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LIQUIDITY-PROFITABILITY DYNAMICS: IS THE BANKING INDUSTRY RESILIENT IN TIMES OF CRISIS?

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Abstract. *The banking industry contributes to the economic expansion since it is considered the keeper and supplier of liquid capital, essential for all commercial and industrial activity. The primary goal of commercial banks is to generate profits while serving clients and maintaining liquidity positions. Hence, this study aims to examine and evaluate the relationship between liquidity (measured through the Liquid assets and Liquid assets to short-term liabilities ratio) and profitability (measured through ROA and ROE) position of the commercial banking system in North Macedonia and Serbia in order to determine whether changes in liquidity levels influence profitability. Since the ten-year examination period (2012-2021) includes the emergence of the Coronavirus global health pandemic, additional tests were conducted to find out whether the sanitary crisis caused changes in the liquidity-profitability dynamics.*
By employing descriptive, correlation and regression analysis, and observing two sub-periods (2010-2019 vs 2020-2021), we infer changes in the liquidity-profitability positions in times of crisis in both countries. These findings reinvigorate the knowledge on liquidity and profitability performance in times of instability as this is a pioneer study in evaluating the pandemic impact on liquidity and performance using empirics in these two markets. Furthermore, by scrutinizing the interrelationship between liquidity and profitability, the findings reveal that associations are time-dependent, with policy implications for banks and financial industry regulators.

Key words: *Liquidity, Profitability, the banking sector of the Republic of North Macedonia, the banking sector of the Republic of Serbia.*

JEL Classification: G01, G21, G28, M4

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1. INTRODUCTION

The banking institution increases the overall financial system's efficiency by offering a useful institutional framework for mobilizing resources and directing them from less productive applications to more profitable projects (Wilner, 2000). Therefore, in order to properly facilitate financial transactions, bank management must pay deliberate attention to both profitability and liquidity, which are their competing objectives. These objectives are similar; a bank's efforts to increase profitability will undoubtedly lower its liquidity and solvency positions, and vice versa.

The ability to manage a trade-off between them is of great importance to financial managers since maintaining a firm's liquidity and its capacity to make profits are key factors that support both growth and survival of an organization (Kimondo, 2014). Profitability and liquidity are powerful tools that are beneficial for effective and efficient financial intermediation as the two variables indicate the sector's health. Liquidity measures a bank's capacity to respond to withdrawal demands from depositors and loan requests from borrowers as well as to fulfill other obligations whereas profitability reveals the bank's intention to earn profit through successful operations. In order to ensure long-term survival and healthy growth, profitability and liquidity should coexist in all business enterprises (Ahmad, 2016).

Practically speaking, profitability and liquidity are strong indicators of the performance and health of all profit-oriented ventures here including commercial banks (Eljelly, 2004). Liquidity management and economic management, the other key component of monetary policy, are both necessary for its implementation. Economic management entails promoting long-term sustainable economic growth by coordinating monetary and credit expansion with an economy's noninflationary output potential.

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Researchers from both established and developing nations have produced novel findings in the discussion of liquidity management and profitability levels in the banking sector. Owing to the aforementioned, the current study uses bank-specific financial variables as proxies for the banking sector's liquidity and profitability to determine whether liquidity has an impact on banks' profitability in North Macedonia and Serbia as neighboring countries and significant trading partners.

Liquidity played a key role in the 2008–2009 financial crises (Bordeleau and Graham, 2010). Holding liquid assets like cash and government securities comes at a cost given the low return. Without regulation, it is realistic to anticipate that banks will maintain liquid assets to the degree that doing so increases their profitability. Hence, while managing their portfolios, commercial banks have two main competing objectives: maintaining a supply of liquid assets in case their cash is put under strain and the need to achieve higher returns on their assets in order to be able to maximize their profits. Acknowledging the significance of maintaining a liquidity-profitability balance, especially in the banking sector, this study seeks to answer the following research questions by inspecting a ten-year period (2012-2021) of banks' financial data:

1. What is the relationship between the liquidity and profitability of Macedonian and Serbian commercial banks?

2. How did the Corona crisis influence the Macedonian and Serbian banking sectors' liquidity and profitability?

To the authors' knowledge, the current study differs from other related researches as it assesses the liquidity-profitability dynamics of two neighboring banking systems, clearly suggesting that the associations are time-varying.

This article contains five sections. Following the introduction, the second section explains the concepts of liquidity and profitability, their significance and importance for the banking sector as well as the liquidity-profitability trade-off through a review of the literature for the subject matter concerned. Section three focuses on a short introduction to both banking sectors and proceeds to describe the research design and variables, population and sampling procedure, and data analysis procedures. The fourth section presents the findings, and the last section provides an overview of the research and concludes the work.

2. LITERATURE REVIEW

2.1. The concept of liquidity

The Basel Committee on Banking Supervision (BCBS) defines liquidity in the banking system as the ability of a bank to have available cash or to readily find cash in order to meet its obligations when they come due, without incurring any unexpected losses (BCBS, 2008). Liquidity is a measurement of the proportion of assets (in cash or that can be promptly converted into cash without losing value) that are accessible to pay short-term obligations. In times of economic crisis, liquid assets are among the most crucial tools for safeguarding banks' reputations. One of the most delicate factors of trust in banks is the capacity to fulfill debts as they become due. Roy et al. (2019) define bank liquidity as the assurance banks have on ensuring that they can invest in assets while covering all their required commitments at the right time and at rational spending levels. Liquidity is the ability of banks to ensure that account holders may easily access their funds at any moment and the guarantee banks give to ensure that all necessary financial commitments can be met through owning a high proportion of liquid assets (Alali, 2019). However, a successful business is not always liquid, and liquidity does not necessarily guarantee profitability.

According to Basel Council on Banking Supervision, several banks struggled to maintain adequate liquidity throughout the global financial crisis (BCBS, 2009). Central banks had to offer unprecedented liquidity support in order to support the financial system. Despite receiving such a significant amount of assistance, a number of banks failed - were forced into mergers, or needed resolution. The crisis drastically altered market conditions, demonstrating the significance of appropriate measurement and management of liquidity risk. The sudden shift in the market's dynamics demonstrated how quickly liquidity can disappear and how long it can take for it to reappear. Although the majority of banks entered the financial crisis of 2007–2009 with favorable capital ratios, liquidity issues sparked and ultimately caused their failure (Avramova and Lesle, 2012).

The importance of liquidity extends beyond a single bank since issues with liquidity at one bank can quickly spread to others. According to this perspective, Gomes and

Wilkins (2013) underline that imprudent liquidity management can result in major issues for specific banks that may eventually spread to systemic issues that result in the collapse of financial intermediation. Lehman Brothers' infamous collapse in September 2008, which dragged other financial firms into a severe liquidity crisis, amply illustrated how infectious illiquidity is.

The Basel Committee on Banking Supervision released two new liquidity requirements, the liquidity coverage ratio (LCR) and net stable coverage ratio (NSFR), in December 2010 to strengthen each bank's reliance on liquidity shocks coming from either the financial sector or the real economy. The LCR mandates that banks have a sizeable inventory of unencumbered, high-quality liquid assets. This safety net is designed to increase banks' ability to withstand a severe liquidity crisis that lasts for 30 calendar days. On the other hand, the NSFR mandates that banks provide finances through reliable funding sources. In order to ensure funding resilience over a longer time horizon, the NSFR objective complements the LCR by requiring banks to fund long-term assets with long-term liabilities, thereby limiting the degree of maturity mismatch. The NSFR specifically mandates that banks' available stable funding over a one-year horizon be at least equal to their required stable funding over the same horizon. The NSFR discourages a disproportionate reliance on short-term wholesale funding, supports a more accurate evaluation of funding risk for all things on and off the balance sheet and fosters funding stability.

Although stricter liquidity rules are important for the banking industry, it should be highlighted that they may have an impact on the performance and stability of banks (Demirguc-Kunt and Levine, 2008). According to Hartlage (2012), the LCR and the NSFR tend to undermine the role of liquidity regulation and have a negative impact on both the banking sector and the economy. In other words, because of the implementation of these rules, this additional safety measure could cost banks more money and cause more difficulties (Shi, 2018). Banerjee and Mio (2018) pointed out that because the LCR must hold a significant amount of high-quality liquid assets, banks' profitability is likely to suffer due to low-yield earnings. Also, in accordance with the NSFR's guidelines, banks may reduce their lending, which could have an adverse effect on their loan profits, a crucial source of income for banks (King, 2013).

