Financial Development, Banking Sector and Economic Growth in BiH: An Empirical Analysis

BRANKA TOPIĆ PAVKOVIĆ, SLAVIŠA KOVAČEVIĆ & DRAGO KURUŠIĆ

Abstract Achieving sustainable economic growth is one of the main goals of economic policy in modern countries. As previous research has shown, the development of financial system has a significant influence on economic growth. The importance of the banking sector in developing countries becomes particularly important due to the insufficient evolvent of other parts of the financial system. The subject of this paper is the analysis of the impact of the banking sector of Bosnia and Herzegovina on economic growth in the period from 2000 to 2021. The aim of the study is to quantify this relationship. The regression relationship between the observed variables was tested, as well as the presence of causality. The results show that the increase in total loans granted by the banking sector to companies from the non-financial sector has a direct positive impact on the development of GDP. Namely, a 1% increase in total bank credit to non-financial private sector firms leads to an increase in GDP of about 0.46%.

Keywords: • financial development • banking sector • economic growth • capitalisation • liquidity

CORRESPONDENCE ADDRESS: Branka Topić Pavković, Ph.D., Associate Professor, University of Banja Luka, Faculty of Economics, Majke Jugovića 4, Bosnia and Herzegovina, e-mail: branka.topic-pavkovic@ef.unibl.org. Slaviša Kovačević, Ph.D., Associate Professor, University of Banja Luka, Faculty of Economics, Majke Jugovića 4, Bosnia and Herzegovina, e-mail: slavisa.kovacevic@ef.unibl.org. Drago Kurušić, MSc, Bosnia and Herzegovina, e-mail: dkurusic96@gmail.com.

https://doi.org/10.4335/2023.3.22 ISBN 978-961-7124-14-9 (PDF)
Available online at http://www.lex-localis.press.

1 Introduction

Financial development and economic growth, as well as the interdependence between these two categories, can be considered as one of the most important topics in contemporary economic theory. Financial markets help to direct the flow of investment and savings in the economy in ways that facilitate capital accumulation and the production of goods and services. They provide the opportunity to create a sufficient number of transactions necessary for the realization of investment and economic growth (Stiglitz & Weiss, 1983; Diamond, 1984). Recent studies have considered the relationship between the development of the financial system and economic growth, assessing the level of implications of the development of the banking sector and the movement of GDP. In the vast literature, we also find authors who attribute a lesser role to finance in economic growth (Robinson, 1952; Lucas, 1988) or claim that finance is not a factor in economic growth (Shan, 2005), i.e., financial development leads to disturbances in the economy (Wijnberg, 1983; Buffie, 1984).

Since the first relevant study by Goldsmith (1969) pointing out the importance of financial development in the process of economic growth, there have been numerous studies addressing this relationship. King & Levine (1993), looking at the breadth of financial instruments, the relative importance of commercial banks to the central bank, the percentage of credit extended to private firms, and the percentage of credit to private firms to GDP, show that these measures of financial development are strongly related to growth in real GDP per capita. Financial intermediation is positively related to economic growth (Levine, 2000), and Beck et al (2000) show that the breadth of financial intermediation has a positive impact on economic growth via higher productivity, while overall financial development may be positively correlated with economic growth (Neusser & Kugler, 1998; Roussean & Wachtel, 2002; Malarvizhi et al; 2019).

Achieving stable economic growth requires the coherence of determinants that create the conditions for long-term growth. The development and stability of the financial sector is one of the determinants that constitute an important factor in creating economic growth and increasing the country's GDP level. The financial system, as an integral part of the economic system, plays a key role in the process of allocation of financial resources. The financial system has a complex structure, the elements of which enable the smooth flow of financial resources at the national and global levels.

One of the main pillars of the country's financial system is the banking sector. The importance of the development and stability of the banking sector in developing countries is particularly evident in the underdevelopment of other parts of their financial sector. A sound financial system dominated by the banking sector can influence economic growth. In this paper, we examine the relationship between BiH's banking sector and its impact on economic growth. The period we observe through empirical research covers the period from 2000 to 2021.

The aim of this research is to quantify the relationship between loans granted to companies from the non-financial sector and economic growth. Therefore, the main hypothesis to be proven is: the increase in loans to companies from the non-financial sector increases the economic growth of BiH. It is undeniable that the banking sector in BiH has expanded in terms of number, diversity of activities and provision of financial services. Nevertheless, the role of banking sector development in influencing economic growth is largely under-researched. This study addresses the question of whether banking sector development stimulates economic growth in BiH. Our major contribution to this debate lies in identifying the role that banks play in fostering economic growth.

2 Literature overview

Since the first studies pointed out the impact of financial development on economic growth, numerous researches have emerged to address this relationship. There are attempts by authors to explain, through relevant research, the relationship between the financial system of countries and the impact on GDP (Hoshi et al., 1991; Weinstein & Yafeh, 1998; Arestis et al., 2001). Financial structure also has a significant impact on GDP performance, but country characteristics have a unique influence on this relationship (Arestis et al., 2008). This is particularly evident in economies that do not have a developed financial market as a whole, as well as in individual parts of the financial market. In economies where firms exist under conditions of a poorly developed financial market, they rely largely on bank credit to finance further development and output growth. Therefore, Jayaratne (1996) finds that bank loans to firms that do not have access to the broader financial market are engines of growth. Rajan & Zingales (1998) examined the relationship between financial development and specific industries at the industry level. They calculated an index for each industry that observes a specific industry's needs related to finance and concluded that the higher the industry index they constructed, the greater the need for more developed financial markets. The implication of this work is that countries that depend on industries that need financial development need adequate financial development to achieve economic growth.

