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## Movements of Balance Sheet Items and Liquidity Nexus: Evidence from Serbian Banking Sector<sup>3</sup>

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**Abstract:** *The subject of research in this paper are eight balance sheets (based on regular annual financial statements), with the aim of finding out the effect of fluctuations in balance sheet items on the movement of commonly used liquidity ratios on a sample of 10 leading Serbian banks in terms of balance sheet assets (Banca Intesa, Komercijalna, UniCredit, Societe Generale, Raiffeisen, AIK, Eurobanka, Erste Bank, Poštanska štedionica i Vojvodjanska), by applying Pearson's correlation coefficient for the period 2010-2017. The four most commonly used liquidity ratios were used as dependent variables, while individual balance sheet items (part of the liquidity formula) were used as independent variables. According to the conducted research, Serbian banking sector recorded positive performance i.e. was sufficiently liquid, from 2010 to 2017. Furthermore, very strong correlation was observed between an increase in cash and an increase in bank liquidity, while there was a moderate correlation between an increase in cash and average total liabilities. Moreover, the increase in loans and receivables from banks and other financial institutions had a significant impact on the increase of liquidity, as well as on the increase in provisions and equity. Finally, the*

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increase in the value of owned property and deposits had a negative impact on liquidity ratios.

**Keyword:** banking sector, bank liquidity, balance sheet positions, Pearson's correlation coefficient.

## **Odnos kretanja bilansnih stavki i likvidnosti: primer bankarskog sektora Srbije**

**Apstrakt:** Predmet istraživanja u ovom radu su osam bilansa stanja (na osnovu redovnih završnih finansijskih računa), sa ciljem da se utvrdi koliki uticaj ima fluktuacija bilansnih stavki na kretanje najčešće korišćenih pokazatelja likvidnosti, na uzorku od 10 vodećih srpskih banaka u pogledu bilansne aktive (Banca Intesa, Komercijalna, UniCredit, Societe Generale, Raiffeisen, AIK, Eurobanka, Erste Bank, Poštanska štednionica i Vojvođanska), primenom Pirsonovog koeficijenta korelacije za period 2010-2017. Četiri koeficijenta likvidnosti korišćena su kao zavisne varijable, dok su pojedinačne stavke bilansa stanja (deo formule likvidnosti) korišćene kao nezavisne varijable. Prema izvedenom istraživanju srpski bankarski sektor je od 2010. do 2017. godine beležio pozitivne rezultate, odnosno dovoljno je likvidan. Takođe, primećena je vrlo jaka korelacija između povećanja gotovine i povećanja likvidnosti banaka, uz umerenu korelaciju između povećanja gotovine i prosečnih ukupnih obaveza. Štaviše, povećanje kredita i potraživanja od banaka i drugih finansijskih institucija imalo je značajan uticaj na povećanje likvidnosti, kao i na povećanje rezervi i kapitala. Konačno, porast vrednosti imovine i depozita u vlasništvu negativno je uticao na koeficijent likvidnosti.

**Ključne reči:** bankarski sektor, likvidnost banke, bilansne pozicije, Pirsonov koeficijent korelacije.

### **1. Introduction**

In accordance with current domestic and international regulations, banks are obliged to prepare and submit annual financial reports to the competent state/ authorized institutions for the purpose of business transparency (Barjaktarović, 2013). Such reports are official indicators of financial standing i.e. health of the bank. They can give information about: (1) assets and liabilities on the particular date (end of calendar of fiscal year) of the bank by balance sheet statement. (2) Bank profitability at the end of the accounting period. (3) Cash flow statement. (4) Funds flow statement. (5) Equity report. (6) Etc. This can be analysed in absolute or relative (ratio) numbers. Results

of the analysis of financial standing of the bank during the particular date or period are in the function of informational support of the internal decision-making process or external users (Knežević et al, 2013; Barjaktarović et al, 2018). As the nature of banks' operations is fundamentally different from those of non-financial corporations, financial statements also differ and their structure and content must reflect all the specifics of banking business (Hadžić, 2009). In terms of regulation, the banking sector of the Republic of Serbia is regulated in accordance with the European directives and rules of the Basel Committee (Barjaktarović et al., 2013; Jelenković & Barjaktarović, 2016; ECB, 2017; WBG, 2016), the so-called internationally accepted banking standards. In order to have a more accurate view of business performance, banking industry experts, mathematicians and economic analysts have developed and designed numerous metrics. Ratios are calculated as a meaningful relationship between the positions in the financial statements, and, for analyzing the performance of banks, they must be adjusted to the specifics of the financial statements of the banking sector (Mishkin, 2006). Ratio is an index by which one variable is measured against another variable and is usually calculated as a percentage or rate (Dimić & Barjaktarović, 2017).