Both Republic of N. Macedonia and the Republic of Serbia began with the implementation of the Basel 3 liquidity regulative at end of 2016. Consequently, due to data unavailability for the entire ten-year period of analysis, the LCR and the NSFR have been excluded as possible indicators for measuring the liquidity of the banking systems subjects of examination in this study.

2.2. The concept of profitability

A bank's profitability is defined as the difference between the profit from its assets and the cost of its liabilities. According to the literature, both micro and macro drivers affect bank profitability. The accounts on the balance sheet and income statement are considered micro or bank-specific variables. Despite being unrelated to the banks' internal operations, these variables significantly impact profitability (Vodova, 2016).

Bank performance has traditionally been evaluated using accounting techniques that are primarily centered on the use of financial ratios. The main objective of financial analysis is to gain an understanding of a bank's financial situation; the balance and development of its assets, liabilities, off-balance-sheet receivables, expenditures and revenues. Many indicators

are utilized in the analysis and evaluation of a bank's financial position. They are either organized into a tree of indicators starting from the viewpoint of one fundamental criterion (profitability) or from several fundamental aspects. The simplicity of the process and the ability to draw a firm conclusion are benefits of analysis and evaluation from the perspective of a single criterion. Its flaw, however, is that it only prioritizes profitability and ignores other aspects of a bank's operations that are crucial from the perspective of prudent conduct principles.

2.3. Liquidity-profitability trade-off

Numerous studies have focused on the connection between the functions of liquidity and profitability in the banking industry. However, there has been a lack of agreement so far and the actual data are conflicting. Increased liquidity holdings may be detrimental to financial development, according to one set of researchers (Arif & Nauman Anees, 2012; Chen et al., 2018, Nguyen et al., 2017). This is because banks with significant liquidity risk frequently lack reliable and accessible funding and may be compelled to borrow from the capital markets at a higher interest rate. According to a second group of academics, lower returns from liquid assets offset higher liquidity risk (i.e. a larger fraction of illiquidity), which they claim has the reverse impact (Trujillo-Ponce, 2013). Indeed, a number of academics have noted that the banks' opportunity cost is increased by the regulatory authorities' requirement for those liquidity holdings (Molyneux & Thornton, 1992).

Nonetheless, in times of instability, profitability can be endangered, as was the case of Nordic banks during the Covid lockdown (Sayegh and Afentaous, 2021). There is also an elevated risk of deposit withdrawals and non-performing loans, which can deteriorate bank performance (Danisman et al., 2021; Goodell, 2020). Monetary measures, liquidity support and borrower support action can ease the adverse crisis influence and are highly dependent on policy decisions (Demirgüç-Kunt et al., 2021). Hence, the relationship can be time- and market condition-varying.

Furthermore, according to Bordeleau and Graham (2010), the link between liquid assets and bank profitability may not be linear. According to academics, there appears to be a trade-off between short-term profitability gains from holding less liquidity and long-term performance advantages from insurance against liquidity shocks. Ehiedu (2014), highlights the significance of striking a balance between profit maximization and adequate liquidity reserves. Additionally, Olagunju et al. (2011) contend that both excess liquidity and illiquidity are harmful to the profits of any bank: chasing high profitability without taking liquidity level into consideration might result in significant illiquidity, which may reduce client loyalty. On the other hand, unnecessarily excessive liquidity can reduce bank profitability.

A suitable theoretical model appears to be far from being constructed, despite numerous studies about the relationship between bank profitability and liquidity. Appendix 2 summarizes the contradictory empirical findings on the effect of liquidity on bank profitability from previous studies.

2.4. Research hypotheses

Taking into consideration the research questions and objectives and the limited but also very different outcomes of existing studies, as a subject of testing in the empirical part of this study we will form the following hypotheses:

Hypothesis 1: There is an association between the liquidity and profitability of the banks in the Republic of North Macedonia
Hypothesis 2: There is an association between the liquidity and profitability of the banks in the Republic of Serbia
Hypothesis 3: The Corona crisis caused changes to the liquidity-profitability relationship of the banks in the Republic of North Macedonia
Hypothesis 4: The Corona crisis caused changes to the liquidity-profitability relationship of the banks in the Republic of Serbia

3. DATA AND METHODOLOGY

This research relies on quantitative analysis of financial information on commercial banks in North Macedonia and Serbia gathered from their publically available audited financial statements.

3.1. The commercial banking sector of the Republic of North Macedonia and the Republic of Serbia

Banking sector of the Republic of North Macedonia

The Law on Banks, which was adopted in 2007, brought about the most significant improvements to the legal system and greatly enhanced the standard of banking regulation and supervision in the Republic of Macedonia. The European Directives 2006/48 on the formation and operation of credit institutions and 2006/49 on the capital adequacy of investment businesses and credit institutions served as the foundation for this regulation. The most notable changes brought about by this law included: stronger corporate governance for banks - setting the groundwork for the adoption of the New Basel Capital Accord (BASEL II); strengthening and improving banks' risk management systems (particularly for credit, liquidity, currency, market and information technology risks); harmonizing accounting standards and regulations for banks with International Accounting Standards and International Financial Reporting Standards. The maintenance of a high level of concentration in the banking system strengthened the dominance of the big banks. In parallel with this, the market share of banks owned by foreign investors increased.

The banking industry, along with the Macedonian economy as a whole is inherently susceptible to changes in the global environment because of the country's small size and open economy (Donev, 2021). The negative consequences of the 2008 global financial and economic crisis have caused the degree of financial intermediation provided by the banking system to stagnate. The decreased bank activity in 2009 and the declining portfolio quality were to blame for the banks' profits being cut in half.

North Macedonia's banking system has significantly improved over the past few years. However, is still quite conservative and primarily provides only typical banking services (Donev, 2021). The report by the National Bank of the Republic of North Macedonia (NBRM, 2022) reveals that in 2021, the banking system, although continuing to operate under pandemic conditions, maintained its stability despite the threat associated with the interruption of global supply chains, rising oil costs, and increasing inflation in the second half of the year, realizing strong growth rates of credit and deposit activity.

Until 2019, 15 banks were in operation out of which 11 were with dominant foreign ownership and 4 were domestically owned. A decision to revoke the license of Eurostandard

Bank AD Skopje (NBRM, 2021), a subsidiary of the Swiss firm "Gofi-Group of Finance," was made by the Governor of the National Bank on the 12th of August that year, bringing the number of banks down to 14. A status change that happened earlier in the year, (permission for the merger of "Ohridska Banka" AD Skopje into "Sparkasse Banka Makedonija" AD Skopje granted by the governor on May 21, 2021) led to a further decrease in the number of banks in 2021 (from 14 to 13). The percentage of banks with significant foreign ownership in the total assets of the banking sector has remained constant, oscillating around 71 percent, peaking in 2020 (71.9 percent). On theother hand, the domestically owned banks gradually decreased their participation, reaching their lowest level (28.1 percent) in 2019.

Banking sector of the Republic of Serbia

Serbia's banking sector began the transition process back in 2000, as the latest among the nations of Central and Eastern Europe. Following a decade of severe political and economic crises, the starting point for banks was highly unstable. Several significant issues contributed to the banking industry's situation: the total obligations to international creditors, including the EBRD, IFC, and the London and Paris Club of Creditors, were assessed to an amount of USD 3.4 billion; debts to citizens relating to non-operating foreign currency deposits were estimated total USD 3.3 billion; the losses due to hyperinflation in the period 1992–1941 totaling USD 8–10 billion and the very precarious situation of the Central Bank in respect to governmental authorities (Filipović and Hadžić, 2012).

The privatization process was necessary for the banking industry to become more efficient and integrated into the European banking system. Before the transition, the Serbian banks' ownership structure was diversified. By total assets, 65 percent of banks were state-owned, 21 percent were owned privately and only 4 percent were foreign. Following the initial privatization wave, their ownership structure was fundamentally altered. At the end of 2007, international banks emerged as key participants accounting for 76 percent of total assets, compared to 16 percent for state banks and 9 percent of domestic private banks. In contrast to other transitional economies, the number of banks was significantly declining - from 108 to only 35 at the end of 2007 (Filipović and Hadžić, 2012). As of 2021, 23 banks remained in operation (NBS, 2022).

In late 2008, the global financial crisis (GFC) began to influence the domestic economy. However, Serbian banks were not directly affected because they had substantial reserves, a favorable financial structure, a far greater capital adequacy ratio than in the region (including developed countries) and a third of their assets in cash. When the GFC started affecting the Serbian economy, the government and central bank undertook some necessary but insufficient steps. The national banking industry had issues with reduced liquidity, scarce and expensive foreign sources for investments, worsened capital adequacy, and a greater share of non-performing loans in total loans, which had a significant negative impact on the country's economy. The impact of the global economic crisis was greater than anticipated, and the stand-by agreement with the IMF was necessary to safely overcome the crisis.

