validity of our instruments under the Null hypothesis: Instrumental variables are valid. AB is Arellano-Bond test AR(1) and AR(2) checks for the serial correlation under the Null hypothesis: No autocorrelation. The p-values are as follows: \*\*\* Significant at 1%, \*\* Significant at 5%, \* Significant at 10%.

**Table 4.10 Determinants of the Return on assets of EAEU banks, 2008 - 2017**

Dependent variable: ROA	Full sample			Regional sample		
	All	SIBs	Non-SIBs	Russia	Kazakhstan	Belarus
L1.ROA	-0.019 (0.027)	0.030 (0.076)	0.011 (0.029)	0.061** (0.030)	0.434*** (0.068)	0.013 (0.029)
<i>L1.NSFR</i>	-0.004 (0.006)	0.012 (0.008)	-0.004 (0.006)	-0.025* (0.014)	-0.001 (0.004)	0.018 (0.012)
Size	0.014*** (0.004)	-0.003** (0.001)	0.019*** (0.004)	0.047*** (0.006)	0.007 (0.006)	-0.002 (0.004)
SIB	-0.062 (0.068)					
<i>L1.Growth</i>	0.004*** (0.002)	0.002 (0.003)	0.004** (0.002)	0.004** (0.002)	0.006 (0.005)	-0.006 (0.004)
Loan	0.032* (0.018)	0.022 (0.016)	0.027 (0.020)	-0.045** (0.023)	0.036 (0.026)	0.004 (0.025)
<i>L1.LLR</i>	0.133*** (0.037)	0.019 (0.025)	0.170*** (0.038)	0.210*** (0.039)	0.181*** (0.064)	-0.240** (0.102)
<i>Equity</i>	0.332*** (0.023)	0.108*** (0.031)	0.351*** (0.026)	0.590*** (0.031)	0.054 (0.039)	0.029 (0.027)
Diversify	0.073*** (0.012)	0.010 (0.011)	0.079*** (0.013)	0.071*** (0.012)	0.077** (0.030)	0.065*** (0.022)
<i>Opex</i>	-0.032*** (0.007)	-0.014 (0.013)	-0.035*** (0.008)	-0.030*** (0.008)	-0.012 (0.018)	-0.137*** (0.023)
State	0.069** (0.031)	-0.024** (0.010)	0.058 (0.040)	0.119*** (0.028)	0.084 (0.197)	-0.016 (0.020)
CR5	-0.227*** (0.049)	-0.013 (0.021)	-0.265*** (0.057)	-0.868*** (0.115)	0.053 (0.057)	0.043 (0.143)
GDPG	-0.061 (0.039)	-0.015 (0.023)	-0.067 (0.048)	-0.155*** (0.044)	0.168 (0.114)	0.053 (0.069)
Inflation	0.033*** (0.008)	0.021*** (0.004)	0.032*** (0.010)	0.040*** (0.011)	-0.046 (0.040)	0.001 (0.009)
Sanctions	-0.006 (0.005)	0.005* (0.002)	-0.009 (0.006)	0.009 (0.008)	0.015* (0.009)	0.002 (0.005)
Constant	-0.187** (0.074)	0.053 (0.038)	-0.279*** (0.086)	-0.499*** (0.105)	-0.229 (0.152)	0.032 (0.163)
Observations	1236	232	1004	808	241	187
Number of banks	129	25	104	81	25	23
Wald-test (ch-sq)	415.02***	93.57***	371.18***	647.06***	72.12***	58.48***
Sargan test	3.268	2.259	2.952	4.015	1.069	1.731
AB test AR(1)	-2.372**	-2.649***	-2.359**	-2.286**	-2.026**	-2.259**
AB test AR(2)	0.436	0.148	0.370	-0.844	0.028	0.827

This table reports the effects of the NSFR, the systemic importance, bank-specific and external control variables on EAEU banks' Return on assets (ROA) during 2008 - 2017. Detailed description of the variables is given in Table 4.2. Variables in italics are instrumented through the GMM procedure following Arellano and Bover (1995), with all instrumented variables lagged at 1. Robust standard errors are in brackets. Wald-test reports the goodness of fit for estimated coefficients under the Null hypothesis: All coefficients (except for constant) are zero. Hansen test of over-identifying restrictions reports validity of our instruments under the Null hypothesis: Instrumental variables are valid. AB is Arellano-Bond test AR(1) and AR(2) checks for the serial correlation under the Null hypothesis: No autocorrelation. The p-values are as follows:

\*\*\* Significant at 1%, \*\* Significant at 5%, \* Significant at 10%.

## 4.5 Summary

This chapter analyzes the impact of the NSFR and the systemic importance on the NIM and ROA of EAEU banks during 2008 - 2017. The NSFR aims to reduce banks' funding liquidity risk and make banks more sustainable to liquidity shocks in the long-term. However, the compliance with the NSFR requires banks to squeeze a maturity gap between assets and liabilities, which may reduce their Net interest margin and overall profitability. The work relies on two complement directions in post-crisis regulatory research that are quite novel even for developed economies. Similar to studies of King (2013), Dietrich et al. (2014), Mergaerts and Vennet (2016), we examine the impact of the NSFR on banks' profitability. Following the work of Bertay et al. (2013), we investigate the effect of size and systemic importance on bank profitability. We apply the dynamic panel model estimated with Arellano and Bover (1995), Blundell and Bond (1998) system GMM.

The major results of this research work are summarized next. *First*, we find strong degree of stability of the NIM and lack of persistence in the ROA of EAEU banks. It appears that NIM is more protected compared to ROA due to low level of competition and high entry barriers in the EAEU banking sectors. *Second*, the NSFR has significant negative impact on the NIM. However, there is no effect of the NSFR on the NIM of SIBs and Kazakhstani banks as well as on overall profitability, ROA. *Third*, SIB status of EAEU banks is associated with both lower NIM and the NSFR. The compliance with the minimum NSFR will continue to depress profitability of SIBs, which in turn, may undermine their long-term sustainability. *Forth*, bank growth, loan losses, equity capitalization and business diversification are among the major bank-specific determinants of EAEU bank profitability, although the significance and sign of the effects vary by samples and a target profitability indicator. *Finally*, the NIM of EAEU banks is mainly determined by high sector concentration and exhibits countercyclical relationship with GDP growth. The ROA of EAEU banks is undermined by more concentrated markets. We also find that Western sanctions have adversely affected the NIM of Russian banks and are not material with respect to the ROA.

## CONCLUSION

The research work contributes to the expanding studies on Eurasian integration by focusing on a specific project of the Eurasian Commission – the establishment of a single financial market in the EAEU by 2025. The major objective of the thesis is to provide a comprehensive assessment of banking stability that is a crucial condition for success in the economic and financial integration in the EAEU.

The design of the research work is as follows. First, it gives a definition for financial integration and discusses the related costs and benefits for financial development and economic growth. The historical background of financial integration in the EU is reviewed next, as it is the most prolong, complex and sustainable example of integration processes in the world. The EU experience has shown that intensive economic integration must be accompanied by a stronger financial system. Harmonization of banking regulation and supervision under the best international practices is another prerequisite to protect the benefits of financial integration in the EAEU. The analysis of the literature proceeds with a discussion of key measures of bank risk-taking (the inverse proxy of bank stability). This is followed by a review of the most recent studies that have examined the effect of bank-specific, macroeconomic and other external variables on the selected bank stability indicators: financial strength, funding stability and profitability. The thesis proceeds with descriptive and empirical analyses of banking stability in the EAEU. The major findings and their practical implications for bank policymakers are discussed.