Most changes in financial markets are aimed at making the role of credit in the economy more efficient (Bernanke et al., 1998). Credit plays an important role in creating economic growth and countries that increase credit to the private sector while taking financial risks achieve faster growth, while such extensive credit policies, especially towards the financial and real estate sectors, can be the cause of financial crises (Bezemer, 2012). Therefore, it is necessary to balance credit policies and unify legal regulations in the banking sector to achieve economic growth. Expansionary credit policies are positively related to economic growth in growing economies (Estrada et al., 2018), while the situation in financially developed economies, which are less unstable, is such that they achieve higher economic growth even in the presence of credit constraints (Aghion et al., 2005). When we talk about credit constraints, credit tightening has similar effects on small

and large firms, but has a negative impact on investment and employment only for small firms (Bottero et al., 2020). Which is somewhat related to Schumpeter's growth theory that small firms are the carriers of economic growth, mainly through innovation, so credit to the population creates funds available to successful entrepreneurs (Lindholm, 1964). However, small businesses have a very difficult time accessing the broader financial markets, with the exception of financing from the banking sector, and for this reason one can conclude why small businesses are more sensitive to credit contractions.

Garcia-Escribando et al. (2015) find that there is a significant effect of credit growth on real economic activity, depending on the type of credit. That is, credit to the private sector affects GDP through investment, while consumer credit is related to private consumption. In relevant studies in this area, the ratio of credit directed to the private sector to GDP is considered as an independent variable when examining the impact of financial development, mainly through commercial bank credit (King & Levine, 1993; Levine, 1997; 2000; Saci et al. al, 2009). Guru & Yadav (2019) examined the relationship between financial sector development and economic growth during the period from 1993 to 1994 using BRICS countries as an example. They included four independent variables in the study: the breadth of financial intermediaries as a percentage of bank liquid assets to GDP, the ratio of commercial banks' assets to deposits increased by central bank assets, the ratio of loans to deposits, and loans to the private sector to GDP. With the application of the dynamic panel model, the authors showed that the previously listed indicators of the development of the banking sector in a positive relationship determine the movement of economic growth, with the significance of the calculated parameters. Grbić & Luković (2020), using Serbia as an example, show that there is a one-way cause-and-effect relationship between the credit activity of banks directed to economic growth. In this work, the authors observed the influence of the share of loans extended to households and the share of loans extended to businesses, and the causal relationship was confirmed in both cases.

Gaytan & Ranciere (2003) show that medium-developed countries need to find an optimal measure of vulnerability to liquidity crises, while underdeveloped and rich countries should develop financial system protection. For this reason, medium-developed countries may face a crisis in the banking sector as they develop. Matei (2020) finds that financial development has a positive impact on growth only in the long run. The empirical results suggest that there is some threshold in the relationship between financial development and economic growth. The impact of financial development on economic growth has a positive effect up to a certain level (Law & Singh, 2014). This has been shown by relevant research in this area (Deida & Fattouh, 2002; Huang & Lin, 2009; Chechetti & Kharroubi, 2012; Arcand et al, 2015; Ductor & Grechyna, 2015; Samargandi et al, 2015; Md & Wei, 2018; Ho & Saadaouni, 2022). while on the other hand, the impact of liquidity has a positive effect on bank assets and liabilities (Diamond & Dybvig, 1983). Berger & Sedunov (2016) find that the impact of liquidity is greater in industries that are more

dependent on banks. The impact of liquidity on growth can be found in relevant studies (Greenwood & Jovanovic, 1990; Bencivenga & Smith, 1991; Levine & Zervos, 1996). The stability of the banking sector contrasts with the banks' expansionary credit policy. The capitalization ratio is an indicator that provides information on the ratio of capital to bank assets. The higher the capital-to-assets ratio, the more restrictive the banking system is in lending. In this way, capital regulation plays an important role in increasing the stability of the financial system (Craig & Koepke, 2012). Increasing capital and property raids have a temporary negative impact on lower investment, consumption, and production, which can lead to short-term recessions (Eickmeier et al., 2018). In this way, economic growth is sacrificed to some extent at the expense of increasing capital in the banking sector (Majcher, 2015). Fraisse et al. (2017) show that a 1% increase in the capitalization rate reduces bank lending by 10%. By reducing bank lending, especially to users that rely on bank credit, such as small businesses, this can lead to a decline in economic growth. An increase in the capitalization rate leads to heterogeneous responses across economic sectors, resulting in a decline in lending for commercial real estate, businesses, and households (Bridges et al., 2014). There is a significant contribution in the literature to the study of the corelation between the financial stability of the banking system through the relationship between capital and bank assets and performance in the real economy (Blum, 1999; Diamond & Rajan, 2002; Kopecky & VanHoose, 2006; Hakenes & Schnabel, 2011; Fratzscher et al, 2016; Gorton & Winton, 2017; Agenor & Pereira da Silva, 2021).

Depending on who plays the main role in financing firms, two models of financial system are distinguished in developed market economies: market-based and bank-based financial systems. This is the traditional approach to classifying financial systems, known as the classical dichotomy (Veysov & Stolbov, 2012). Banks are thought to have an advantage over the securities market in the early stages of economic development when the institutional environment is not efficient enough to support securities market activities (Grbić & Jovanović, 2020).