The paper started from the general hypothesis that the banking sector of Serbia is sufficiently liquid. The aim of this paper is to examine how movements in balance sheet positions affect the movements of banks' liquidity ratios. With this regard, a special hypothesis was added: Banks' liquidity is largely influenced by the increase in cash and the timely repayment of loans. The subject of the analysis are banks operating in the Republic of Serbia, which were selected according to the values of balance sheet assets at the end of IV quarter of 2017 (4q 2017). The following banks had the largest market share in the period 2010-2017 (in terms of total assets): Banca Intesa Belgrade, Komercijalna Bank Belgrade, UniCredit Bank Belgrade, Societe Generale Bank Belgrade, Raiffeisen Bank Belgrade, Agroindustrijska komercijalna bank - AIK Bank Belgrade, Euro Bank Belgrade, Erste Bank Novi Sad, Bank Postanska stedionica Belgrade and Vojvodjanska Bank Novi Sad. The dominant share in the banking sector of Serbia is held by foreign-based banks (Barjaktarović & Ječmenica, 2011; Barjaktarović et al, 2013) from Italy, Austria, France and Hungary with about 77% market share (NBS, 2017). It is important to point out that this is in accordance with the trends which are present on the financial market of the Western Balkan region. Furthermore, the Serbian financial market is primarily banked-based. In terms of size, on average, the regions' financial sector assets are equal to 93% of GDP (gross domestic product). Regional banking sectors are predominantly foreign owned. Moreover, top five (foreign-owned) banks hold 80-90% of total banking assets. Accordingly, it means that Western Balkan financial market is dependent on external developments (WBG, 2016)

According to the NBS report from the IV quarter of 2017, the banking sector in Serbia included 28 banks with a network of 1,610 business units and 23,067 employees. Only eight domestically owned banks had a market share of 28.56%; and they decreased their market share in the total balance sheet of the banking sector (from 24.1% to 23.67%), and slightly increased their share in the total capital of the banking sector (from 24.4% to 24.5%). Consequently, the participation of foreign-owned banks increased (from 75.9% to 77%) relative to the balance sheet amount and decreased from 75.6% to 75.5% relative to capital. The nominal decrease was recorded only in domestic-owned banks with the majority of ownership held by domestic private individuals, 3.6% in the balance sheet in total (NBS, 2017). According to the WB (2016), there is some space for further consolidation of banking sectors in the region, having in mind strong competition, low profitability, entrance of new business subjects and capacity of the market.

The paper consists of five chapters. The introduction describes the current situation in the banking sector of Serbia, second section is the literature review, while the third section represents research methodology. Research results are presented in the fourth chapter, while conclusion represents the fifth chapter of the paper.

## **2. Literature review**

There are various studies connected to the factors which have influence on bank's liquidity. They can be divided on studies which take in consideration internal or bank-specific (microeconomics) indicators, macroeconomic and mixed indicators (bank specific and macroeconomic indicators).

Research studies connected to external or macroeconomic (or external) factors influenced liquidity are mainly focused on gross domestic product (GDP), unemployment, inflation, public deficit and monetary policy (Trenca et al., 2012; Račić, 2014). They are not in the focus of this research, so they will not be taken into consideration. Furthermore, there are research papers connect to mixed factors which have influence on the liquidity of banks (Vodova, 2011; Vodova, 2011a; Vodova, 2012; Vodova 2013; Vodova, 2016; etc). However, they are also not in the focus of this research. Finally, there are studies dealing with the internal factors influencing bank's liquidity.

According to Rose & Hudgins (2015), creating bank's liquidity is positively related to bank's value. Furthermore, researchers examined relationship between capital formation and liquidity, and they identified that it had positive

relation for large banks (Berger & Bouwman, 2009) and negative for small banks (Allen et al., 2009).