The descriptive analysis is performed across three dimensions. *First*, the thesis compares capacity, concentration and ownership characteristics of EAEU banking sectors during 2009 – 2015 relative to banks from CEE and Baltic countries. Russian, CEE and Baltic States' banking sectors are quite similar in terms of bank assets to GDP ratio, whereas Kazakhstani and Belarusian banking sectors are much behind. The analysis observes some heterogeneity in EAEU banking structures' development over time. For example, the Russian banking system demonstrates average concentration and declining market share of foreign banks; the Belarusian banking sector is highly concentrated and state-controlled; Kazakhstani banks are privately owned and operate at diminishing level

of concentration. We report that the removal of cross-border barriers for financial services will reinforce the power of Russian banks in smaller EAEU member states. Financial integration in the EAEU will also contribute to increase in competition, further bank consolidation, and the reduction of the market share of public banks. Harsh cross-border competition, however, may harm the stability of some credit institutions. Enhanced micro and macro-prudential regulation is critical for preserving financial stability and economic benefits of integration in the EAEU.

*Second*, this research work analyzes recent developments and the level of harmonization of banking regulations in the EAEU relative to the BCBS Basel III standards for capitalization and liquidity. It is observed that the Central banks of the founding EAEU states implemented major legal reforms between 2013 and 2016. However, the degree of legislative conversions in the banking sectors of member countries remains weak. Russian banks have made substantial progress in compliance with Basel III standards for capitalization and liquidity. Kazakhstani and Belarusian banks' regulations continue to lag behind in terms of advanced risk management and mitigation tools, supervisory oversight, and information disclosure recommended by Basel III. Moreover, the thesis reports some divergences in implementation of Basel III standards at the national levels. For example, the National Bank of Kazakhstan introduces tighter requirements for CET1 and Tier 1 capital ratios compared to Russian and Belarusian banks. The National Bank of the Republic of Belarus sets a greater threshold for a Total capitalization ratio. The LCR and NSFR are applicable only for systemically important banks listed by the Central Bank of Russia, whereas all banks are required to meet the liquidity standards in Kazakhstan and Belarus. An unequal regulatory burden may weaken the competitiveness of some EAEU banks under ongoing integration processes. However, further research is needed to suggest policy implications in this area.

*Third*, the comparison of key stability indicators shows that in spite of different stages in transition, CEE, Baltic and EAEU banks face common challenges in managing profitability and business models' risks. Banks of both regions suffer from depressed interest margin and high level of NPLs. Systemic NPLs issues and recovery of distressed

banks in the EAEU are managed by the state budget, whereas the Single Resolution Mechanism of EU Banking Union entitles a banking system to be responsible for incurred assets' losses. Enhanced regulation and supervision in the EU contributed to improvement in capitalization and funding liquidity of CEE and Baltic banks by 2015. Within the EAEU, Russian banks operate at high funding liquidity risk, Kazakhstani banks continue to struggle with sizable credit losses, whereas Belarusian banks' profitability is the most suppressed. Unless regulation is strengthened and specific banking risks are properly addressed, financial integration may lead to the spillover of risks across the national borders and threaten the overall financial stability in the EAEU.

The thesis offers the empirical analysis at domestic and regional levels that does not currently exist. It uses hand-collected annual bank data from 1 January 2006 to 1 January 2017. The variables' construction, a use of lag effect and instrumental variables resulted in the period of study from 1 January 2008 to 1 January 2017. The sample mainly consists of unlisted EAEU banks of various size, whereas the majority of research works from advanced economies rely on samples of listed banks or international samples of large banks. Therefore, this thesis expands the empirical literature on banking stability in emerging economies by taking into account the fact that these banks operate at different institutional settings, governance and economic environments. For example, a government affiliation or Western sanctions on Russia may impact on the empirical results for banks in the region. This thesis also contributes to the development of post-crisis regulatory research in the EAEU. This is the first study that calculates the NSFR using public bank data for Russia, Kazakhstan and Belarus. There are no research works that have analyzed the business determinants of the NSFR and estimate the effect of the NSFR on EAEU bank profitability. Finally, this is a pioneering study that compares the regulation of SIBs in the EAEU and investigates the relationship between bank systemic importance and profitability.

The first part of the empirical analysis investigates the impact of EAEU bank ownership and business activities on bank financial and funding stability during times of crisis and sanctions. In terms of ownership types, we find that state ownership is strongly

associated with a lower probability of EAEU banks' failure. Moreover, state banks have not been significantly affected by sanctions (compared to private banks) because government funding support is available to them. It appears that state ownership buffers the destabilizing effect of sanctions. At the same time, state ownership results in substantial fiscal costs of maintaining banking stability in the region. In contrast, the funding stability of EAEU banks does not depend on ownership type and is mainly driven by external factors. The NSFRs of Russian and Belarusian banks have been the most affected by sanctions, but there is no observable significant influence of sanctions on Kazakhstani banks' funding stability.

With respect to business models, this thesis reports the following results. *First*, there is strong evidence that larger banks are more financially fragile, but this effect is reversed for Belarusian banks. This finding supports the need to regulate systemically important credit institutions in the EAEU by imposing greater capital requirements. *Second*, rapid lending expansion negatively impacts on a bank's Z-score, which necessitates control of asset growth through setting regulatory restrictions for fast-growing credit institutions. *Third*, in contrast to the US and EU studies, this research work observes either neutral or negative effects of greater engagement in securities' business and fee-generating activities on the Z-score. The results confirm the stabilizing role of traditional banking models in EAEU countries. *Fourth*, a greater reliance on market borrowing clearly suggests a trade-off, as it improves the financial stability but negatively impacts on the funding stability of EAEU banks. *Finally*, greater equity capitalization indicates a strong positive impact on both the financial and funding soundness of EAEU banks confirming its powerful function as a regulatory tool for improving long-term bank sustainability.

The second part of the empirical analysis provides the most recent insight into determinants of profitability of EAEU banks and suggests valuable recommendations for national regulators. *First*, it reports that the NIM is the most persistent source of bank profitability, whereas the ROA is less sustainable. It seems that high entry barriers and lack of competition protect the NIM. *Second*, compliance with the minimum level of the

NSFR significantly reduces the NIM. This, in turn, may induce EAEU banks' engagement in non-interest generating activities to increase profitability. The national regulators should carefully observe potential shifts in bank business models and their risks. *Third*, the systemic status of banks is strongly associated with lower NIM. SIBs also have significantly lower NSFR than non-SIBs implying the potentially greater adverse effect on profitability. The results confirm that systemically important credit institutions should be subject to tighter capital requirements as their profitability may not be sufficient to cover asset losses. *Forth*, credit risk significantly undermines the NIM of EAEU banks, whereas operational inefficiency negatively affects ROA. Both credit and operational risks should be addressed by EAEU bank managers in order to support their profitability in the long run. *Fifth*, greater equity capitalization positively influences on both measures of bank profitability and remains a powerful tool for regulators. *Sixth*, income diversification reduces NIM and improves ROA of EAEU banks. The results imply that non-interest generating activities mainly play a replacement role rather a supporting effect with respect to EAEU banks' profitability. *Seventh*, we observe that greater sector concentration positively contributes to NIM but has an inverse impact on ROA of EAEU banks. It seems that lack of market competition and high entry barriers protect only NIM, but have negative influence on overall bank performance. Therefore, EAEU banking sector's de-concentration is desirable only if banks move to more diversified business models. *Finally*, for other external variables, we report countercyclical behavior of bank profits. Higher inflation negatively impacts NIM of Kazakhstan and Belarusian banks but it is positively associated with ROA in all bank samples, except for Kazakhstan and Belarus. Western sanctions negatively influence on NIM of Russian banks only.