According to authors Hassan et. al (2017), positive effects on the banking sector in Bosnia and Herzegovina were achieved through the penetration of foreign capital into the banking system, which led to better credit supply and higher quality of banking services. This made it possible to improve the management of banks, increase customer satisfaction, introduce new business technologies, improve the infrastructure of the financial system, and attract foreign direct investment. All this ultimately led to the growth of GDP in BiH.

The stability of the banking system should not be overestimated under conditions of stable economic growth and is even more important for economies in transition. The relationship between the banking system and other economic movements is used by many researchers to define banking stability, as the banking system has a great importance for the overall economy. This is due to the immensely important function of banks as financial

intermediaries. The dependence of other sectors on the banking sector underscores its importance to the overall economy. A stable and healthy banking sector, in conjunction with the balance of public finances, can contribute to the stability and growth of the entire economic system.

In the economic environment of developing countries such as BiH, which is characterised by the underdevelopment of its financial market for securities, the role of commercial banks in the economy plays an important role. These market conditions lead to the fact that banks play a prominent role in the processes of resource allocation, which means that the credit policy of the banking sector becomes a crucial factor influencing the macroeconomic efficiency, economic growth and social development (Bašić & Ćurić, 2021).

3 The specificity of the banking sector in BiH

If we look at the financial sector of Bosnia and Herzegovina, we can see that it is predominantly based on commercial banks. The banking sector represents one of the most important components of the modern financial market, mainly because of the volume of assets it holds, especially in developing countries. Therefore, the fundamental characteristic of the financial system in BiH is the dominant position of banks and the banking sector compared to other sectors of the financial system.

The banking sector in Bosnia and Herzegovina is characterized by the activity of a total of 24 banks. Of these, 8 banks are registered in the Republic of Srpska, while 16 banks are registered in the Federation of Bosnia and Herzegovina. In the end of 2021, in financial market of Bosnia and Herzegovina, in the sector of non-banking financial institutions includes, 25 insurance companies and one reinsurance company, 32 investment funds, 4 leasing companies, 26 microcredit organisations, 8 broker companies and 2 stock exchanges (Central Bank of Bosnia and Herzegovina, 2022).

Figure 1: Number of Financial Institutions in BiH

Financial instituitons in BH	*31 December 2020*			*30 June 2021*			*31 December 2021*		
	FBiH	**RS**	**Total**	**FBiH**	**RS**	**Total**	**FBiH**	**RS**	**Total**
*Banks**	16	8	**24**	16	8	**24**	15	8	**23**
Investment funds	16	19	**35**	16	19	**35**	16	16	**32**
Insurance and reinsurance companies	12	14	**26**	12	14	**26**	12	14	**26**
Broker's houses	4	4	**8**	4	4	**8**	4	4	**8**
Leasing companies	4	0	**4**	4	0	**4**	4	0	**4**
Microcredit organizations	14	14	**28**	13	14	**27**	13	13	**26**
Stock exchanges	1	1	**2**	1	1	**2**	1	1	**2**
Total	**67**	**60**	**127**	**66**	**60**	**126**	**65**	**56**	**121**

** Razvojna banka FBiH is included*

Source: Central Bank of Bosnia and Herzegovina, 2022. Available at: https://www.cbbh.ba/Content/Read/8.

The total financial sector assets in Bosnia and Herzegovina in the end of 2021 amounted to KM 43.3 billion, which is higher by KM 2.9 billion or by 7.1% compared to the positions recorded in the end of 2020. The largest share still belonged to banks accounting for 88.4% of the total financial sector assets. Insurance and reinsurance companies accounted for KM 2.3 billion, i.e. 5.4% of the total financial sector assets.

Figure 2: The financial sector assets in Bosnia and Herzegovina in the end of 2021

Financial instituitons in BH	*12/2020*		*06/2021*		*12/2021*		*Assets growth index*	
	Assets	*Share (%)*	*Assets*	*Share (%)*	*Assets*	*Share (%)*	*12.2021/ 12.2020*	*12.2021/ 06.2021*
Commercial banks	35.790,84	88,59	37.040,81	88,61	38.279,64	88,45	106,95	103,34
Investment funds	2.189,48	5,42	2.279,49	5,45	2.326,68	5,38	106,27	102,07
Insurance and reinsurance companies	820,22	2,03	835,29	2,00	943,41	2,18	115,02	112,94
Broker's houses	1.161,03	2,87	1.176,05	2,81	1.246,74	2,88	107,38	106,01
Leasing companies	416,48	1,03	444,70	1,06	458,03	1,06	109,98	103,00
Microcredit organizations	11,64	0,03	13,62	0,03	14,14	0,03	121,52	103,84
Stock exchanges	10,47	0,03	11,03	0,03	10,46	0,02	99,88	94,81
Total for sector	***40.400,16***	***100,00***	***41.801,01***	***100,00***	***43.279,11***	***100,00***	***107,13***	***103,54***

Source: Central Bank of Bosnia and Herzegovina, 2022. Available at: https://www.cbbh.ba/Content/Read/8.

As the banking sector holds a dominant position in the financial sector of Bosnia and Herzegovina, the situation in this sector is of particular importance for the overall economic development of country. In Table 1, we find the main indicators for the observed period.