After the modest but encouraging recovery that took place at the end of 2009 and in the first half of 2010, there were warning signs of the so-called W-effect (or repeated recession), which started in the second quarter of 2011, primarily because of unfavorable development and fiscal policy issues in the US and the EU Southern Periphery. During 2011–2012, Serbian banks experienced stagnation (Filipović and Hadžić, 2012).

Thanks to sufficient capitalization, good liquidity and profitability throughout 2021, Serbia's banking sector, which makes up around 91 percent of the financial sector's assets, remained stable. The results of the macro-prudential stress tests showed that the banking industry was quite resilient to shocks of all intensities and capable of bearing the effects of any risks it might be subjected to (NBS, 2022).

3.2. Sample and variables

This study's population of interest was composed of all commercial banks in North Macedonia and Serbia between the years 2012 and 2021. For an individual bank to qualify it needed to have operated throughout the set period and have publically available audited financial statements, from which secondary data analysis can be performed. At the end of December 2021, there were a total of 36 (13 Macedonian and 23 Serbian) commercial banks in operation out of which 28 banks' (10 Macedonian and 18 Serbian) audited financial statements were available for data to be collected for analysis (list of banks in Appendix 1).

Traditionally, accounting methods primarily based on the usage of financial ratios have been employed for assessing bank performance (Kumbirai and Webb, 2010, pp.35). Ratio analysis in the banking sector is far more challenging and sophisticated than in the non-banking sector. "Complexity of the ratio analysis with banks is embedded in complexity of the banking business and its higher risk exposure in comparison with other economic subjects" (Vesic and Petronijevic, 2018, pp.148).

This study was constructed following the approach of Raykov (2017). To perform our ratio analysis, we will be using two independent variables (liquidity proxies) the "Liquid assets" and "Liquid assets to short-term liabilities" ratios and two dependent variables (profitability proxies) the "Return on assets" and "Return on equity" ratios. The relationships were analyzed using linear regression and Pearson correlation.

Independent variables (liquidity proxies)

Liquid assets ratio (LA): LA should be able to tell us how well a bank can handle widespread liquidity shocks. As a general rule, the higher the ratio, the higher the capacity to absorb liquidity shock. Yet, a very high value could also be seen as inefficient (Vodova, 2016).

$$Liquid\ assets\ ratio\ (LA) = \frac{Liquid\ Assets}{Total\ Assets} \times 100\% \quad (1)$$

Liquid assets to short-term liabilities ratio (LA-STL): This ratio is intended to measure the liquidity mismatch between assets and liabilities and show how well a bank can handle short-term cash withdrawals without running into liquidity issues. The capacity of banks to absorb liquidity shock increases as the value of this ratio rises (Vodova, 2016).

$$Liquid\ assets\ to\ short\text{-}term\ liabilities\ ratio\ (LA\text{-}STL) = \frac{Liquid\ Assets}{Short-term\ liabilities} \times 100\% \quad (2)$$

Dependent variables (profitability proxies)

Return on assets ratio (ROA): ROA shows how well a bank's management can capitalize on the value of its assets. Often regarded as the most important profitability metric, it measures how well bank management generates profit from the bank's actual investment resources. ROA values below 0.75 are regarded as weak, from 1-1.75 percent as very good, and those above 1.75 as exceptional (Vodova, 2016).

$$ROA = \frac{Net\ Profit\ After\ Tax}{Total\ Asset} \times 100\% \quad (3)$$

Return on equity ratio (ROE): ROE is another metric used to represent how well banks are performing. This ratio indicates the profitability of a financial institution or corporation by demonstrating the percentage of generated profit compared to the invested money that shareholders contributed (Kalanidis, 2016). Values between 15 and 20 percent are considered desirable.

$$ROE = \frac{Net\ Profit\ After\ Tax}{Shareholder's\ equity} \times 100\% \quad (4)$$

4. Results and Discussion

4.1. Descriptive statistics

Figure 1 summarizes the dynamics of the liquidity-profitability mean values for both markets over the observed ten-year period.

2020 stands out as the lowest LA ratio year in the Macedonian banking sector. The average level of liquidity in the Macedonian banking sector over the past ten years has been rather low, leaving the banks particularly vulnerable to the damaging effects of any possible liquidity crisis (Vodova, 2013). During the same timeframe, the highest average ROA values were recorded in 2018 and 2021, while the highest average ROE value was recorded in 2018. Since the average ROE levels lag the desired range of 15-20 percent, it seems that the banks were not very effectively utilizing their shareholders' equity which reflected in lower profit levels. In 2021 compared to 2020, the mean values of the profitability indices improved. These findings allow us to draw the conclusion that the COVID-19 pandemic years were the most profitable for the banking sector in North Macedonia.

2021 stands out as the lowest liquidity year in the Serbian banking sector, while the highest values are observed in 2015 and 2013. Similar to the Macedonian banking sector, the liquidity indicators' average values in this ten-year period have been relatively low. The lowest profitability averages were recorded in 2014, while the highest average values were recorded in 2017. The Serbian banking sector has generally been operating at a low return during the observed timeframe. The average banking sector's liquidity levels were at their lowest during the COVID-19 years, lower than they were for the 2012-2019 period and lower than they were for the entire 2012-2021 period. In contrast to how the liquidity ratios changed, the Serbian banks' average profitability peaked during the pandemic.

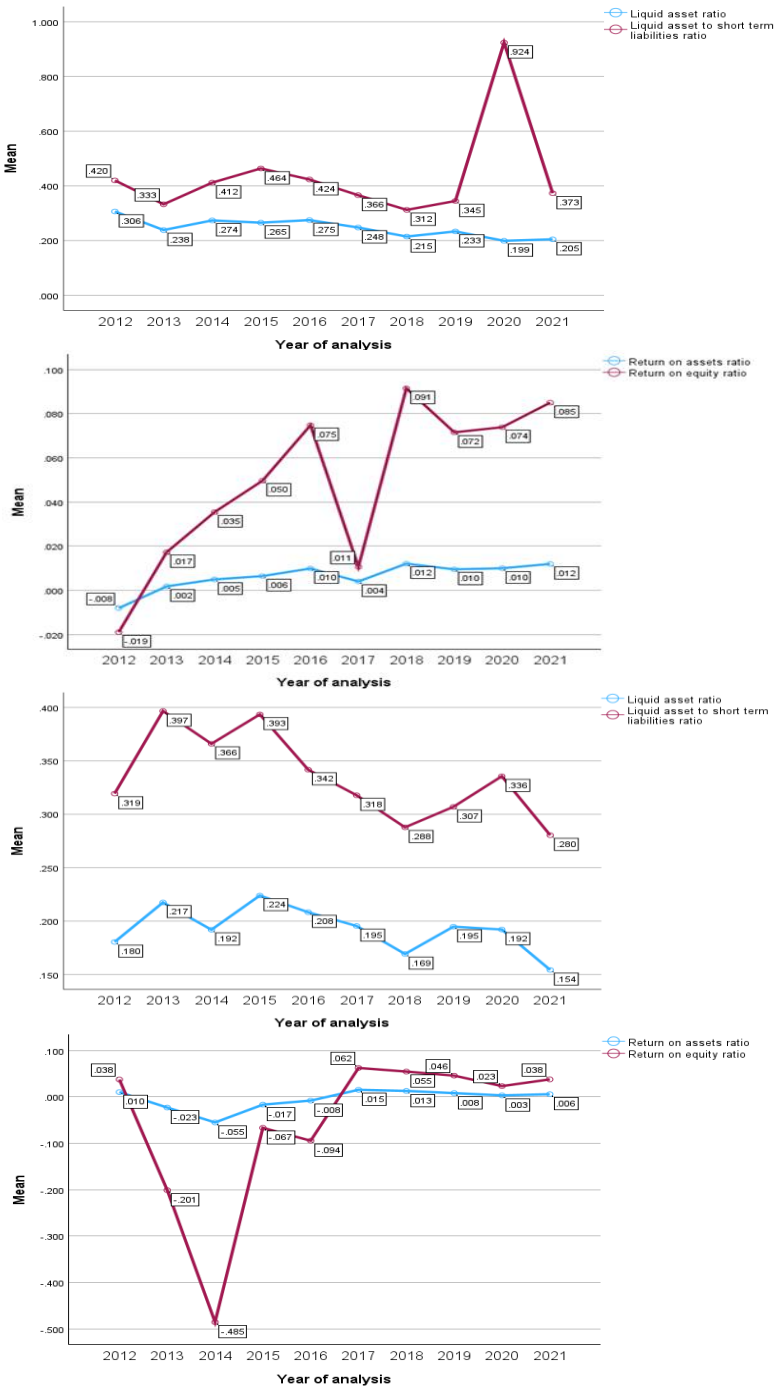

Fig. 1 Liquidity-profitability dynamics, North Macedonia and Serbia, 2012-2021
Source: Authors' calculation