These empirical findings clearly show that the profitability of EAEU banks is mainly driven by bank-specific determinants rather than by external macroeconomic factors. We suggest that apart from prudential standards, bank regulators should pay closer attention to bank business models. On one hand, compliance with the NSFR reduces funding liquidity risk; on the other hand, it inevitably facilitates shifts to non-traditional banking activities. The possible transfer of business model risks to "shadow banking" may have severe consequences for banking stability if overlooked by regulators. Moreover, the



systemically important credit institutions should be subject to tighter regulation and market discipline.

The results of this research work are essentially micro-prudential. The future research in this area may incorporate qualitative variables such as management quality, corporate governance or the level of fraud and their impact on bank stability. Moreover, a sustainable EAEU banking system requires the comprehensive design of regulatory policies and supervisory practices to control both bank-specific and systemic risks. The development and testing of early warning indicators of those risks are essential. Future empirical research should analyze the effect of bank business models (and their risks) on the systemic stability of the EAEU banking sectors for narrowing the gap between micro and macro prudential regulations in the region. For financially integrated EAEU markets, the effective resolution mechanism for distressed banks should be in place at the intergovernmental level. This suggests a thorough comparative analysis of existing practices to cope with systemic banking issues.

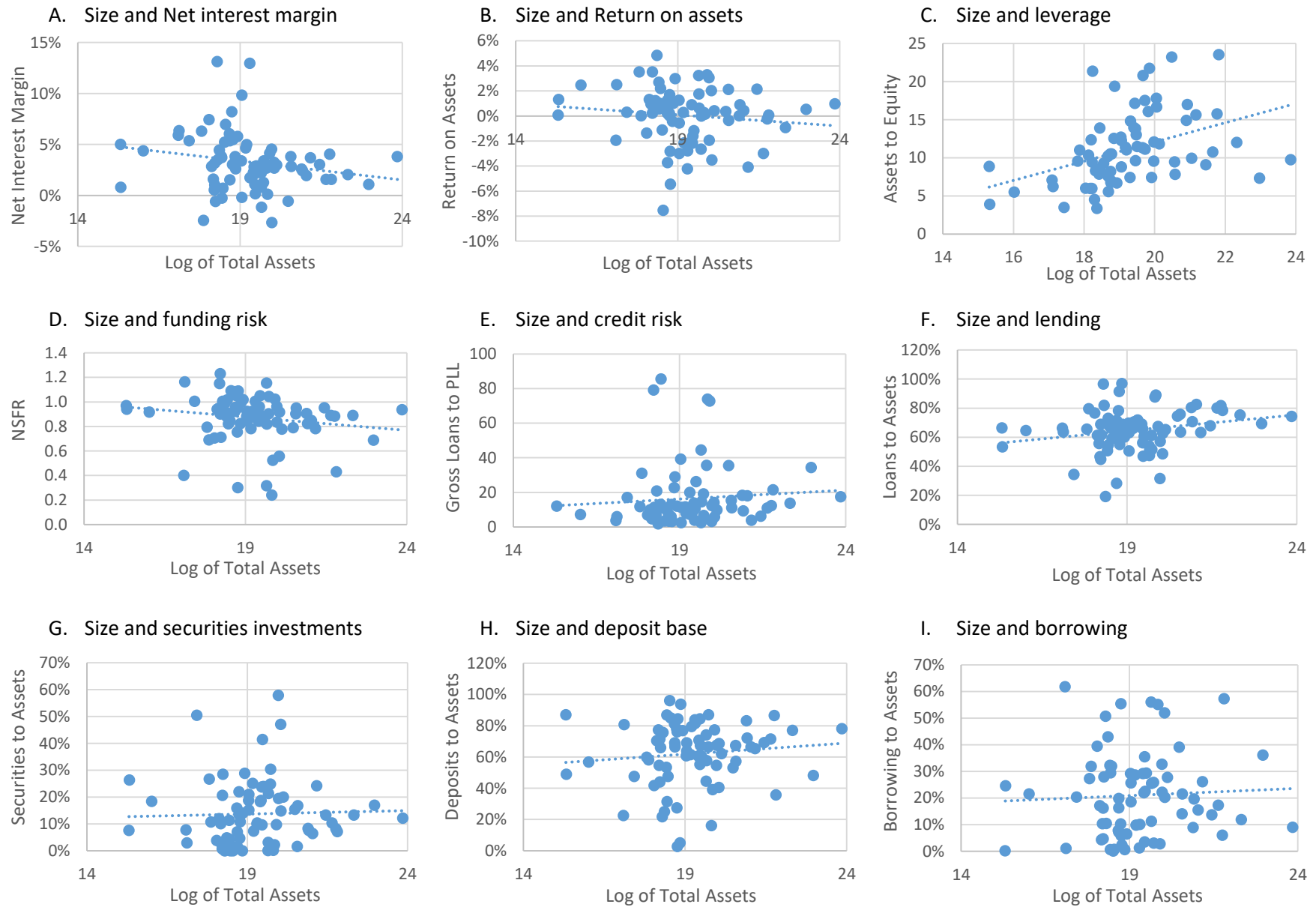
## **APPENDIX A Relationship between EAEU bank size and business variables**

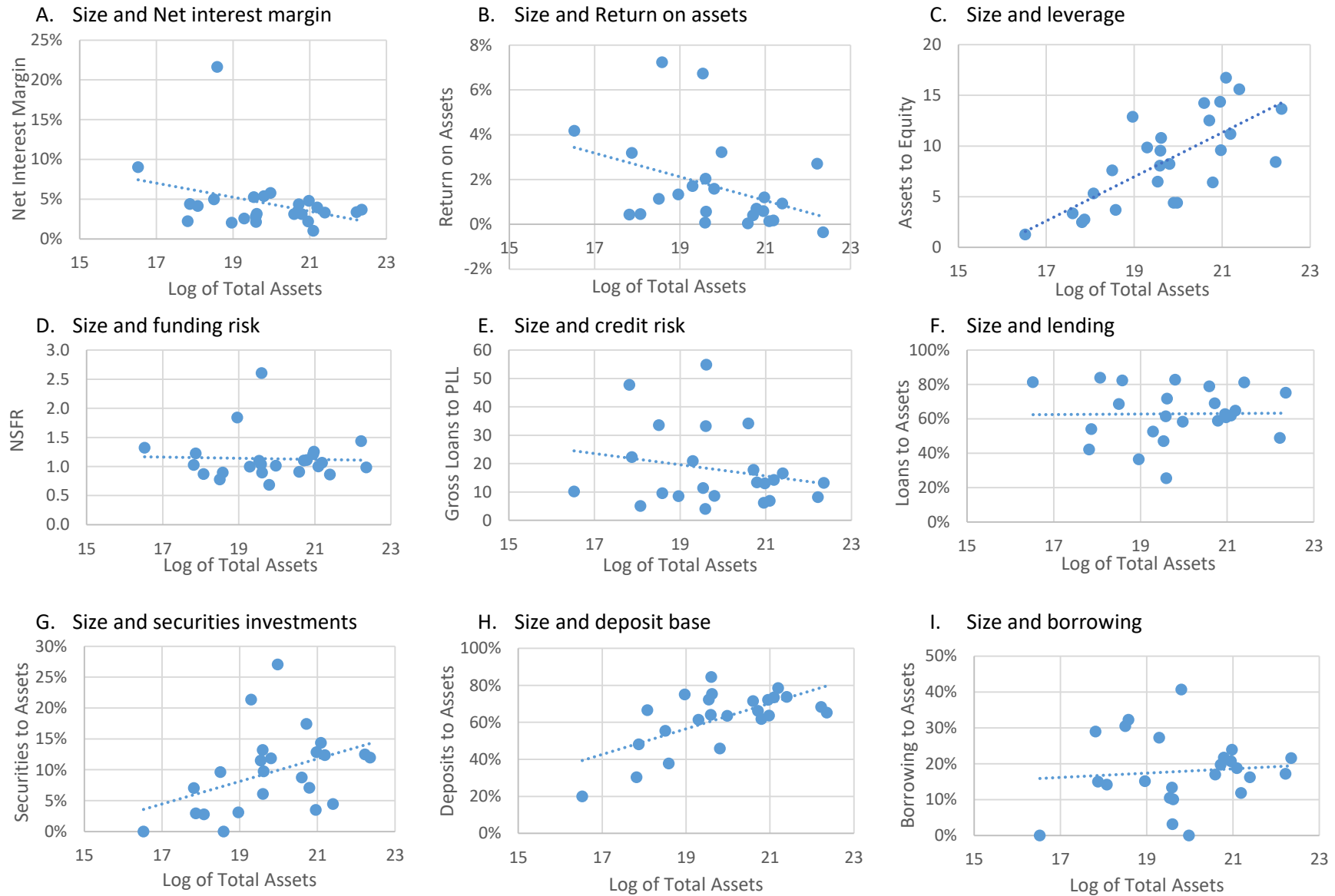
Figures 5.1, 5.2, 5.3 graphically depict the relationship between size and selected business-specific variables of Russian, Kazakhstan and Belarusian banks using data as of 1 January 2016. Bank size is measured by the natural logarithm of total assets in the respective country. There are three groups of business variables. The first group measures profitability (NIM and ROA). The second group measures bank risks and includes the leverage ratio (Assets to equity), the funding liquidity risk ratio (NSFR) and the credit risk ratio (Gross loans to provisions for loan losses). The third group reflects the degree of bank engagement in lending, securities investments, deposit-taking and borrowing (expressed as ratios relative to total assets).<sup>116</sup> Two characteristics (a bank size and a selected business-specific variable) are likely to be linearly correlated, if scatter points cluster in a certain direction and concentrate around the trend line.