Melese & Laximikantham (2015) designed a study to assess bank-specific factors that affect the liquidity of 10 Ethiopian commercial banks in the period from 2007 to 2013, by applying balanced panel fixed effect regression model. The results of the study showed that capital adequacy and profitability have a statistically significant impact on liquidity, while size of the bank has a positive and statistically significant impact on liquidity. It turns out that the growth of non-performing loans and credit is not statistically significant and has no impact on liquidity.

Further research of Teshome et al. (2018) also examined the financial performance of Ethiopian private commercial banks. The study included Husman test to analyze eight private banks in the industry between 2007 and 2016. The study concluded that capital adequacy ratio, credit interest income and bank size have a positive and significant impact on financial performance (including liquidity). Non-performing loans, loan loss reserves, leverage and operating cost efficiency have a significant negative impact on bank's financial performance.

Laštůvková (2016), executed research on the influence of variables representing the size of the bank – total assets, gross volume of loans and client's deposits on liquidity of size groups (large, medium - sized and small) of Check, Slovak and Slovenian banks, in the period from 2001 to 2013, by applying robust panel regression analysis together with the time series analysis. The researched factors influenced all dimensions of the liquidity. Moreover, the differences (regarding the significance of influence of each variable which represents banks' size on liquidity) had been showed, not just among different size groups, but also among the same size groups in different banking sectors. Further Laštůvková's research (2017) proved, by applying robust regression analysis on Slovenian banking sector, that internal factors had significant influence on banks' liquidity in the period from 2001 to 2013. Relevant bank-specific indicators taken in consideration were: loans, deposits, the value of profit, the value of equity, the value of total assets (as measure of bank's size) and gross loans/clients' deposits financial ratio.

Elahi (2017) examined factors (net-interest margin /NIM/, credit risk, bank size, profitability, income diversification and financial leverage) influencing liquidity in eight leading banks in Germany (bank-based economy) and United Kingdom /UK/ (marked-based economy) in the period from 2006 to 2015, by

applying panel regression and correlation analysis. Results revealed that net interest margin has a significant negative impact on liquidity for both UK and Germany. Financial leverage has significant negative relationship with liquidity for Germany, but this relationship is insignificant in case of UK. Bank size, credit risk, profitability and income diversification are insignificantly related with liquidity in case of both UK and German banks.

Diep & Nguyen (2017) analyzed influence of five internal indicators (size of the bank, ratio of total short-term liability to equity, ratio of total loans to total deposits, return on assets and capital to asset proportion) on liquidity of 32 commercial banks in Vietnam in the period from 2009 to 2016, by using correlation analysis. Research results confirmed that three key determinants, including the size of bank, the ratio of total loans to total deposits and capital to asset proportion, significantly affected the liquidity of a bank.

By implementing regression analysis on the sample of 23 commercial banks which performed business in the Republic of Serbia in the period from 2008 to 2013, Milošević Avdalović (2018) indicated that the liquidity of banks was positively correlated with capital adequacy ratios and interest income to total assets ratio, while negative and statistically significant relationship existed between the indicators of liquidity and the size of the bank (measured by bank assets), expense ratios compared to interest income and return on equity ratios.

It can be noticed that there are no research studies connected to the relation of absolute values of balance sheet items which have effect on bank's liquidity and appliance of Persons coefficient of correlation on the sample of ten leading banks in Serbian market.

### **3. Research methodology**

The basis for the research in this paper is the publicly disclosed data of commercial banks operating in the Republic of Serbia, collected from their corporate websites and National Bank of Serbia (NBS) website. Most of the data were collected from the quarterly reports referring to the analyzes and reports of the banking sector operating in the Republic of Serbia, which aims at accomplishing the transparency of banking operations in Serbia (NBS, 2019), and also from the individual balance sheets of observed banks. As the share of the 10 largest banks in terms of balance sheet assets at the end of Q4 2017 amounted to 77.1% of the average value of their performance, they

approximate, to a great extent, the performance of the entire banking system of the Republic of Serbia.