4.2. Hypotheses testing

Hypothesis 1: There is an association between the liquidity and profitability of the banks in the Republic of North Macedonia

Table 1 Regression results for Hypothesis 1: liquidity and profitability of Macedonian banks (2012-2021)

Model 1: ROA/LA				**Model 2: ROA/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	0.004	0.015	0.762	LA-STL	-0.001	0.003	0.615
Constant	0.005	0.004	0.19	*Constant*	0.007	0.002	<.001
Model 1 tests				**Model 2 tests**			
Observations (N) = 100				Observations (N) = 100			
R2 = .001				R2 = .003			
Model 3: ROE/LA				**Model 4: ROE/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	0.057	0.099	0.569	LA-STL	-0.01	0.017	0.57
Constant	0.035	0.027	0.193	*Constant*	0.053	0.013	<.001
Model 3 tests				**Model 4 tests**			
Observations (N) = 100				Observations (N) = 100			
R2 = .003				R2 = .003			

All p-values are two-tailed.
The variables are defined in the Research methodology section.
Source: Authors' calculation in SPSS

Table 1 shows that the LA ratio is positively and insignificantly related to both ROA and ROE, whereas the LA-STL ratio is negatively and insignificantly related to both ROA and ROE. Due to the insignificance of the obtained positive and negative relationships, the liquidity-profitability correlation is statistically insignificant throughout the observed period, a conclusion that will be significantly altered upon inspection of the two sub-periods, thus emphasizing the time-dependence of the analysis.

Hypothesis 2: There is an association between the liquidity and profitability of the banks in the Republic of Serbia

Table 2 indicates that LA and LA-STL are negatively and significantly related to ROA at a 0.01 level, but negatively and insignificantly related to ROE. We cantherefore conclude that Hypothesis 2 can be accepted regarding ROA and rejected regarding ROE, although models' 3 and 4 significance levels do not stray far from p<.05. These results converge with Kalanidis (2016), Saif-Alyousfi et al. (2017), Raykov (2017), and Öndeş and Osman (2020).

Table 2 Regression results for Hypothesis 2: liquidity and profitability of Serbian banks (2012-2021)

Model 1: ROA/LA				**Model 2: ROA/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	-0.152	0.046	0.001	LA-STL	-0.081	0.025	0.001
Constant	0.025	0.011	0.02	*Constant*	0.023	0.01	0.025
Model 1 tests				**Model 2 tests**			
Observations (N) = 180				Observations (N) = 180			
R2 = .057				R2 = .057			
Model 3: ROE/LA				**Model 4: ROE/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	-0.782	0.422	0.066	LA-STL	-0.39	0.226	0.086
Constant	0.092	0.096	0.339	*Constant*	0.072	0.091	432
Model 3 tests				**Model 4 tests**			
Observations (N) = 180				Observations (N) = 180			
R2 = .019				R2 = .017			

All p-values are two-tailed.
The variables are defined in the Research methodology section.

Source: Authors' calculation in SPSS

Hypothesis 3: The Corona crisis caused changes to the liquidity-profitability relationship of the banks in the Republic of North Macedonia

The correlation and regression analysis results in Table 3 show that in the period 2020-2021, the average LA ratio's value decreased, whereas the average LA-STL ratio increased. Givent that the crisis triggered a global lack of fund availability, banks ensured liquidity by keeping high cash levels and, as a result, cash and balances with the central bank peaked in 2020.

Furthermore, the favorable movements in financial performance can be explained with the decrease in t*he ratio of non-performing loans (NPL) to total loans that started in 2016 and continued in the years that followed. In 2020 and 2021 the Macedonian banking sector noted its lowest NPL levels.* The National Bank's regulatory actions in the field of credit risk management, particularly the addition of the opportunity for temporarily delaying loan repayment owing to the Corona Crisis, had an impact on the lowering of non-performing loans in 2020 despite challenging working conditions brought on by the pandemic. Due to this action, the potential materialization of the credit risk in the bank portfolios was temporarily delayed (NBRM, 2021). This improvement was further made possible by the banks' increased efforts to collect "bad" loans and the faster credit growth, which occurred during a year in which there was a certain amount of materialization of the credit risk (the anticipated decline in the creditworthiness of some clients in 2021 primarily from the activities that were most affected by the sanitary crisis, especially with the expiration of the so-called COVID measures) (NBRM, 2022).

Table 3 Regression results: liquidity-profitability relationship of Macedonian banks (2012-2019 vs 2020-2021)

Liquidity-profitability, Macedonian banks (2012-2019)

Model 1: ROA/LA				**Model 2: ROA/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	0.005	0.017	0.759	LA-STL	-0.007	0.011	0.488
Constant	0.004	0.005	0.428	*Constant*	0.008	0.005	0.084
Model 1 tests				**Model 2 tests**			
Observations (N) = 80				Observations (N) = 80			
R2 = .001				R2 = .006			
Model 3: ROE/LA				**Model 4: ROE/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	0.054	0.115	0.636	LA-STL	-0.038	0.073	0.609
Constant	0.028	0.032	0.397	*Constant*	0.056	0.031	0.076
Model 3 tests				**Model 4 tests**			
Observations (N) = 80				Observations (N) = 80			
R2 = .003				R2 = .003			

Liquidity-profitability, Macedonian banks (2020-2021)

Model 1: ROA/LA				**Model 2: ROA/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	0.048	0.024	0.06	LA-STL	-0.002	0.001	0.27
Constant	0.001	0.005	0.796	*Constant*	0.012	0.002	<.001
Model 1 tests				**Model 2 tests**			
Observations (N) = 20				Observations (N) = 20			
R2 = .182				R2 = .067			
Model 3: ROE/LA				**Model 4: ROE/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	0.421	0.153	0.013	LA-STL	-0.013	0.009	0.195
Constant	-0.01	0.033	0.868	*Constant*	0.088	0.014	<.001
Model 3 tests				**Model 4 tests**			
Observations (N) = 20				Observations (N) = 20			
R2 = .296				R2 = .092			

All p-values are two-tailed.
The variables are defined in the Research methodology section.

Source: Authors' calculation in SPSS

Hence, both profitability indicators' mean values increased during the pandemic and a change in the relationship between ROE and LA is noted (from positive insignificant to positive significant at the 0.05 level). Given the outcome, there is enough evidence to accept Hypothesis 3. This outcome is in line with the Eurozone research conducted by Toutou and Xiaodong (2011) during the GFC, as well as with Yaacob et al. (2016) who indicated that raising Basel III liquidity ratios can have a favorable impact on the profitability attained by reducing liquidity shocks.

Hypothesis 4: The Corona crisis caused changes to the liquidity-profitability relationship of the banks in the Republic of Serbia

Table 4 Regression results: liquidity-profitability relationship of Serbian banks (2012-2019 vs 2020-2021)

Liquidity-profitability, Serbian banks (2012-2019)

Model 1: ROA/LA				**Model 2: ROA/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	-0.164	0.055	0.003	LA-STL	-0.092	0.03	0.003
Constant	0.026	0.013	0.048	*Constant*	0.025	0.012	0.05
Model 1 tests				**Model 2 tests**			
Observations (N) = 144				Observations (N) = 144			
R2 = .060				R2 = .061			
Model 3: ROE/LA				**Model 4: ROE/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	-0.833	0.5	0.098	LA-STL	-0.431	0.279	0.125
Constant	0.084	0.118	0.477	*Constant*	0.066	0.115	0.565
Model 3 tests				**Model 4 tests**			
Observations (N) = 144				Observations (N) = 144			
R2 = .019				R2 = .017			

Liquidity-profitability, Serbian banks (2020-2021)

Model 1: ROA/LA				**Model 2: ROA/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	-0.027	0.027	0.337	LA-STL	-0.026	0.01	0.019
Constant	0.009	0.005	0.090	*Constant*	0.013	0.004	0.003
Model 1 tests				**Model 2 tests**			
Observations (N) = 36				Observations (N) = 36			
R2 = .027				R2 = .152			
Model 3: ROE/LA				**Model 4: ROE/LA-STL**			
	B	S.E.	Sig.		B	S.E.	Sig.
LA	-0.121	0.149	0.422	LA-STL	-0.151	0.056	0.011
Constant	0.052	0.029	0.084	*Constant*	0.077	0.021	<.001
Model 3 tests				**Model 4 tests**			
Observations (N) = 36				Observations (N) = 36			
R2 = .019				R2 = .177			

All p-values are two-tailed.
The variables are defined in the Research methodology section.