Table 1: Main indicators of banking sector in BiH (2000-2021.) (Author's adaptation)

Year	Total placed loans (in billions BAM)	Banking sector capital (in billions of BAM)	Total assets of the banking sector (in billions of BAM)	Credit share in GDP	Share of liquid assets in total assets	Capitalization rate
2000	3,02	1,10	4,27	25,59	37,30	25,70
2001	3,34	1,12	5,57	26,41	44,60	20,07
2002	4,28	1,21	6,35	30,70	33,80	19,13
2003	5,12	1,31	7,69	34,86	35,10	16,98
2004	5,93	1,47	9,40	37,05	35,70	15,66
2005	7,54	1,71	11,87	43,87	36,10	14,42
2006	8,81	1,60	14,36	45,36	35,90	11,11
2007	11,50	1,97	19,25	52,50	37,70	10,23
2008	14,14	2,27	20,74	56,58	29,50	10,95
2009	13,68	2,32	20,64	55,23	30,30	11,24
2010	14,15	2,51	20,78	55,81	28,50	12,07
2011	14,90	3,05	21,49	56,86	27,00	14,17
2012	15,54	3,19	21,93	59,34	25,30	14,56
2013	16,03	3,35	23,07	59,93	26,20	14,52
2014	16,47	3,41	24,05	60,33	26,60	14,17
2015	16,87	3,55	24,95	59,00	26,20	14,25
2016	17,20	3,77	26,10	57,53	26,90	14,46
2017	18,42	4,01	28,24	58,72	28,10	14,19
2018	19,49	4,13	30,96	58,26	29,30	13,34
2019	20,77	4,37	33,38	58,85	29,20	13,09
2020	20,35	4,32	33,81	59,40	28,60	12,79
2021	21,08	4,43	36,38	56,86	30,70	12,17

With the introduction of a more efficient system of banking supervision and conditions for independent market operations, the banking sector became the most stable part of the economy of Bosnia and Herzegovina. The greatest changes occurred in the ownership

structure when state property and capital were transferred to private ownership. At the same time, Bosnia and Herzegovina has introduced better administration and the application of new laws based on international standards. For the banking sector, this meant reform, restructuring and consolidation. This was the first step toward its further rapid development.

4 Research

Based on the research objective, i.e., quantifying the relationship between the variables of the banking sector of BiH and economic growth, we have singled out three variables that we will observe. In the relevant literature, the mentioned variables have been recognized as crucial factors for the study of this issue. The empirical analysis that we conduct in the study considers the period from 2000 to 2021. The independent variables in the study are divided into financial variables, while we consider GDP as the dependent variable. The following table provides a specification of the variables that are the subject of the study:

Table 2: Specifics of the research variables (Source: Author's presentation)

Variables	Label	Type	Source
Gross domestic product	*GDP*	Dependent	International Monetary Fund
Total loans of the banking sector to non-financial private companies	*CPS*	Independent	Central Bank of BiH
Liquidity of the banking sector	*LIQUID*	Independent	Central Bank of BiH
Market capitalization of the banking sector	*CAP*	Independent	Central Bank of BiH

The dependent variable *GDP* is observed as the nominal gross domestic product shown in levels, in local currency and the variable *CPS* is the level of bank placements to non-financial companies, also shown in levels and in local currency. The variable *LIQUID* observes the total liquid assets of commercial banks as a percentage of total bank assets and variables *CAP* is the ratio of bank capital of commercial banks to bank assets.

To establish a proportional relationship between GDP and the variables CPS, single linear regression is used, a technique most commonly used to determine the correspondence between two variables when there is a dependent variable and an independent variable. The single linear regression is presented as follows:

$$Y_i = \beta_0 + \beta_1 x_i + e_i, \;\; i = 1,2, \dots N \qquad 1$$

where Y_i is the dependent variable, x_i is the independent variable, β_0 and β_1 are the regression parameters, e_i is the stochastic term of the regression and where N is the population size. In our research, we created a single regression model using the data from the sample, which was presented in logarithmic transformation:

$$logGDP = b_0 + b_1 logCPS \quad 2$$

where b_0 and b_1 are unknown regression parameters that we estimate from sample data. Using linear regression, we will determine the fitted line with the least square error of the regression against the sampled data to determine the intensity and direction of interdependence between the independent and dependent variables.

5 Results and Discussion

In this chapter, we present the results obtained by examining the relationship between banking sector variables and economic growth in BiH. Based on the methodology presented, the following table contains descriptive statistics on the variables we observed during the research:

Table 3: Descriptive statistics (Source: Author's calculations)

	GDP	CPS	CAP	LIQUID
Mean	24.50	5.86	14.51	31.30
Median	25.76	7.03	14.17	29.40
Maximum	37.07	9.03	25.70	44.60
Minimum	11.79	0.87	10.22	25.30
Std. Dev.	7.65	2.78	3.49	4.99
Skewness	-0.16	-0.67	1.66	0.91
Kurtosis	1.94	1.92	6.01	3.19
Jarque-Bera	1.12	2.72	18.41	3.11
Probability	0.57	0.25	0.00	0.21
Sum	539.07	12.86	319.24	688.60
Sum Sq. Dev.	1230.53	1.62E+08	256.36	524.44
Observations	22	22	22	22

Among the variables we observe in the study, first we determine the direction in which the observed variables move. In determining the correlation, we use Pearson's correlation coefficient. The correlation results are presented in the following table:

Table 4: Correlation matrix (Source: Author's calculations)

	GDP	CPS	CAP	LIQUID
GDP	1	-	-	-
CPS	0.97	1	-	-
CAP	-0.61	-0.76	1	-
LIQUID	-0.74	-0.84	0.42	1

According to the correlation results obtained, we can confirm the existence of a positive linear relationship between GDP and total banking sector loans to non-financial companies in Bosnia and Herzegovina, with a high correlation coefficient of 0.97. The results of the correlation also support an inverse relationship between GDP as an dependent variable in the research and the ratio of capital and assets of the banking sector, i.e., the capitalization of the banking sector and the liquidity of the banking sector in Bosnia and Herzegovina. The correlation coefficient between the movement of capitalization and GDP is -0.61 and between the development of GDP and banking sector liquidity this is -0.74. These results prove the existence of a inverse relationship between the development of GDP, on the one hand, and capitalization and liquidity, on the other. In the correlation matrix, we can also see that there is a multicollinearity between the independent variables capitalization and liquidity and banking sector credit as the third independent variable in the research.