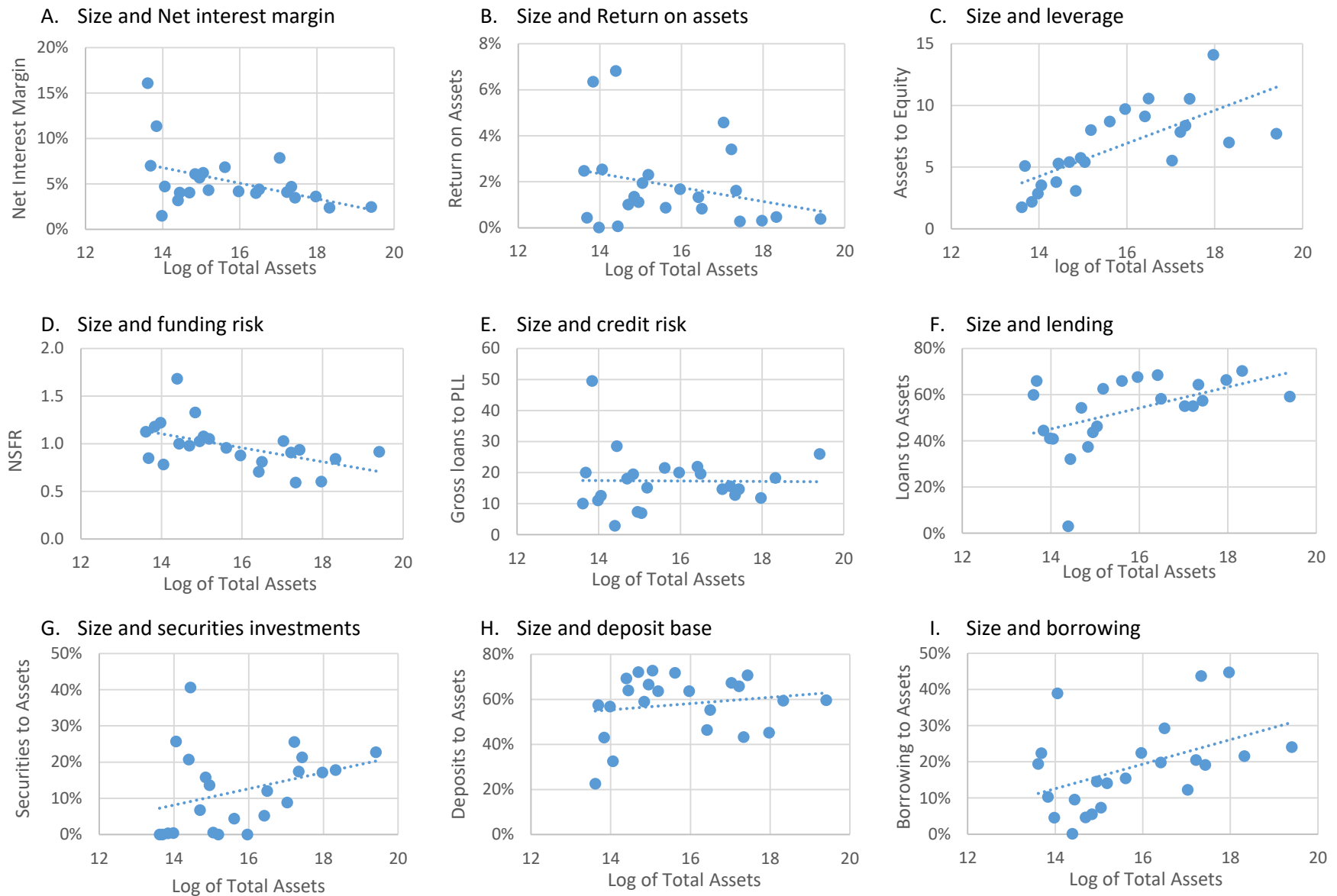
It is obvious that bank size is positively correlated with leverage of Russian and Kazakhstani banks and strongly positively associated with leverage of Belarusian banks (see scatter diagrams C). The NIM of Kazakhstani and Belarusian banks exhibits negative relationship with bank size (see scatter diagrams A and B). Kazakhstani banks' size positively correlates with deposit base and securities investments. The interesting observations is that large Belarusian banks engage more in lending activities and securities business (see diagrams F and G). They also have greater amount of borrowing in their funding structure and operate at less prudent funding (see diagrams D and I).

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<sup>116</sup> Securities include held-to-maturity and available for sale investments. Borrowing consists of short-term and long-term borrowing.

**Figure 5.1 Russian banks' size and bank activities, as of 1.01.2016**

**Figure 5.2 Kazakhstani banks' size and bank activities, as of 1.01.2016**

**Figure 5.3 Belarusian banks' size and bank activities, as of 1.01.2016**

## **APPENDIX B Development of EAEU bank business models over time**

### **B.1 Investment models from asset composition**

Bank investment strategy is represented by three groups of variables. The first group is the ratio of liquid assets to total assets. Liquid assets consists of cash and cash equivalents, deposits at the Central bank, deposits in banks and marketable securities. The second group includes the ratio of loans to total assets and lending growth. It captures aggressiveness of bank lending that may impact on loan quality. Slowdown in traditional lending may be a result of banks' engagement in non-traditional types of activities and/or adverse external environment. The third group of variables includes the ratio of total securities (held-to-maturity and available-for-sale securities) to total assets and its growth. It directly measures banks' investments in securities business. Figures 5.4, 5.5 and 5.6 present the composition of total assets (Panel A) and growth rates of assets, loans and securities (Panel B) of Russian, Kazakhstan and Belarusian banks during 2007 – 2016.