Source: Authors' calculation in SPSS

During 2020-2021, both average LA and LA-STL ratio values declined and were at their lowest overall levels, whereas both profitability indicators average values depicted an increase. For Serbian banks, 2014 and 2015 were the years in which they registered the highest NPL levels. Sector-wise, the corporate sector (which includes public enterprises and companies) had a substantially higher share of NPLs than the household sector (consisting of natural persons, entrepreneurs, households, private households with employed persons and registered farmers). NPL levels became the key concern for the Serbian banking sector, as their high levels were creating danger of systemic risk.

Cleaning up the banking sector's balance sheet therefore became crucial to sustaining the lending cycle at lower interest rates and assisting the economy's return to faster growth rates. However, the evidence of banks' operational capabilities in the area of NPL management revealed that some banks were struggling with a lack of internal organization and analytic capacity, as well as a lack of clear processes and procedures for managing NPLs, which was essential for their efficient resolution.

The National Bank and the Government of the Republic of Serbia recognized the settlement of non-performing loans (NPLs) as a task of high significance that necessitates an all-encompassing strategy and participation of all pertinent parties. This strategy aimed to establish a system that would prevent the accumulation of non-performing loans to a level that could have a materially negative impact on credit activity and jeopardize potential economic growth. It also aimed to provide incentives and remove systemic barriers that hampered the timely resolution of NPLs. It was anticipated that implementing the Strategy's recommended actions would significantly lower NPL levels (Government of the Republic of Serbia, 2015). The positive results noted after the first year of the implementation continued in the same direction enabling the Serbian banking sector to mark 2020 and 2021 as the "best" or years with the lowest levels of non-performing loans. Following record low values of the share of NPLs in total loans in 2020, the coronavirus pandemic slowed the downward trend of this indicator relative to 2015, when the NPL Resolution Strategy was adopted (NBS, 2022).

Lastly, as can be inferred from Table 4, the relationships between the indicators changed; the LA ratio was negatively and insignificantly related to both ROA and ROE whereas the LA-STL ratio was negatively and significantly related to both profitability measures at a 0.05 level. In conclusion, there is enough evidence for Hypothesis 4 to be accepted, a conclusion aligned with Kalanidis (2016), who established that liquidity measures have a negative relationship with performance in European banks, providing support that the opportunity cost of holding low yield assets and on the other hand holding deposits which cannot be invested appropriately or are invested in high-risk assets, comes to dominate the increased resilience of the banks due to increased liquidity. The studies of Saif-Alyousfi et al. (2017), Raykov (2017), and Öndeş and Osman (2020) focusing on the altered financial management function during the GFC draw comparable inferences.

5. CONCLUSION

Acknowledging the banking industry as the backbone of global economies because it supports the entire financial system, this paper scrutinizes the two main competing objectives of commercial banks: maintaining a supply of liquid assets in case their cash is put under strain and the need to achieve higher returns on their assets in order to be able to maximize their profits. Acknowledging the importance of achieving and maintaining a liquidity-profitability balance in the banking sector, this study aimed to examine and evaluate the relationship between the liquidity **(**measured by liquid assets and liquid assets to short-term liabilities ratio**)** and profitability **(**measured by ROA and ROE**)** position of the commercial banking system in the Republics of North Macedonia and Serbia in order to determine whether these two performance indicators are connected in a way that changes in liquidity levels influence changes in their profitability. Because the ten-year period of examination (2012-2021) included the emergence of the global

COVID-19 health pandemic, additional tests were conducted to be able to find out whether the health crisis affected i.e. caused changes in the liquidity-profitability relationship of both banking sectors.

Overall, the results show that there was no statistically significant correlation between the liquidity and profitability metrics of the Macedonian banking sector during the course of this 10-year period. However, when divided into two sub-periods to assess the presence of a specific COVID-19 influence, a change in the average liquidity (lowest registered LA and highest registered LA-STL ratio) and profitability (highest registered average ROA/ROE levels) was noted, causing a positive significant association to be observed between the LA ratio and ROE, suggesting that during the pandemic years, an increase in the banks' liquidity was associated with an increase in their profitability when calculated using these particular measures.

The correlation and regression study results for the Serbian banking sector for 2012-2021, revealed a mixed outcome; both liquidity measures were negatively and significantly associated with ROA at the 0.01 level, but negatively and insignificantly related to ROE. The sub-period analysis revealed that the Coronavirus pandemic had an adverse impact on the Serbian banks' average liquidity, which was at its lowest (both LA and LA-STL values decreased), while their average profitability (measured by both ROA and ROE ratios) levels peaked. This resulted in changes to the liquidity-profitability relationships, with the LA ratio being negatively and insignificantly related to both ROA and ROE while the LA-STL ratio was negatively and significantly related to the profitability indicators.

In conclusion, the Corona crisis caused changes to the liquidity-profitability relationship of banks in both countries (2012-2019 compared to 2020-2021). These results are in convergence with the conclusions reached by Al-Alawnh et al. (2022). A solid institutional setting can better the resilience of banks and their response to crisis. The decisions made by the Central Banks to temporarily delay loan repayment during crisis reduced the possibility of deposit withdrawals and NPLs spike, which had a favorable impact on bank performance, contrary to the risks underlined by Danisman et al. (2021) and Goodell (2020). As demonstrated in the results section, our findings are fairly robust to alternative performance indicators. As a general recommendation, Macedonian and Serbian banks' management should work on improving the current liquidity and profitability positions since doing so would not only significantly strengthen this sector but it will also make it more resilient to the impact of any crisis that could potentially occur in the future. Hence, threats to financial strength should be considered prudently as continued reliance on policy measures in state of instability can impede on the long-term loan repayment discipline and transparency. We therefore recommend that banks diversify their income sources by employing varying security investments. Moreover, financial regulators should not lose sight of the liquidity-profitability dynamics at all times because it is vital for the future and the stability of the financial system.

REFERENCES

Abbas, F., Iqbal, S., & Aziz, B. (2019). The impact of bank capital, bank liquidity and credit risk on profitability in post-crisis period: A comparative study of US and Asia. *Cognet Economics and Finance, 7*(1), 1605683. https://doi.org/10.1080/23322039.2019.1605683

Adelopo, I., Vichou, N., & Cheung, Y., K. (2022). Capital, liquidity and profitability in European banks. *Journal of Corporate Accounting and Finance, 33*, 23-35. https://doi.org/10.1002/jcaf.22522

Ahmad, R. (2016). A Study of Relationship between Liquidity and Profitability of Standard Chartered Bank Pakistan: Analysis of Financial Statement Approach. *Global Journal of Management and Business Research: C Finance, 16*(1), 76-82. Available at: https://globaljournals.org/GJMBR_Volume16/7-A-Study-of-Relationship.pdf

Al-Alawnh, N. A. K., Mohsin, H. J., Hani, L. Y. B., Al-Naser, B. M., Qurran, A. A., & Alzu'bi, S. K. (2022). The impact of Covid-19 on liquidity and profitability in commercial banks. *International Journal of Advanced Research, 10*(5), 490-496. http://dx.doi.org/10.21474/IJAR01/14731

Alali, S. M. (2019). The impact of bank liquidity on the profitability of commercial banks: An applied study on Jordanian commercial banks for the period (2013/2017). *International Journal of Economics and Financial Issues, 9*(5), 24-28. https://doi.org/10.32479/ijefi.8304

Alshatti, A. S. (2015). The effect of credit risk management on financial performance of Jordanian commercial banks. *Investment Management and Financial Innovations, 12*(1), 338-345. Available at: https://www.businessperspectives.org/images/pdf/applications/publishing/templates/article/assets/6515/Iimfi_en_2015_01cont_2_Alshatti.pdf

Arif, A., & Nauman Anees, A. (2012). Liquidity risk and performance of banking system. *Journal of Financial Regulation and Compliance, 20*(2), 182-195. https://doi.org/10.1108/13581981211218342

Ashraf, M., Nabeel, M., & Hussain, M. S. (2017). Liquidity management and its impact on banks profitability: A Perspective of Pakistan. *International journal of business and management invention, 6*(5), 19-27. Available at: https://www.ijbmi.org/papers/Vol(6)5/version-1/D0605011927.pdf