Now we present results demonstrating a linear relationship between total banking sector credit to nonfinancial private firms and economic growth. The relationship, which we tested with statistical software, is expressed in the results of the following table:

Table 5: Linear regression results (Source: Author's calculations)

Dependent Variable: LOG(GDP)				
Method: Least Squares				
Date: 08/28/22 Time: 09:37				
Sample: 2000 2021				
Included observations: 22				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.75	0.23	-3.19	0.005
LOG(CPS)	0.46	0.02	16.59	0
R-squared	0.93	Mean dependent var		3.14
Adjusted R-squared	0.92	S.D. dependent var		0.34
S.E. of regression	0.09	Akaike info criterion		-1.83
Sum squared resid	0.17	Schwarz criterion		-1.73
Log likelihood	22.18	Hannan-Quinn criter.		-1.81
F-statistic	275.41	Durbin-Watson stat		0.14
Prob(F-statistic)	0			

Based on the results presented in the previous table, we see a positive relationship between the total number of commercial banks' loans to non-financial companies in the BiH economy and economic growth. As evidenced by the research results, a 1% increase in the banking sector's loans to non-financial companies implies a 0.46% increase in GDP. The coefficient test shows the statistical significance of the estimated linear regression coefficients. The coefficient of determination is 0.932, which means that fluctuations in the change in the level of GDP can be explained by 93.23% changes in the level of total banking sector credit to non-financial firms.

We will test the presence of causality between the independent and dependent variables based on the methodology proposed by Granger (1969). In order to determine the optimal length of the historical values that we will use to test the presence of causality between the observed variables, we will use the VAR model. Based on the VAR model and the information criteria for determining the optimal length of lags, the smallest value of the criteria for choosing the optimal number of lags is considered when testing causality. The results show that using the lag length of the three previous values in the VAR model is optimal, as shown in the following table:

Table 6: Selection of the optimal number of previous values (Source: Author's calculations)

VAR Lag Order Selection Criteria						
Endogenous variables: LOG(GDP) LOG(CPS) LOG(LIQUID) LOG(CAP)						
Exogenous variables: C						
Date: 08/28/22 Time: 09:22						
Sample: 2000 2021						
Included observations: 19						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	58.1793	NA	3.92E-08	-5.703085	-5.504255	-5.669435
1	151.2083	137.0954	1.24E-11	-13.8114	-12.81725	-13.64315
2	168.4985	18.20024	1.43E-11	-13.94721	-12.15775	-13.64436
3	221.1914	33.27970*	7.35e-13*	-17.80962*	-15.22484*	-17.37217*
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

For the previously estimated VAR model, Appendix 1 provides evidence that there is no autocorrelation for the specified number of layers. Based on the previously established number of optimal lags and the above methodology for testing causality between the time series, in the following table, Granger causality was tested between the observed variables GDP, CAP, CRED and LIQUID and the following results were obtained:

Table 7: Results of the causality test (Source: Author's calculations)

Pairwise Granger Causality Tests			
Date: 08/28/22 Time: 09:26			
Sample: 2000 2021			
Lags: 3			
Null Hypothesis:	Obs	F-Statistic	Prob.
LOG(CPS) does not Granger Cause LOG(GDP)	19	0.23826	0.868
LOG(GDP) does not Granger Cause LOG(CPS)		0.05447	0.9825
LOG(LIQUID) does not Granger Cause LOG(GDP)	19	5.12129	0.0165
LOG(GDP) does not Granger Cause LOG(LIQUID)		0.34167	0.7957
LOG(CAP) does not Granger Cause LOG(GDP)	19	4.6504	0.0222
LOG(GDP) does not Granger Cause LOG(CAP)		0.65372	0.5958
LOG(LIQUID) does not Granger Cause LOG(CPS)	19	6.02535	0.0096
LOG(CPS) does not Granger Cause LOG(LIQUID)		1.56339	0.2494
LOG(CAP) does not Granger Cause LOG(CPS)	19	3.06906	0.0589
LOG(CPS) does not Granger Cause LOG(CAP)		4.35068	0.0272
LOG(CAP) does not Granger Cause LOG(LIQUID)	19	7.72309	0.0039
LOG(LIQUID) does not Granger Cause LOG(CAP)		0.90206	0.4687

As the presented results of the causality test show, at 1% significance, it is possible to conclude that the development of capitalization and liquidity in the banking market of BiH causes the development of the domestic product. The nature of the relationship in both cases is unilateral, which means that the development of GDP does not cause the movement of the other two variables. Similarly, the existence of a unilateral causal relationship was confirmed in the case of liquidity development and the movement of loans granted to non-financial companies, where the relationship is also one-sided. The

causal relationship between the evolution of lending and the capitalization rate can be considered two-sided, because based on the F-statistic and probability, we can conclude that there is a two-way influence of these two variables in the sense of Granger causality. There is also a causal relationship in the relationship between capitalization and liquidity, and it is unilateral. In the other cases we tested, the causal relationship between the observed variables was not confirmed.