Figure 5.4 shows that Russian banks' lending activities accounted for more than 71.0% of total assets except for the year 2011 when lending share fell to 69.0% total assets. Both asset and lending growth rates are closely correspond to each other implying that lending growth is a good proxy of overall bank growth. Indeed, lending and asset growth rates' geometric means are very similar and equal to 28.9% and 29.1% respectively. The share of securities grew from 5.3% in 2007 to 13.3% in 2011, then slightly fell down to 10.5% in 2014 and rose again to 13.4% by 2016. The geometric mean of securities growth is 34.7%. However, the pick of growth in securities reached 135.7% in 2009. During consequent years, the growth in securities slowed down. The share of liquid assets in Russian banks declined and reached the minimum level of 10.5% by 2016.

Figure 5.5 shows that Kazakhstani banks have relatively small share of loans in the total asset structure compared to Russian banks. The lending ratio fell from 73.3% in 2008 to 60.4% in 2011. The slight improvement in the ratio during 2012-2014 followed by decline to 59.7% in 2015. Prior to 2008, Kazakhstani banks attempted aggressive investment strategy as the lending and securities' growth rates were 107.2% and 105.7%

respectively. In fact, the loan portfolio of Kazakhstani banks shrunk by 20.7% during three years of negative growth. The share of securities from total assets increased from 2.6% in 2007 to 13.9% in 2015 and then fell to 3.1% in 2016. Securities' growth exhibits significant fluctuation over time compared to more stable lending. Geometric means of growth rates for assets, loans and securities are 17.9%, 17.7% and 23.6% respectively over the period of study. Kazakhstani banks also maintained quite sufficient level of liquid assets that reached 25.4% by 2016.

Figure 5.6 shows that loan portfolio of Belarusian banks increased from 71.6% in 2007 to 78.3% in 2010, and then fell to 58.5% of total assets in 2012. The consequent recovery during 2013 – 2015 was not sustainable as the ratio declined again to 61.1%. Investments in securities historically accounted for a small portion of total assets. The ratio decreased from 8.9% in 2007 to 3.7% in 2011, and then gradually rose to 18.6% by 2016. The growth rates of loans and securities were positive, except for the year 2010 when securities portfolio shrunk by 21.1%. In 2012, the growth in securities picked at 235.4%, which contributed to asset growth of 102.3% in that year. The geometric means for growth rates were 40.6%, 39.9% and 49.5% for assets, loans and securities respectively.

**Figure 5.4 Asset composition and growth rates of Russian banks, 2007-2016**

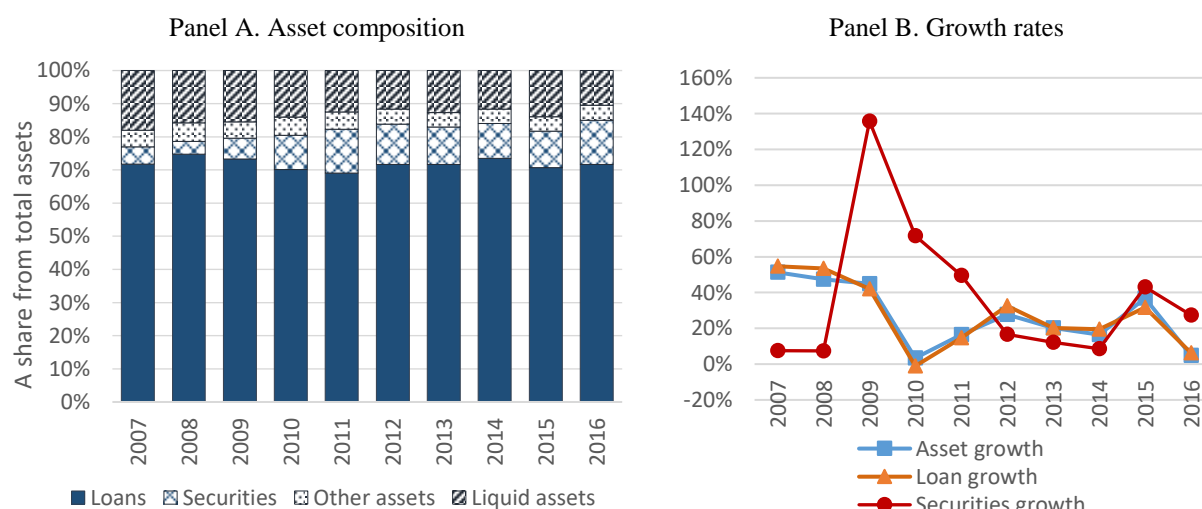


Figure shows the asset composition and percentage growth rates in assets, loans and securities of Russian banks during 2007-2016. Data are as of 1 January of a given year.

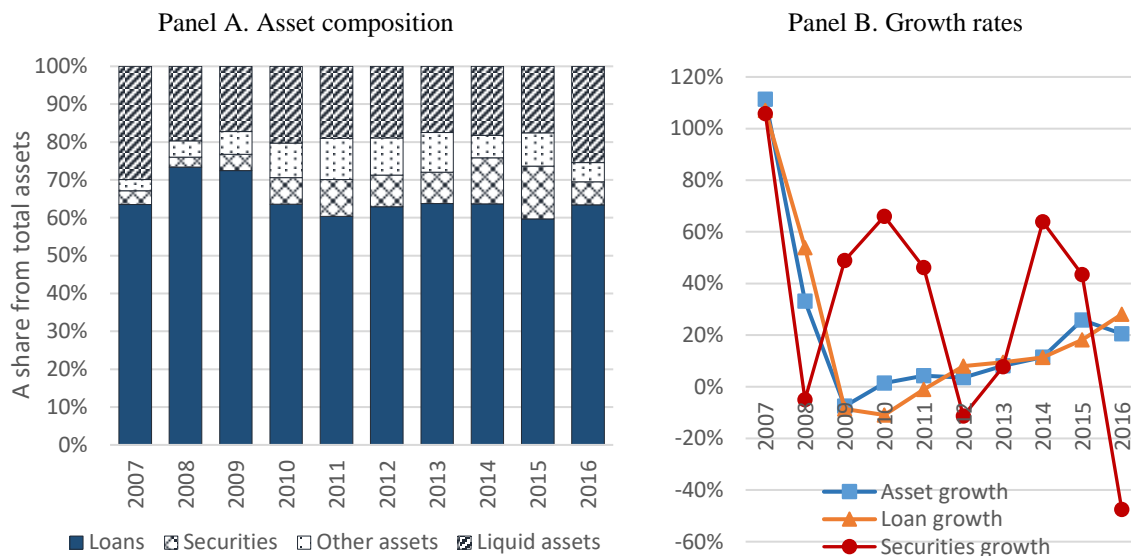
**Figure 5.5 Asset composition and growth rates of Kazakhstani banks, 2007-2016**

Figure shows the asset composition and percentage growth rates in assets, loans and securities' investments of Kazakhstani banks during 2007-2016. Data are as of 1 January of a given year.