Avramova, S., & Le Lesle, V. (2012). *Revisiting Risk-Weighted Assets: Why Do RWAs Differ Across Countries and What Can Be Done About It?*, IMF Working Paper No. 12/90. Available at: https://www.imf.org/en/Publications/WP/Issues/2016/12/31/Revisiting-Risk-Weighted-Assets-25807

Awulo, T., Alemu, A., & Chala, W. B. (2019). Impact of liquidity on profitability of bank: A case of Commercial Banks of Ethiopia. *Research Journal of Finance and Accounting, 10*(1), 26-34. https://doi.org/10.7176/RJFA/10-1-04

Ayaydin, H., & Karakaya, A. (2014). The Effect of Bank Capital on Profitability and Risk in Turkish Banking. *International Journal of Business and Social Science, 5*(1), 252-271. Available at: https://www.researchgate.net/publication/312902787

Banerjee, R. N., & Mio, H. (2018). The impact of liquidity regulation on banks. *Journal of Financial intermediation, 35*(B), 30-44. https://doi.org/10.1016/j.jfi.2017.05.008

BCBS (2008). *Principles for Sound Liquidity Risk Management and Supervision*. Bank for International Settlements, Basel, Switzerland. Available at: https://www.bis.org/publ/bcbs144.pdf

BCBS (2009). *International framework for liquidity risk measurement, standards and monitoring*. Bank for International Settlements, Basel, Switzerland. Available at: https://www.bis.org/publ/bcbs165.pdf

Bordeleau, E., & Graham, C. (2010). *The Impact of Liquidity on Bank Profitability*. Bank of Canada Working Paper No. 2010-38, Available at: https://www.bankofcanada.ca/wp-content/uploads/2010/12/wp10-38.pdf

Chen, Y. K., Shen, C. H., Kao, L., & Yeh, C. Y. (2018). Bank liquidity risk and performance. *Review of Pacific Basin Financial Markets and Policies, 21*(1), 1-40. https://doi.org/10.1142/S0219091518500078

Dang, D. V. (2021). The Basel III Net stable funding ratio and a risk-return trade-off: Bank-level evidence from Vietnam. Asian Academy of Management *Journal of Accounting and Finance (AAMJAF), 17*(2), 247-274. https://doi.org/10.21315/aamjaf2021.17.2.10

Danisman, G. O., Demir, E, & Zaremba, A. (2021). Financial resilience to the covid-19 pandemic: the role of banking market structure. *Applied Economics, 53*(39), 4481-4504. https://doi.org/10.1080/00036846.2021.1904118

Demirgüç-Kunt, A., Pedraza, A., & Ruiz-Ortega, C. (2021). Banking sector performance during the COVID-19 crisis. *Journal of Banking & Finance, 133*, 106305. https://doi.org/10.1016/j.jbankfin.2021.106305

Demirgüç-Kunt, A., & Levine, R. (2008). *Finance, Financial Sector Policies, and Long-Run Growth*. Policy Research Working Paper No.4469, Available at: https://openknowledge.worldbank.org/bitstream/handle/10986/6443/wps4469.pdf?sequence=1&isAllowed=y

Dietrich, A., Hess, K., & Wanzenried, G. (2014). The good and bad news about the new liquidity rules of Basel III in Western European countries. *Journal of Banking & Finance, 44*, 13-25. https://doi.org/10.1016/j.jbankfin.2014.03.041

Donev, B. (2021). Macroeconomic and macro-financial factors of the stability of the banking sector - The case of the Republic of North Macedonia. 2nd international conference *"Economic and Business Trends Shaping the Future"*, Skopje, N. Macedonia, 11-12 November 2021 (online), 216-228. http://doi.org/10.47063/EBTSF.2021.0022

Ehiedu, C. V. (2014). The impact of liquidity on profitability of some selected companies: The financial statement analysis (FSA) approach. Research *Journal of Finance and Accounting, 5*(5), 81-90. Available at: https://iiste.org/Journals/index.php/RJFA/article/view/11414/11746

Eljelly, A. (2004). Liquidity - profitability tradeoff: An empirical investigation in an emerging market. *International Journal of Commerce and Management, 14*(2), 48-61. http://dx.doi.org/10.1108/10569210480000179

Filipović, M., & Hadžić, M. (2012). Banking Sector in Serbia: Impacts of late transition and Global Crisis, in Bojnec, Š., Brada, C. J., & Kuboniwa, M. ed(s), *Overcoming the Crisis: Economic and Financial Developments in Asia and Europe*, (Online), Koper: University of Primorska Press, 65-75. Available at: https://hippocampus.si/ISBN/978-961-6832-32-8/papers/hadzic.pdf

Golubeva, O., Duljic, M., & Keminen, R. (2019). The impact of liquidity risk on bank profitability: some empirical evidence from the European banks following the introduction of Basel III regulations. *Accounting and Management Information Systems, 18*(4), 455-485. http://dx.doi.org/10.24818/jamis.2019.04001

Gomes, T., & Wilkins, C. (2013). The Basel III Liquidity Standards: an Update. *Bank of Canada -Financial system review*, 37-43. Available at: https://www.bankofcanada.ca/wp-content/uploads/2013/06/fsr-0613-gomes.pdf

Government of the Republic of Serbia. (2015). *NPL Resolution Strategy*. Available at: https://mfin.gov.rs/upload/media/qGkXCU_6016d5622cde9.pdf

Growe, G., DeBruine, M., Lee, Y. J., & Maldonado, T. F. J. (2014). The Profitability and Performance Measurement of U.S. Regional Banks Using the Predictive Focus of the "Fundamental Analysis Research". *Advances in Management Accounting, 24*, 189-237. http://dx.doi.org/10.1108/S1474-787120140000024006

Hartlage, A. (2012). The Basel III Liquidity Coverage Ratio and Financial Stability. *Michigan Law Review, 111*(3), 454-483. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2270891

Kalanidis, D. (2016). *The Impact of Liquidity on Bank Profitability: Post Crisis Evidence from European Banks*. International Hellenic University. Available at: https://core.ac.uk/download/pdf/236165448.pdf

Kimondo, C. N. (2014). *The relationship between liquidity and profitability of nonfinancial companies listed in Nairobi securities exchange*. MA Dissertation. University of Nairobi. Available at: http://erepository.uonbi.ac.ke/bitstream/handle/11295/74951/Kimondo%20_The%20relationship%20between%20liquidity%20and%20profitability%20of%20non%20financial%20companies.pdf?sequence=2

King, M. R. (2013). The Basel III net stable funding ratio and bank net interest margins. *Journal of Banking & Finance, 37*(11), 4144-4156. https://doi.org/10.1016/j.jbankfin.2013.07.017

Kumbirai, M., & Webb, R. (2010). A financial Ratio Analysis of Commercial Bank Performance in South Africa. *African Review of Economics and Finance, 2*(1), 30-53. Available at: https://www.ajol.info/index.php/aref/article/view/86945

Mashamba, T. (2018). The effects of Basel III liquidity regulations on banks' profitability. *Journal of Governance and Regulation, 7*(2), 34-48. https://doi.org/10.22495/jgr_v7_i2_p4

Molyneux, P., & Thornton, J. (1992). Determinants of European bank profitability: A note. *Journal of Banking and Finance, 16*(6), 1173-1178. https://doi.org/10.1016/0378-4266(92)90065-8

Munteanu, I. (2013). Optimizing Bank Liquidity in Central and Eastern Europe. *Review of Economic and Business Studies, 6*(1), 83-90. Available at: https://www.researchgate.net/profile/Dr-Vikas-Gautam/publication/298790048

NBRM. (2021). *Report on risks in the banking system of the Republic of North Macedonia in 2020*. Available at: https://www.nbrm.mk/content/Regulativa/Godisen_BS_31_12_2020_ENG.pdf

NBRM. (2022). *Report on risks in the banking system of the Republic of North Macedonia in 2021*. Available at: https://www.nbrm.mk/content/Regulativa/Godisen_BS_31_12_2021_ENG.pdf

NBS. (2022). *Annual Financial Stability Report 2021*. Available at: https://www.nbs.rs/export/sites/NBS_site/documents-eng/publikacije/fs/fsr_2021.pdf

Nguyen, M., Perera, S., & Skully, M. (2017). Bank market power, asset liquidity and funding liquidity: International evidence. *International Review of Financial Analysis, 54*, 23-38. https://doi.org/10.1016/j.irfa.2017.09.002

Okaro, C. S., & Nwakoby, C. N. (2016). Effect of liquidity management on performance of deposit money banks in Nigeria. *Journal of policy and development studies, 10*(3), 156-169. http://dx.doi.org/10.12816/0032106