6 Conclusion

Given the fact that the banking sector has a multidimensional impact on the development of the national economy, there has been a significant increase in interest in studying and clarifying the nature of their interconnectedness. The paper focuses on the issue of whether and to what extent the development of the banking sector stimulates economic growth in Bosnia and Herzegovina in the period from 2000 to 2021. The aim of this research was to determine the cause-effect relationship and the intensity of dependence between the quality of the banking sector and economic growth.

The development of the banking sector in Bosnia and Herzegovina was mainly focused on the opening of the banking system to foreign banks. The acquisition of the new banks led to increased competition, which, together with a higher level of prudential supervision, resulted in an overall improvement in the quality of the banking sector's operations. It is undeniable that the banking sector in Bosnia and Herzegovina has expanded in terms of number, diversity of activities and provision of financial services. Due to strong competition, customers have more choices when selecting their bank.

Quantitative analysis has shown that in BiH a strong positive correlation can be expected between the development of the banking sector and the gross domestic product. The obtained results indicate a positive linear relationship between GDP and total banking sector loans to non-financial companies in BiH, with a high correlation coefficient of 0.97. The correlation results also support the existence of a negative relationship between GDP as an dependent variable in the study and the ratio of banking sector capital and assets, i.e. banking sector capitalization and banking sector liquidity in BiH.

The banking sector plays a key role in securing sources of financing for the purpose of economic growth. The research findings are consistent with previous studies and are essential for developing countries such as Bosnia and Herzegovina that seek long-term economic growth. The development of the banking sector increases the value of the entire financial system and helps to ensure financial stability. At the same time, it promotes the development of production and a growing economy.

References:

Agénor, P.-R. & Pereira da Silva, L. A. (2021) Capital requirements, risk-taking and welfare in a growing economy, *Journal of Regulatory Economics*, 60, pp. 167-192, https://doi.org/10.1007/s11149-021-09438-z.

Aghion, P., George-Marios, A., Abhijit, B. & Manova, K. (2005) Volatility and Growth: Credit Constraints and Productivity-Enhancing Investment, *NBER Working Paper*, No. 11349, https://doi.org/10.3386/w11349.

Arcand, J. L., Berkes, E. & Panizza, U. (2015) Too much finance?, *Journal of Economic Growth*, 20(2), pp. 105-148, https://www.jstor.org/stable/44113443.

Arestis, P., Demetriades, P. O. & Luintel, K. B. (2001) Financial Development and Economic Growth: The Role of Stock Markets, *Journal of Money, Credit and Banking*, 33(1), pp. 16-41, https://doi.org/10.2307/2673870.

Luintel, K. B., Khan, M., Arestis, P. & Theodoridis, K. (2008) Financial structure and economic growth, *Cardiff Economics Working Papers*, No. E2008/3 (Cardiff: Cardiff University, Cardiff Business School), available at: https://www.econstor.eu/bitstream/10419/83908/1/558750761.pdf (September 5, 2022).

Bašić, D. & Ćurić, P. (2021) Credit policy of banks in the function of developing the economy of Republic of Srpska, *Acta Economica*, 19(34), pp. 225–238, https://doi.org/10.7251/ACE2134225B.

Beck, T., Levine, R. & Loayza, N. (2000) Finance and the sources of growth, *Journal of Financial Economics*, 58(1-2), pp. 261-300, https://doi.org/10.1016/S0304-405X(00)00072-6.

Bencivenga, V. R. & Smith, B. D. (1991) Financial Intermediation and Endogenous Growth, *The Review of Economic Studies*, 58(2), pp. 195-209, https://doi.org/10.2307/2297964.

Berger, A. N. & Sedunov, J. (2016) Bank liquidity creation and real economic output, *Journal of Banking & Finance*, 81, pp. 1-19, https://doi.org/10.1016/j.jbankfin.2017.04.005.

Bernanke, B. S. & Blinder, A. S. (1998) Credit, Money, and Aggregate Demand, *American Economic Review*, 78(2), pp. 435-439.

Bezemer, D. J. (2012) Finance and Growth: When Credit Helps, and When it Hinders, Paper presented at the *"Paradigm Lost" INET conference in Berlin*, April 12–15.

Blum, J. (1999) Do capital adequacy requirements reduce risks in banking?, *Journal of Banking and Finance*, 23(5), pp. 755-771, https://doi.org/10.1016/S0378-4266(98)00113-7.

Bošnjak, A., Hassan, A. & James, K. (2017) Analysis of the Banking Sector Performance in Bosnia and Herzegovina, Montenegro and Serbia Before and After the Global Financial Crisis, *Economics, Sciendo*, 5(2), pp. 83-101, https://doi.org/10.1515/eoik-2017-0029.

Bottero, M., Lenzu, S. & Mezzanotti, F. (2020) Sovereign debt exposure and the bank lending channel: Impact on credit supply and the real economy, *Journal of International Economics*, 126, https://doi.org/10.1016/j.jinteco.2020.103328.

Bridges, J., Gregory, D., Nielsen, M., Pezzini, S., Radia, A. & Spaltro, M. (2014) The impact of capital requirements on bank lending, *Bank of England Working Paper*, No. 486.

Buffie, E. F. (1984) Financial repression, the new structuralists, and stabilization policy in semi-industrialized economies, *Journal of Development Economics*, 14(4), pp. 305-322, https://doi.org/10.1016/0304-3878(84)90061-0

Central Bank of Bosnia and Herzegovina (2022) *Comment on Trends in the Sector of Non-banking Financial Institutions*, available at: https://www.cbbh.ba/home/GetTableAttachment?contentId=7a7c82f1-a559-4f0f-a2c1-673dc88491ee&lang=en (September 5, 2022).