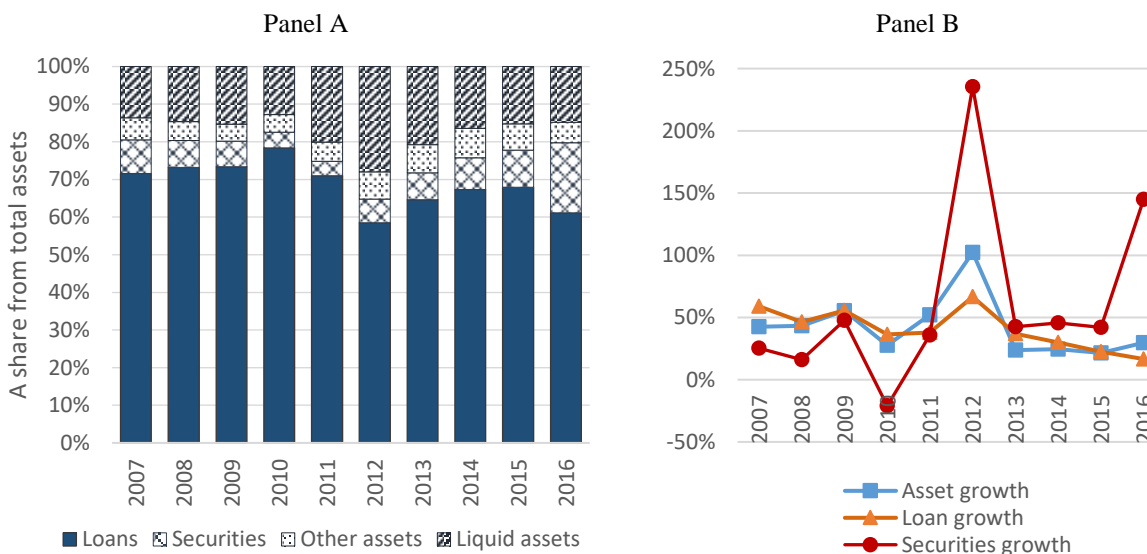
**Figure 5.6 Asset composition and growth rates of Belarusian banks, 2007-2016**

Figure shows the asset composition and percentage growth rates in assets, loans and securities' investments of Belarusian banks during 2007-2016. Data are as of 1 January of a given year.



## B.2 Funding models from liabilities and equity composition

Bank funding strategies are measured by four variables presented as ratios out of total assets. Deposits include all customer deposits and represent the core source of financing. Short-term market borrowing consists of short-term wholesale market and interbank funding. Wholesale interbank loan market is traditionally used to offset banks' short-term needs for funds. In contrast to customers' deposits, they are highly sensitive to adverse market conditions and their cost may rise tremendously during times of liquidity squeeze. Long-term borrowing is represented by bonds and subordinated bonds. Shareholders equity is perpetual and the most stable type of financing. Figures 5.7, 5.8 and 5.9 portray the funding composition of EAEU banks (Panel A) and growth rates in each source of financing (Panel B) during 2007-2016 periods.

Figure 5.7 shows that deposit share fell from 65.1% to 53.8% of total assets during the crisis period 2007 – 2009. Post-crisis improvement in deposit base to 66.5% in 2012 declined to 58.4% in 2016. Among the possible reasons of decrease in deposits are adverse regional macroeconomic environment and imposed Western sanctions on Russian banks that undermined the confidence of bank clients. The reliance on short-term borrowing also declined from 15.6% in 2008 to 8.7% in 2016, whereas long-term borrowing historically represented only small share, around 3% - 5% of total assets. The growth rates in all sources of financing slowed down since 2008 and even turned to negative for total borrowing in 2016. Shareholders' equity increased from 10.6% in 2007 to 12.5% in 2011, and then fell down to the minimum level of 8.8% of total assets. The geometric growth rates were 26.4%, 20.7%, 16.4% and 23.6% in deposit, short-term borrowing, long-term borrowing and equity financing of Russian banks respectively.

Figure 5.8 decomposes the funding structure of Kazakhstani banks. Among three countries, Kazakhstani banks had the lowest level of deposits prior to the crisis (38.9% in 2007 and 27.8% in 2008) and the highest reliance on short-term and long-term borrowing that were accounted for 30.7% and 18.7% of total assets respectively in 2007. Deposit base increased to 68.7% by 2016. At the same time short-term borrowing fell to 5.4% and long-term borrowing decreased to 12.5% by 2016. Equity financing represents the

smallest share of the total funding structure and indicates the crisis of bank capital in 2010 when equity shrunk by 54.7% (see Panel B). The growth in equity by 113.9% was associated with strong Kazakhstani government support of distressed banks. Geometric means of growth rates in deposits, short-term and long-term borrowing, and equity were 28.2%, 2.8%, 13.7% and 21.6% respectively over the period of study.

Figure 5.9 depicts that the deposit base of Belarusian banks decreased from 61.3% in 2007 to its lowest level of 46.9% in 2011, then followed by increase up to 58.4% of total assets by 2016. Short-term borrowing experienced significant increase from 11.5% in 2007 to 20.8% in 2016. The share of long-term borrowing was less than 1% before the crisis, gradually rose to 9.7% by 2012 and then fell to 4.5% of total assets by 2016. Equity to total assets ratio of Belarusian bank dramatically declined from 18.2% in 2007 to 12.7% in 2016. Indeed, Panel B shows that only equity financing reported negative growth rates. Geometric average of deposit, short-term and long-term borrowing and equity growth were 39.9%, 55.0%, 63.7% and (-4.0%) respectively.

**Figure 5.7 Funding composition and growth of Russian banks, 2007-2016**

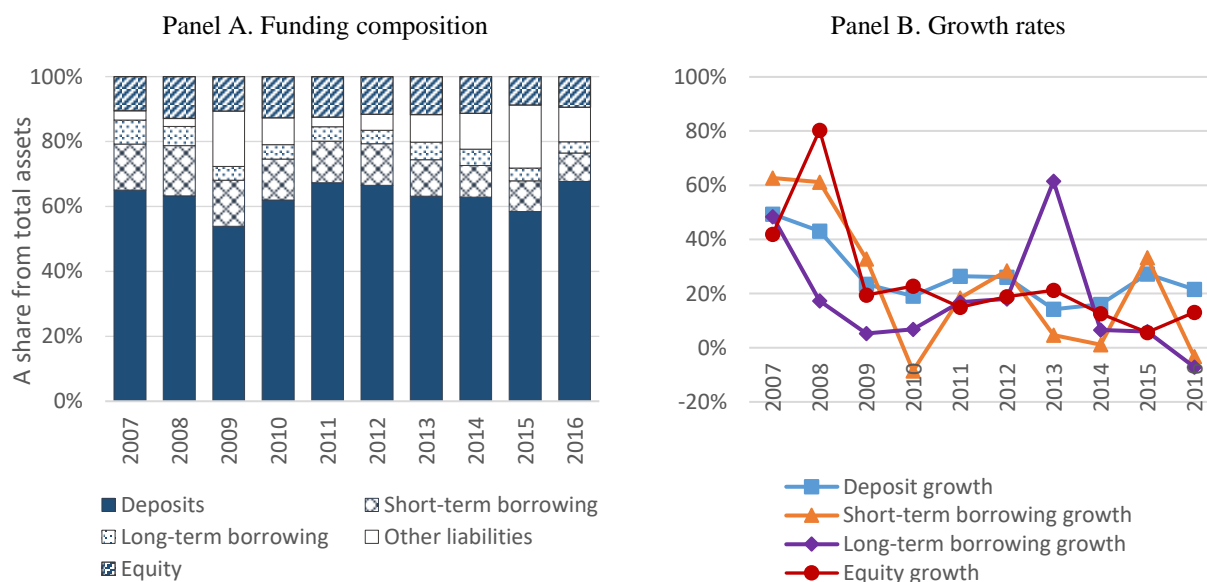


Figure shows the funding composition and growth rates in deposits, short-term borrowing, long-term borrowing and equity of Russian banks during 2007-2016. Data are as of 1 January of a given year.