Olagunju, A., David, A. O., & Samuel, O. O. (2011). Liquidity Management and Commercial Banks' Profitability in Nigeria. *Research Journal of Finance and Accounting, 2*(7-8), 24-38. Available at: https://www.iiste.org/Journals/index.php/RJFA/article/view/1283/1204

Öndeş, T., & Osman, B.A. (2020). Is Liquidity An Influencing Factor for Profitability of Banks? An Empirical Study. *IBAD Journal of Social Sciences, 7*, 394-402. https://doi.org/10.21733/ibad.686734

Raykov, E. (2017). The liquidity-profitability trade-off in Bulgaria in terms of the changed financial management functions during crisis. *Management, 22*(1), 135-156. https://doi.org/10.30924/mjcmi/2017.22.1.135

Roy, S., Misra, A. K., Padhan, P. C., & Rahman, M. R. (2019). Interrelationship among liquidity, regulatory capital and profitability - A study on Indian banks. *Cogent Economics and Finance, 7*(1), 1664845. https://doi.org/10.1080/23322039.2019.1664845

Said, M. R. (2018). Basel III New Liquidity Framework and Malaysian Commercial Banks Profitability. *Jurnal Pengurusan, 52*, 111-120. Available at: http://journalarticle.ukm.my/20172/1/17333-88577-1-PB.pdf

Saif-Alyousfi, A., Saha, A., & Md-Rus, R. (2017). Profitability of Saudi commercial banks: A comparative evaluation between domestic and foreign banks using Capital Adequacy, Asset Quality, Management Quality, Earning Ability and Liquidity Parameters. *International Journal of Economics and Financial Issues, 7*(2), 477-484. Available at: https://www.econjournals.com/index.php/ijefi/article/view/4165/pdf

Sayegh, A. & Afentaous, S. (2021). *COVID-19 Impact on Bank Profitability in the Nordic Countries.* Bachelor Thesis. Jonkoping University International Business School. Available at: https://www.diva-portal.org/smash/get/diva2:1677308/FULLTEXT01.pdf

Shahchera, M. (2012). The impact of liquidity on Iranian bank profitability. *Journal of Money and Economy, 7*(1), 139-160. Available at: https://jme.mbri.ac.ir/files/site1/user_files_10c681/admin_t-A-10-25-40-e97f635.pdf

Shi, Z. (2018). *Impact of Basel III on Chinese firms access to credit*. MA Dissertation. Georgetown University. Available at: https://repository.library.georgetown.edu/bitstream/handle/10822/1050888/Shi_georgetown_0076M_13986.pdf?sequence=1&isAllowed=y

Toutou, J., & Xiaodong, X. (2011). *The relationship between liquidity risk and performance: An empirical study of banks in Europe 2005-2010*. MA Dissertation. Umeå School of Business. Available at: http://www.diva-portal.org/smash/get/diva2:523854/FULLTEXT01.pdf

Trujillo-Ponce, A. (2013). What determines the profitability of banks? Evidence from Spain. *Accounting & Finance, 53*(2), 561-586. https://doi.org/10.1111/j.1467-629X.2011.00466.x

Vesic, T., & Petronijevic, J. (2018). Trends in profitability of banks in Republic of Serbia through rational analysis, in Cogoljević, D., Piljan, I., & Salamzadeh, A. (ed.) *Finance and insurance sector industry*, Silver and Smith Publishers, London, UK, 138-155. Available at: https://www.researchgate.net/publication/328739071_Trends_in_profitability_of_banks_in_Republic_of_Serbia_through_rational_analysis

Vodova, K. P. (2013). Determinants which Affect Liquid Asset Ratio of Czech and Slovak Commercial Banks. *Financial Assets and Investing, 4*(1), 25-41. https://doi.org/10.5817/FAI2013-1-2

Vodova, K. P. (2016). Bank liquidity and profitability in the Polish banking sector. *Scientific Journal of Bielsko-Biala School of Finance and Law (ASEJ), 20*(1), 19-33. https://doi.org/10.19192/wsfip.sj1.2016.2

Wilner, S. B. (2000). The Exploitation of Relationships in Financial Distress: The Case of Trade Credit. *The Journal of Finance, 55*(1), 153-178. https://doi.org/10.1111/0022-1082.00203

Yaacob, S. F., Aisyah, A. R., & Abdul Karim, Z. (2016). The determinants of liquidity risk: A panel study of Islamic banks in Malaysia. *Journal of Contemporary Issues and Thought, 6*, 73-82. Available at: https://ejournal.upsi.edu.my/index.php/JCIT/article/view/1073/765

DINAMIKA LIKVIDNOST-PROFIABILNOST: DA LI JE BANKARSKA INDUSTRIJA OTPORNA U KRIZNIM VREMENIMA?

Bankarska industrija doprinosi ekonomskoj ekspanziji jer se smatra čuvarem i dobavljačem likvidnog kapitala, koji je neophodan za sve komercijalne i industrijske aktivnosti. Osnovni cilj komercijalnih banaka je da generišu profit dok uslužuju klijente i održavaju pozicije likvidnosti. Stoga, ovaj rad ima za cilj da ispita i oceni odnos izmedju likvidnosti (mereno kroz Likvidna sredstva i odnos izmedju likvidnih sredstava i kratkoročnih obaveza) i profitabilnosti (mereno kroz povrat na imovinu i povraćaj kapitala) komercijalnog bankarskog sistema u Severnoj Makedoniji i Srbiji, ne bi li se odredilo da li promene u nivoima likvidnosti utiču na profitabilnost. Kako desetogodišnji period istraživanja (2012-2021) uključuje i pojavu globalne pandemije Koronavirusa, radjeni su dodatni testovi kako bi se otkrilo da li je ova zdravstvena kriza dovela do promena u dinamici izmedju likvidnosti i profitabilnosti.

Korišćenjem deskriptivne, korelacione i regresivne analize i praćenjem dva pod-perioda (2010-2019 i 2020-2021), zaključujemo da ima promena u pozicijama likvidnost-profitabilnost u kriznim vremenima u obe zemlje. Ovi zaključci potvrdjuju saznanja o performansama likvidnosti i profitabilnosti u nestabilnim vremenima, jer je ovo pionirska studija ocenjivanja uticaja pandemije na likvidnost i profitabilnost uz pomoć empirijskih istraživanja na ova dva tržišta. Osim toga, preispitivanjem medjusobnog odnosa likvidnosti i profitabilnosti, zaključci pokazuju da su veze vremenski zavisne, što donosi implikacije na politiku banaka i drugih regulatora finansijske industrije.

Ključne reči: *likvidnost, profitabilsnost, bankarski sektor Republike Severne Makedonije, bankarski sektor Republike Srbije*

APPENDIX 1
LIST OF BANKS WHOSE PUBLICALLY AVAILABLE FINANCIAL STATEMENTS WERE USED FOR ANALYSIS

Macedonian banking sector	Serbian banking sector
1. Sparkasse Banka AD Skopje	1. Addiko Bank AD Beograd
2. Capital Bank AD Skopje	2. Agroindustrijsko Komercijalna Banka AIK AD, Beograd
3. Komercijalna banka AD Skopje	3. Alta banka AD Beograd
4. Development Bank of N.Macedonia AD Skopje	4. API Bank AD Beograd
5. NLB Banka AD Skopje	5. Banca Intesa AD Beograd
6. Centralna Kooperativna Banka AD Skopje	6. Banka Poštanska štedionica AD Beograd
7. Stopanska Banka AD Bitola	7. Expobank AD Beograd
8. Stopanska Banka AD Skopje	8. Erste Bank AD Novi Sad
9. Univerzal Investment Bank AD Skopje	9. Eurobank Direktna AD Beograd
10. TTK Banka AD Skopje	10. Halkbank AD Beograd
	11. Mobi Banka AD Beograd
	12. NLB Komercijalna banka AD Beograd
	13. 3 Banka AD Novi Sad
	14. ProCredit Bank AD Beograd
	15. Raiffeisen Banka AD Beograd
	16. Srpska banka AD Beograd
	17. UniCredit Bank Serbia a.d. Beograd
	18. RBA Banka AD Novi Sad