Having in mind that changes of the values of balance sheet items represent the subject of this paper, it requires values from two reporting periods to have one research item as average value. Accordingly, for the period 2010-2017, eight research subjects were used so that the average value of two years is one research subject. The balance sheet prepared for 31st of December of 2009 was the starting point of the survey, in order to start analysis in mentioned defined period.

*Table 1. Banks' assets in the period 2009-2017 (in RSD billion)*

Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bank									
Banca Intesa	307	359	392	413	427	473	488	551	565
Komercijalna bank	205	256	275	324	364	406	392	400	369
UniCredit bank	111	167	199	244	252	265	308	332	363
Societe Generale bank	99	136	194	203	221	222	231	236	288
Raiffeisen bank	193	179	189	200	204	224	234	254	265
AIK bank	109	142	143	154	152	173	179	184	209
Erste bank	/	/	/	/	/	98	117	143	162
Eurobank	146	181	160	169	158	146	141	151	158
Postanska stedionica bank	/	/	/	75	100	113	130	133	140
Vojvodjanska bank	87	92	93	104	109	123	120	126	123

*Source: Authors' calculation based on NBS Quarterly Reports.*

Based on average items on the balance sheet, four liquidity ratios were calculated for the top 10 banks (in terms of assets) operating in the Republic of Serbia at the end of 4q 2017. The year 2009 is included in Table 1 in order to calculate the 2010 average. Having in mind that: (1) Erste Bank Novi Sad, was not among the 10 largest banks in Serbia in the period 2010-2014, the value of assets of the bank was not included in the calculation. Instead of its values, the values of Hypo Alpe Adria Bank were used (the amount of assets was RSD 121 billion in 2009, RSD 145 billion in 2010, RSD 147 billion in

2011, RSD 145 billion in 2012 and RSD 124 billion in 2014). (2) The Bank Postanska stedionica Belgrade was not in the top 10 banks in Serbia in 2010 and 2011. Therefore, the values of assets of the bank were not included in the calculation, but the values of assets of Alpha Bank Belgrade were used instead (RSD 74 billion in 2009, RSD 98 billion in 2010 and RSD 85 billion in 2011). Other banks were in the top 10 and did not change their values during the analyzed period.

The liquidity ratios are calculated according to the following formulas:

$$\text{Liquidity indicator 1} = \frac{\text{average cash and short-term effective}}{\text{average total assets}} \quad (1)$$

$$\text{Liquidity indicator 2} = \frac{\text{average cash and short-term effective}}{\text{average deposits}} \quad (2)$$

$$\text{Liquidity indicator 3} = \frac{\text{average net loan}}{\text{average deposits}} \quad (3)$$

$$\text{Liquidity indicator 4} = \frac{\text{average liabilities}}{\text{average total assets}} \quad (4)$$

Liquidity ratios are calculated for each bank individually, whereas the ratio average is used as dependent variable, while items from officially announced banks' balance sheet (NBS's Quarterly reports at the end of 4q) are used as independent variables. The items observed are:

- Available-for-sale financial assets;
- Loans and receivables from banks and other financial organizations;
- Loans and receivables from customers;
- Property, plant and equipment;
- Other assets;
- Deposits and other liabilities to banks, other financial institutions and the central bank;
- Deposits and other liabilities to other customers;
- Provisions;
- Shareholder equity and other equity.

To determine the relationship between the analyzed indicators, Pearson's correlation coefficient (Jovetić, 2014) was applied in Microsoft Excel software, which is calculated according to the following formula:

$$r = \frac{\sum_{i=1}^N (x_i - \bar{x}) - (y_i - \bar{y})}{\sqrt{\sum_{i=1}^N (x_i - \bar{x})^2 \sum_{i=1}^N (y_i - \bar{y})^2}} \quad (5)$$

Elements of the formula (Pearson correlation coefficient): N is the number of indicators in the ratio; YI stands for Independent Indicators and Xi for

Dependent Indicators; x and y are averages (relevant indicators). Pearson's correlation values are explained as follows:

- +/- 0 - +/- 0.2 no correlation,
- +/- 0.21 - +/- 0.4 weak correlation,
- +/- 0.41 - +/- 0.6 mean correlation,
- +/- 0.61 - +/- 0.8 strong correlation,
- +/- 0.81 - +/- 1 very strong correlation.