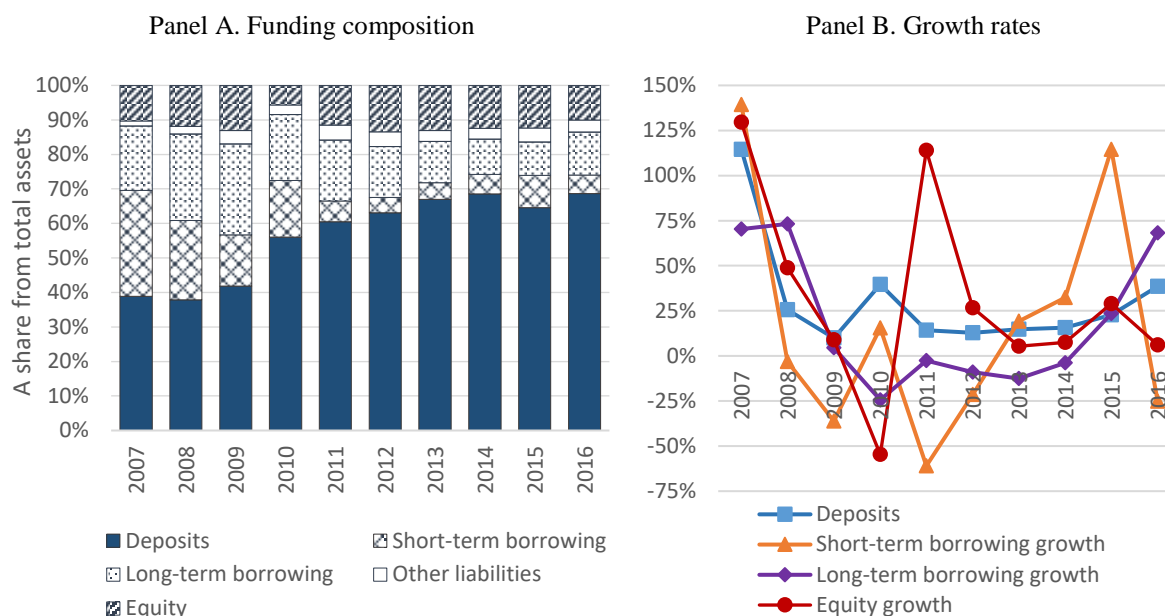
**Figure 5.8 Funding composition and growth of Kazakhstani banks, 2007-2016**

Figure shows the funding composition and growth rates in deposits, short-term borrowing, long-term borrowing and equity of Kazakhstani banks during 2007-2016. Data are as of 1 January of a given year.

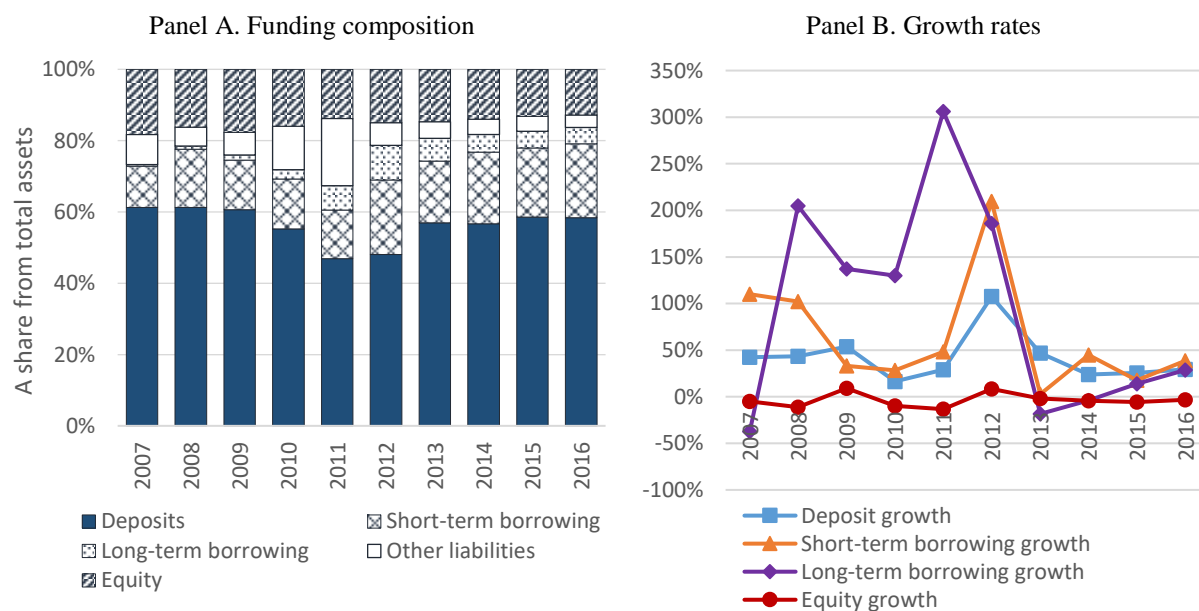
**Figure 5.9 Funding composition and growth of Belarusian banks, 2007-2016**

Figure shows the funding composition and growth rates in deposits, short-term borrowing, long-term borrowing and equity of Belarusian banks during 2007-2016. Data are as of 1 January of a given year.

### **B.3 Business models from income composition**

Some types of bank activities could not be captured directly from the balance sheet. For example, banks earn fee and commission income from credit cards' servicing, securitization, financial guarantees, hedging activities etc. They also generate gains/losses from trading. Analysis of bank revenue shows the degree of engagement in those activities. We consider three variables. The first variable is the ratio of interest income to total operating revenue. Interest income represents total revenue from interest - earning assets. The second variable is the ratio of fee and commission income to total operating revenue. The third variable aggregates the rest types of revenue received in the form of dividends, fines, gains from securities and foreign exchange trading.

Figure 5.10 shows that Russian banks earn significant amount of revenue from lending activities. The share of interest income increased from 69.0% in 2007 to 78.6% in 2011. Then it gradually declined to 67.9% of operating revenue in 2015 followed by improvement to 73.8 in 2016. The share of fee income decreased from 20.2% in 2007 to 8.6% in 2010 and then rose to 11.6% by 2013. Consequently, it fell again to 9.3% of total operating revenue by 2016. The increase in other income (to 18.6% of total operating revenue) in 2009 was achieved by profitable foreign exchange trading, whereas sizable growth in other income revenue (188.1% growth rate) in 2015 was associated with gain in securities trading. Geometric means of interest, fee and other incomes' growth rates were 27.3, 19.3% and 30.8% respectively for the entire estimated period.

Figure 5.11 provides evidence that interest income of Kazakhstani banks dramatically decreased from 86.4% in 2009 to 53.8% in 2016. It was mainly associated with shrink of the loan portfolio due to low credit supply and high credit losses. Interest revenue exhibited even greater negative growth during 2010 – 2012. At the same time, fee and commission income increased from the lowest level 8.6% in 2009 to its highest share 18.0% of total operating revenue in 2014. Then the ratio fell to 10.9% in 2016. Other income did not represent significant share except for year 2016 when it accounted for 35.3% of total operating revenue. The trend was associated with sizable gain from

securities trading. Geometric means of interest, fee and other income growth rates were 16.0%, 17.6% and 44.3% respectively during the period 2007 - 2016.

Figure 5.12 indicates that Belarusian banks had the lowest share of interest income out of total operating revenue (62.5% in 2007 and 58.2% in 2012) compared to Russian and Kazakhstani banks. Overall, the interest revenue improved and reached 78.7% in 2011 and then gradually fell to 70.2% by 2016. Fee and commission revenue compensated the low interest income share as it accounted for 26.3% of total revenue in 2007. Consequently, fee revenue declined to 10.4% by 2012. Other income of Belarusian banks reached its pick of 25.6% of total operating revenue in 2012. The effect was associated with huge gain from derivatives position in that year. Positive growth for both interest and fee incomes reached their pick in 2012 with 119.6% and 83.7% respectively. The other income reported 548.1% growth rate in the same year. The geometric average of interest, fee and other income of Belarusian banks were 46.4%, 33.1% and 47.8% respectively during 2007 - 2016.