Cecchetti, S. & Kharroubi, E. (2012) Reassessing the impact of finance on growth, *BIS Working Papers*, No 381.

Craig, B. R. & Koepke, M. (2012) *Bank Capitalization*, available at: https://www.clevelandfed.org/newsroom-and-events/publications/economic-trends/2012-economic-trends/et-20120501-bank-capitalization.aspx (July 28, 2022).

Deidda, L. & Fattouh, B. (2002) Non-linearity between finance and growth, *Economics Letters*, 74(3), pp. 339-345, https://doi.org/10.1016/S0165-1765(01)00571-7.

Diamond, D. W. (1984) Financial Intermediation and Delegated Monitoring, *The Review of Economic Studies*, 51(3), pp. 393-414, https://doi.org/10.2307/2297430.

Diamond, D. W. & Dybvig, P. H. (1983) Bank Runs, Deposit Insurance, and Liquidity, *Journal of Political Economy*, 91(3), pp. 401-419, https://www.jstor.org/stable/1837095.

Diamond, D. & Rajan, R. (2002) A theory of bank capital, *Journal of Finance*, 55(6), pp. 2431-2465, https://doi.org/10.1111/0022-1082.00296.

Ductor, L. & Grechyna, D. (2015) Financial development, real sector, and economic growth, *International Review of Economics & Finance*, 37, pp. 393-405, https://doi.org/10.1016/j.iref.2015.01.001

Eickmeier, S., Kolb, B. & Prieto, E. (2018) The Macroeconomic Effects of Bank Capital Requirement Tightenings: Evidence from a Narrative Approach, *CAMA Working Paper*, No. 42/2018, https://dx.doi.org/10.2139/ssrn.3250499.

Estrada, G. E., Erce, A., Park, D. & Rojas, J. (2018) Skewed Credit and Growth Dynamics after the Global Financial Crisis, *ADB economics working paper series*, no. 562.

Fraisse, H., Lé, M. & Thesmar, D. (2017) The real effects of bank capital requirementsm, *ESRB Working Paper Series*, No 47.

Fratzscher, M., König, P. J. & Lambert, C. (2016) Credit provision and banking stability after the great financial crisis: The role of bank regulation and the quality of governance, *Journal of International Money and Finance*, 66, pp. 113-135, https://doi.org/10.1016/j.jimonfin.2016.02.015.

Garcia-Escribando, M. & Han, F. (2015) Credit Expansion in Emerging Markets: Propeller of Growth?, *IMF Working Paper*, No. 2015/212.

Gaytan, A. & Rancière, R. (2003) Banks, liquidity crises and economic growth, *Economics Working Papers*, 853.

Goldsmith, R. W. (1969) *Financial Structure and Development* (New Haven Conn: Yale University Press).

Gorton, G., & Winton, A. (2017) Liquidity provision, bank capital, and the macroeconomy, *Journal of Money, Credit and Banking*, 49(1), pp. 5-27, https://doi.org/10.1111/jmcb.12367.

Granger, C. W. (1969) Investigating Causal Relations by Econometric Models and Cross-spectral Methods, *Econometrica*, 37(3), pp. 424-438, https://doi.org/10.2307/1912791.

Grbić, M. & Luković, S. (2020) The Relationship Between Banks' Credit Activity and Economic Growth: An Empirical Research for the Republic of Serbia, *Industrija*, 48(2), pp. 37-53, https://doi.org/10.5937/industrija48-27225.

Grbic, M. & Jovanovic, D. (2020) Comparative financial systems: Implications for economic growth, *Oditor - casopis za Menadzment, finansije i parvo*, 6(1), pp. 49-65, available at: https://scindeks.ceon.rs/Article.aspx?artid=2217-401X2001049G (May 21, 2022).

Greenwood, J. & Jovanovic, B. (1990) Financial Development, Growth, and the Distribution of Income, *Journal of Political Economy*, 98(5), pp. 1076-1107, https://www.jstor.org/stable/2937625.

Guru, B. K. & Yadav, I. S. (2019) Financial development and economic growth: panel evidence from BRICS, *Journal of Economics, Finance and Administrative Science*, 24(47), pp. 113-126, https://doi.org/10.1108/JEFAS-12-2017-0125.

Hakenes, H. & Schnabel, I. (2011) Capital regulation, bank competition, and financial stability, *Economics Letters*, 113(3), pp. 256-258, https://doi.org/10.1016/j.econlet.2011.07.008.

Ho, S.-H. & Saadaoui, J. (2022) Bank credit and economic growth: A dynamic threshold panel model for ASEAN countries, *International Economics*, 170, pp. 115-128, https://doi.org/10.1016/j.inteco.2022.03.001.

Hoshi, T., Kashyap, A. & Scharfstein, D. (1991) Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups, *The Quarterly Journal of Economics*, 106(1), pp. 33-60, https://doi.org/10.2307/2937905.

Huang, H.-C. & Lin, S.-C. (2009) Non-linear finance–growth nexus, *The Economics of Transition*, 17(3), pp. 439-466, https://doi.org/10.1111/j.1468-0351.2009.00360.x.

Jayaratne, J. & Strahan, P. E. (1996) The Finance-Growth Nexus: Evidence from Bank Branch Deregulation, *The Quarterly Journal of Economics*, 111(3), pp. 639-670.

King, R. G. & Levine, R. (1993) Finance and Growth: Schumpeter Might be Right, *The Quarterly Journal of Economics*, 108(3), pp. 717-737, https://doi.org/10.2307/2118406.