#### 4. Results and discussion

In the observed period, the number of banks remained almost unchanged, but there was a downward trend in the number of organizational and business units. Banks' capital was mainly foreign owned, i.e. 77.1% of the total amount of capital. Banks from Italy, Austria, Greece, and France had the highest capital participation. Accordingly, Banca Intesa was the leader on the Serbian market in the entire analyzed period. It is in accordance with the Western Balkan region trends (WB, 2016). An increasing item was the amount of net balance sheet assets, which increased by around 11% from RSD 2,968 billion to RSD 3,369 billion from 2014 to 2017 (NBS, 2018). The faster growth of assets was achieved by banks owned by foreign entities, but the growth of total assets, despite the decrease in the number of banks, was also present in the banking sector owned by domestic entities. The average liquidity ratio over the entire observed period was above 2, which confirms general hypothesis, since banks have significant excess liquidity if it is known that the regulatory minimum is 1. In practice, a liquidity ratio of about 2 would mean that banks cover 1 RSD of liabilities with 2 RSD of assets.

*Table 2. Results of the implementation of the Pearson coefficient on the liquidity of the Serbian banking sector in the period 2010-2017*

<b>Pearson Correlation Model</b>	Liquidity indicator 1	Liquidity indicator 2	Liquidity indicator 3	Liquidity indicator 4
Cash and balances with the Central Bank	0,94	0,92	0,05	-0,48
Available-for-sale financial assets	-0,87	-0,88	-0,05	0,91
Loans and receivables from	0,66	0,69	-0,70	-0,35

banks and other financial institutions				
Loans and receivables from customers	-0,43	-0,41	0,47	-0,39
Property, plant and equipment	-0,85	-0,88	0,47	0,56
TOTAL ASSETS	0,51	0,47	0,45	-0,16
Other assets (%)	0,77	0,78	-0,63	-0,06
Deposits and other liabilities	-0,41	-0,38	0,16	-0,33
Provisions	0,99	0,87	-0,54	-0,22
Liabilities	0,23	0,19	-0,14	0,48
Share capital	0,90	0,92	-0,09	-0,83
TOTAL LIABILITIES	0,77	0,78	-0,63	-0,06

Source: Authors' calculation based on balance sheets of analyzed banks and quarterly NBS reports.

The executed comparative analysis for the period 2010-2017 results in information on materially significant balance sheet positions of banks' liquidity in the Republic of Serbia, and the presented research findings supported achievement of the primary research goal. Moreover, the values of cash, share capital and provisions had the significant influence of banks' liquidity.

Table 2 presents values between observed liquidity ratios and their movements in accordance with the movements of observed balance sheet items measured by Pearson's correlation model. A very strong, statistically significant, correlation was observed between an increase in cash and an increase in bank's liquidity (a special hypothesis), while a moderate correlation was observed between an increase in cash and average total liabilities. It can be concluded that banks have sufficient cash available. On the other hand, less liquid assets, especially in the context of primary liquidity, means less expenses on holding them, because their placement generates income, which implies that there is a negative correlation referring to financial assets held for sale in relation to the movement of liquidity. It can be said that the more a bank provides loans to business and residential sector, the higher is the outflow of funds, thus a bank can have illiquidity problems if credit installments are not paid on time or if there is not appropriate asset and liability management in place. Banks can borrow from other banks as well as from the central bank and thus strengthen their financial potential (Mishkin, 2012). However, these borrowings carry more costs and potential risks than