**Figure 5.10 Revenue composition and growth of Russian banks, 2007-2016**

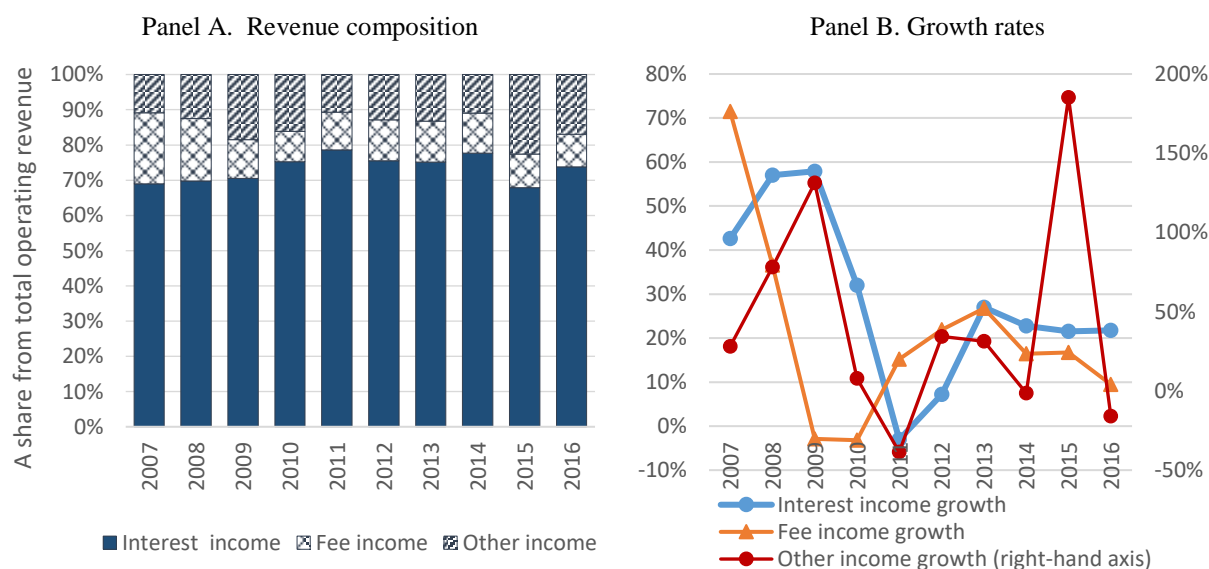


Figure shows the composition of total operating revenue and growth rates in interest, fee and other income of Russian banks during 2007-2016. Other income is scaled on the right-hand secondary axis. Data are as of 1 January of a given year.

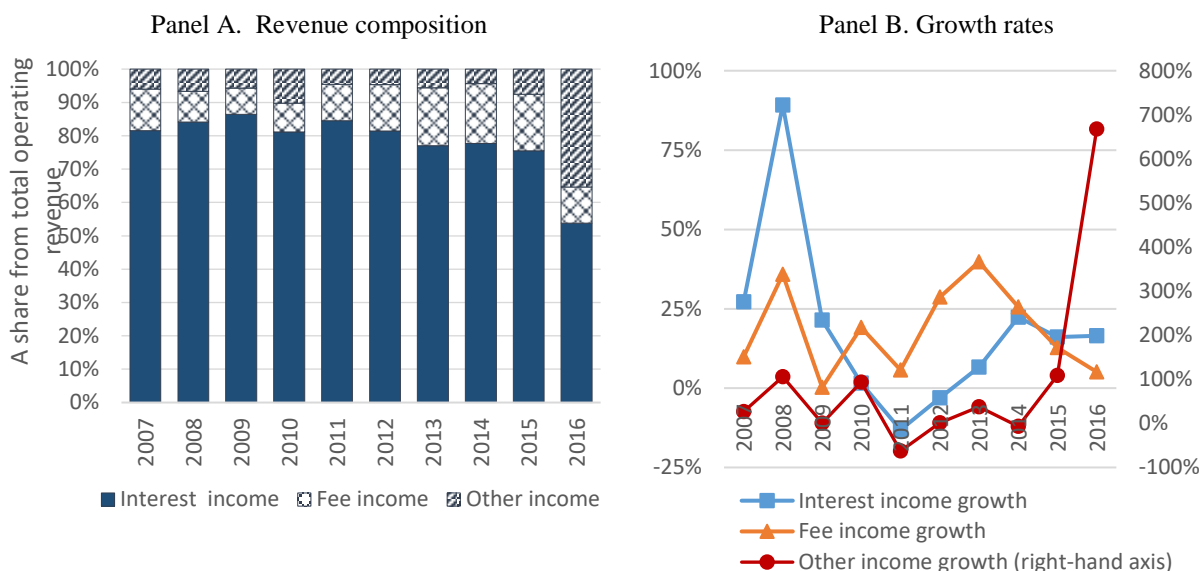
**Figure 5.11 Revenue composition and growth rates of Kazakhstani banks, 2007-2016**

Figure shows the composition of total operating revenue and growth rates in interest, fee and other income of Kazakhstani banks during 2007-2016. Other income is scaled on the right-hand secondary axis. Data are as of 1 January of a given year.

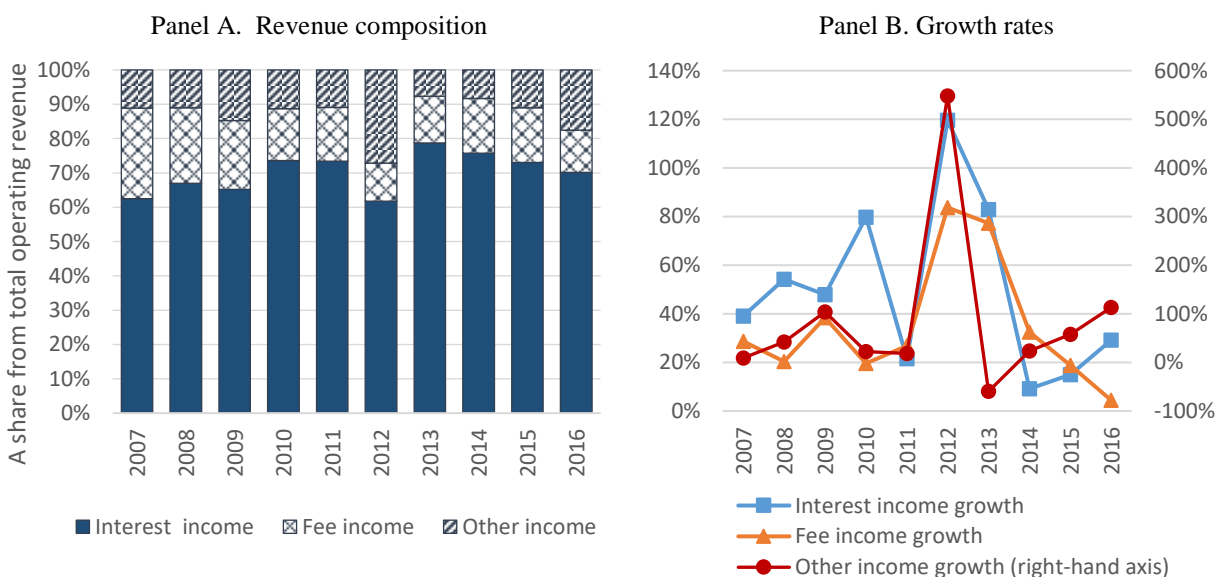
**Figure 5.12 Revenue composition and growth of Belarusian banks, 2007-2016**

Figure shows the composition of total operating revenue and growth rates in interest, fee and other income of Belarusian banks during 2007-2016. Other income is scaled on the right-hand secondary axis. Data are as of 1 January of a given year.

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