APPENDIX 2
LIQUIDITY-PROFITABILITY ASSOCIATION, EMPIRICAL FINDINGS

Relationship type	Author and year	Technique	Sample size	Variables		Testing outcome
				Independent	Dependent	
Non-linear relationship	Bordeleau and Graham (2010)	Two-step Generalized Method of Moment	55 U.S. and 10 Canadian banks from (1997-2009)	Liquid assets	ROA Ratio of outstanding repurchase agreements to total liabilities	Up until a certain point, an increase in the holdings of liquid assets increases bank profitability, but after that point, additional increases in the holdings of liquid assets reduce bank profitability
	Shahchera (2012)	Generalized Method of Moments (GMM)	All listed Iranian banks over the period (2002-2009)	Liquid asset Business cycle Capital ratio Loan-to-assets ratio Deposit ratio	ROE	Profitability is improved for banks that hold some liquid assets. However, there is a point at which holding further liquid assets diminishes their profitability
	Growe et al. (2014)	Generalized Method of Moments (GMM)	All U.S. regional banks during the period (1994-2011)	CPI GDP Bank assets to GDP Stock market capitalization to banks assets Efficiency ratio Equity to assets Provision for credit losses Reserve for credit losses Nonperforming assets Net charge offs Noninterest income to revenue	ROA ROE	Evidence of non-linear relationship between the liquidity and profitability indicators

				Loans to assets Equity growth Equity to Asset Growth Loan Growth Equity to Loan Growth Cost to Assets		
	Munteanu (2013)	Generalized Method of Moments (GMM)	Commercial banks in Eastern and Central Europe from (2003-2010)	Non-linear expression of relatively liquid assets (Liquid Assets over Total Assets ratio) and a set of control variables	ROAE ROAA	Funding markets would compensate banks for maintaining liquid assets by reducing the funding costs associated with storing low-return assets. Excessive liquidity holding will reduce bank profitability and limit credit availability for the actual economy, causing negative externalities to be felt by the general public and all national governments worldwide
Positive relationship	Toutou and Xiaodong (2011)	Regression analysis	Sample of 12 banks from the EURO STOXX index based on their market capitalization	Loan to assets Loan to deposit Cash position	ROA ROE Net profit margin Net interest margin	Significant positive relationship between loan to assets, loan to deposits and cash position ratio with ROE and the Net profit margin
	Dietrich et al. (2014)	Regression analysis	921 banks in Western Europe between (1996-2010)	Net Stable Funding Ratio (NSFR)	ROA ROE NIM	Applying the new liquidity indicators tends to lead banks to be more stable and resilient
	Yaacob et al. (2016)	Regression analysis	17 Malaysian Islamic banks from (2000-2013)	Liquidity Coverage Ratio Net Stable Funding Ratio	ROA	Raising Basel III liquidity ratios can have a favorable impact on the profitability attained by reducing liquidity shocks
	Mashamba (2018)	GMM estimator	40 commercial banks from emerging market economies (2011-2016)	Liquidity Coverage Ratio and a set of control variables	ROA	LCR helped banks in emerging nations by increasing their profitability
	Said (2018)	Panel data	8 Malaysian commercial banks in the period (2005-2011)	NSFR	ROA ROE NIM	The NSFR had a favorable impact on each of the three profitability ratios. In other words, the banks were able to maintain their profitability performance even when switching to holding HQLA
	Abbas et al. (2019)	Two-step GMM estimator	Comparison between the banking industry in the US and the major Asian economies (2011- 2017)	Liquid assets Total assets	ROA ROE Return on average earning assets	A positive correlation between liquidity and profitability with a 3.5% increase in liquidity being correlated with a 1% increase in profitability
	Dang (2021)	Regression analysis	Vietnam commercial banks (2007- 2018)	Net Stable Funding Ratio	ROA ROE Net interest margin	Banks with higher NSFRs earned more potential benefits than banks with lower NSFRs. A rise in NSFR improves bank profitability and lowers funding costs and credit risks

	Adelopo et al. (2022)	Multiple regression model	The largest banks in the European Union spanning 28 countries using data from (2010- 2018)	Total equity to total assets Total equity to risk-weighted assets Total loans to total customer deposits Total customer deposits to total funding	ROA ROE Operating profit to risk-weighted assets	Strong and positive correlation between bank performance and liquidity levels
Negative relationship	King (2013)	Regression analysis	Sample of 15 synthetic banks from 15 different nations, including some emerging economies	Net Stable Funding Ratio	Net interest margin	In 10 out of 15 representative banks, the NSFR was below the required minimum. However, the strategies to increase the NSFR were estimated to reduce bank NIMs by on average 70 to 88 basis points
	Kalanidis (2016)	Balanced panel data set	50 large European banks for the period (2009-2015)	Cash and due from Banks to Total assets Total customer deposits Impaired loans to Gross loans Net loans to Total assets Loans less Customer deposits to Total assets Tier1 Capital to Total Assets Cost to Income ratio	ROAA ROAE Profit before tax Net interest margin	Total customer deposits, cash due from banks, and liquidity measures have a negative relationship with ROAA, ROAE, and PBT, supporting the idea that the opportunity cost of holding low-yield assets and, on the other hand, holding deposits that are invested in high-risk or deposits that cannot be invested properly, come to dominate the increased resilience of the banks as a result of increased liquidity
	Saif-Alyousfi et al. (2017)	OLS and the fixed effect model	20 Saudi domestic and foreign banks in the period (2000-2014)	Net loans to total deposits Liquid assets to total assets	ROA ROE NIM	The liquid assets to total assets ratio of the domestic banks affected the ROE and NIM negatively
	Raykov (2017)	Regression analysis	20 selected companies included in the BGBX40 for the period (2007-2015)	Quick ratio	Return on current assets	Controlled liquidity and operational profitability over the long run have a weak but unmistakably negative relationship
	Banerjee and Mio (2018)	H-step cumulative average treatment	90 banks in the UK	Individual liquidity guidance (ILG)		The ILG's implementation caused banks to migrate to storing low-yield liquid assets, which had a detrimental impact on their profitability
	Golubeva et al. (2019)	OLS technique complemented by Weighted Least Squares regression analysis	45 European banks during (2014-2017) + 37 observations for 2018	Liquidity coverage ratio Loan to deposit Financing gap ratio	ROA ROE Net profit margin	Keeping excess liquidity has a mildly negative impact on profitability
	Öndeş and Osman (2020)	Random effect regression model	10 biggest banks of Turkey based on asset size in the years (2008-2017)	Loan to deposits Deposit to assets Liquid assets to total assets Liquid assets to short-term liabilities Liquid assets to deposits and non-deposit resources ratio	ROAA ROAE	Both the liquid asset to total asset and the loan to deposit ratio had a considerable negative impact on ROE and ROA. The deposit-asset ratio had a considerable and detrimental impact on ROA and a negligible and detrimental impact on ROE

Mixed results	Chen, Shen, Kao, and Yeh (2010)	Two-stage least squares estimators	12 advances economies commercial banks (1994-2006)	Liquid assets to total assets Risky liquid assets to total assets	ROAA ROAE NIM	In a market-based financial system, liquidity risk is positively correlated with NIM, suggesting; banks with higher concentrations of illiquid assets earn more interest revenue. Liquidity risk is negatively associated with ROAA and ROAE, which runs counter to their conclusion regarding the relationship with NIM
	Ayaydin and Karakaya (2014)	Two-step system Generalized Method of Moments	23 Turkish commercial banks from (2003-2011)	Liquidity ratio (Liquid assets to customer and short-term deposits)	Net interest margin ROA ROE Interest income	A positive correlation between liquidity and interest income to total assets, but a negative correlation between liquidity and NIM
	Alshatti (2015)	Augmented Dickey Fuller stationary test model	Sample of 13 Jordanian commercial banks during (2005–2012)	Liquid assets Investment ratio Quick ratio Capital ratio Net credit facilities to total assets	ROA ROE	While the capital and the liquid assets ratio had a negative impact, an increase in the quick and the investment ratio of the available funds positively impacted the Jordanian commercial banks' profitability
	Okaro and Nwakoby (2016)	OLS method and regression analysis	Deposit money banks' performance in Nigeria (2000–2015)	Liquidity ratio Loan to deposit Cash to deposit Loan to assets	ROA ROE NIM	A significant and positive relationship between the cash-to-deposit ratio and profitability and a substantial and negative association the rest of the liquidity ratios and bank profitability
	Ashraf et al. (2017)	Regression analysis	Pakistani banking industry's (2006-2015)	Quick ratio Current ratio Cash ratio Interest coverage Capital adequacy ratio	ROA ROE Earnings per share	EPS and ROA were positively impacted by the quick and capital adequacy ratios. The relationship between the cash and current ratio and ROA was negative, whereas the interest coverage ratio and ROE had a positive relationship
	Awulo et al. (2019)	Autoregressive distributed lag model (ARDL)	Ethiopian commercial banks in the years (1986-2017)	Current ratio Loan-to-deposit ratio	ROA	Over the long term, the loan-to-deposit ratio had a negative impact, whereas the current ratio had a significant positive impact on ROA

Source: Information gathered by the authors