e.g. deposits of legal entities and individuals. It can be seen in the analysis that this supports the obtained negative strong correlation of -0.70 between the third liquidity indicator and the loans and receivables of other banks. On the other hand, the increase in liquidity is positively affected by customers' (borrowers') fulfilment of commitments in time. So, the negative mean correlation of -0.43 can lead to further analysis of non-performing loans (NPL), which used to have a decreasing trend, from 21.6% at the end of 2015 to 6.4% at the end of the third quarter of 2018 (NBS, 2018). That was a result of the implementation of the Decision on accounting write-off of balance sheet assets, which led to a decrease in the amount of problematic loans by RSD 53.6 billion in September 2017 alone (NBS, 2019). It is important to stress out that the financial sector across the Western Balkan region has progressed in strengthening certain regulations and eliminating certain oversights (ECB, 2017). With this in mind, a time deposit for a bank represents a future payment of principal and interest rates (liabilities), and the strong positive correlation with liquidity ratios is not surprising, since the payment in the future will imply an outflow of liquid assets. Although necessary to cover potential losses, provisions still represent a kind of opportunity cost - this is borne out by the strong positive correlation amount obtained - 0.99. According to Doojav & Batmunkh (2018), this level of provisions reflects the unused portion of the bank's credit potential since it does not yield anything. The paper confirmed the existence of strong (positive) increase in shareholder capital affects liquidity. Shareholder capital is part of the highest quality capital and can be used unconditionally, in its entirety and without delay to cover risks or losses from business operations (Vesić et al, 2019). Moreover, a capital, as a guarantee substance, is extremely important for determining the amount of risk that can be assumed and under what conditions (Barjaktarović, 2013; Barjaktarović et al., 2013).

## 5. Conclusions

The conducted analysis indicates that the banking sector of the Republic of Serbia is gradually achieving better business performance as a result of regulatory requirements and owners' intentions to change the business model in order to achieve the optimum level of profit while taking risks in a changing environment. The main driver of balance sheet asset growth is intensive lending activity. Six out of ten observed banks are foreign-owned and hold 74% of the market share. Individually, foreign-owned banks have better business performance, including liquidity. Bank's customers can evaluate bank liquidity on the basis of efficiency in execution of payment orders, in terms of time when the order was submitted for execution and at which moment the creditor received funds to the account. The executed comparative

analysis for the period 2010-2017 results in information on materially significant balance sheet positions of banks' liquidity in the Republic of Serbia, and the presented research findings support achievement of the primary research goal. Moreover, the values of cash, share capital and provisions had the significant influence of banks' liquidity. Monitoring the level and the trend of NPL is of great importance for identifying potential problems with debt collection and monitoring credit risk, as these loans and related indicators represent indicators of deterioration in the quality of the banking sector's loan portfolio. However, based on liquidity indicators, it can be concluded that the Serbian banking sector is moving in a stable and predictable business environment, which confirms the general hypothesis of this paper. The National Bank of Serbia adjusted regulatory minimums during 2018 to the level of Basel standards, which can be a confirmation that the Serbian banking sector is approaching the European countries, both in quality and in the security of financial sector. Therefore, the overall liquidity ratio is above the regulatory minimum, and a comparison of balance sheet positions with liquidity ratios indicates that a higher amount of cash and assets with the central bank will have a direct impact on increasing liquidity ratios;

- An increase in available-for-sale assets will directly affect the bank's overall liquidity if excessive placement of funds occurs;
- An increase in loans and receivables from banks and other financial institutions will lead to an increase in liquidity in the short-term, but as soon as the annuity payment comes, banks may run into problems of liquidity and the need for further borrowing;
- An increase in property, facilities and equipment will have a major adverse effect on liquidity, since the amount to pay for these items is measured in high figures and will take a long time to return to the form of cash (at the desired time);
- The customers' withdrawal of deposits and payment of commitments after due date have a strong negative impact on liquidity. If the quality maturity structure of receivables and sources of funds is not created, the bank can easily get into the problem of illiquidity;
- Provisions have a positive effect on increasing liquidity, as they represent one of the types of guarantors of payment of future liabilities, but, on the other hand, reduce the size of credit potential;
- An increase in share capital has a positive effect on increasing the bank's liquidity. In the case of share issuing, the bank raises funds which will be used to place the loan. By earning an active interest rate, a portion of the earned income will be set aside for future dividend payments.

The relatively conservative NBS policy has helped banks to cope with the negative effects of the economic crisis on the Serbian market. It can be said that many market participants will not be in the same position in the near future. Currently, there is an on-going process of consolidation of the Serbian banking market, as a result of local and regional mergers and acquisitions. Furthermore, macroeconomic factors will have an effect on the efficiency of Serbian banks. Finally, global trends and tendencies in the introduction of new products and new entities in the market will influence the performance of Serbian banks.

Further research will be focused on mixed factors influencing liquidity of consolidated banks which perform business in the Republic of Serbia, as well as in the Western Balkan region.

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