Kopecky, K. J. & VanHoose, D. (2006) Capital regulation, heterogeneous monitoring costs, and aggregate loan quality, *Journal of Banking and Finance*, 30(8), pp. 2235-2255, https://doi.org/10.1016/j.jbankfin.2005.07.018.

Law, S. H. & Singh, N. (2014) Does too much finance harm economic growth?, *Journal of Banking & Finance*, 41, pp. 36-44, https://doi.org/10.1016/j.jbankfin.2013.12.020.

Levine, R. (1997) Financial Development and Economic Growth: Views and Agenda, *Journal of Economic Literature*, 35(4), pp. 688-726, https://www.jstor.org/stable/2729790.

Levine, R. & Zervos, S. (1996) Stock Market Development and Long-Run Growth, *The World Bank Economic Review*, 10(2), pp. 323-339, https://www.jstor.org/stable/3990065.

Levine, R., Loayza, N. & Beck, T. (2000) Financial intermediation and growth: Causality and causes, *Journal of Monetary Economics*, 46(1), pp. 31-77, https://doi.org/10.1016/S0304-3932(00)00017-9.

Levine, R., Loyaza, N. & Beck, T. (2000) Financial intermediation and growth: Causality and causes, *Journal of Monetary Economics*, 46(1), pp. 31-77, https://doi.org/10.1016/S0304-3932(00)00017-9.

Lindholm, R. W. (1964) Consumer Credit and Economic Growth, *Challenge*, 13(2), pp. 20-22, https://doi.org/10.1080/05775132.1964.11469764.

Lucas, R. E. (1988) On the mechanics of economic development, *Journal of Monetary Economics*, 22(1), pp. 3-42, https://doi.org/10.1016/0304-3932(88)90168-7.

Majcher, P. (2015) Increased Bank Capital Requirements: Neither Panacea nor Poison, *Procedia Economics and Finance*, 25, pp. 249 – 255.

Malarvizhi, C. A., Zeynali, Y., Al Mamun, A. & Bin Ahmad, G. (2019) Financial Development and Economic Growth in ASEAN-5 Countries, *Global Business Review*, 20(1), pp. 57-71, https://doi.org/10.1177/0972150918802684.

Matei, I. (2020) Is financial development good for economic growth? Empirical insights from emerging European countries, *Quantitative Finance and Economics*, 4(4), pp. 653-678, https://doi.org/10.3934/QFE.2020030.

Md, Q. & Wei, J. (2018) Investigation of the asymmetric relationship between financial innovation, banking sector development, and economic growth, *Quantit Financ Econ*, 2(4), pp. 952-980, https://doi.org/10.3934/QFE.2018.4.952.

Neusser, K. & Kugler, M. (1998) Manufacturing Growth And Financial Development: Evidence From OECD Countries, *The Review of Economics and Statistics*, 80(4), pp. 638-646.

Rajan, R. & Zingales, L. (1998) Which Capitalism? Lessons from the East Asian Crisis, *Economics*, http://dx.doi.org/10.2139/ssrn.137550.

Robinson, J. (1952) *The Generalisation of the General Theory and other Essays* (London: Palgrave Macmillan).

Rousseau, P. L. & Wachtel, P. (2002) Inflation thresholds and the finance–growth nexus, *Journal of International Money and Finance*, 21(6), pp. 777-793, https://doi.org/10.1016/S0261-5606(02)00022-0.

Saci, K., Giorgioni, G. & Holden, K. (2009) Does financial development affect growth?, *Applied Economics*, 41(13), pp. 1701-1707, https://doi.org/10.1080/00036840701335538.

Samargandi, N., Fidrmuc, J. & Ghosh, S. (2015) Is the Relationship Between Financial Development and Economic Growth Monotonic? Evidence from a Sample of Middle-Income Countries, *World Development*, 68, pp. 66-81, https://doi.org/10.1016/j.worlddev.2014.11.010.

Shan, J. (2005) Does financial development 'lead' economic growth? A vector auto-regression appraisal, *Applied Economics*, 37(12), pp. 1353-1367, https://doi.org/10.1080/00036840500118762.

Stiglitz, J. E. & Weiss, A. (1983) Incentive Effects of Terminations: Applications to the Credit and Labor Markets, *The American Economic Review*, 73(5), pp. 912-927, https://www.jstor.org/stable/1814662.

Veysov, A. & Stolbov, M. (2012) Financial System Classification: From Conventional Dichotomy to a More Modern View, *MPRA Paper*, No. 40613.

Weinstein, D. E. & Yafeh, Y. (1998) On the Costs of a Bank-Centered Financial System: Evidence from the Changing Bank Relations in Japan, *The Journal of Finance*, 53(2), pp. 635-672, https://www.jstor.org/stable/117364.

Wijnberg, S. V. (1983) Interest rate management in LDCs, *Journal of Monetary Economics*, 12(3), pp. 433-452.

Appendix:

Annex 1: Autocorrelation test result

The results of the autocorrelation test provide us with the conclusion that the VAR model, on the basis of which we determined the optimal number of previous values when testing Granger causality, is free from the existence of autocorrelation.

VAR Residual Serial Correlation LM Tests						
Date: 08/28/22 Time: 09:24						
Sample: 2000 2021						
Included observations: 20						
Null hypothesis: No serial correlation at lag h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	19.65964	16	0.2359	1.359143	(16, 12.9)	0.2926
2	15.03907	16	0.5218	0.910166	(16, 12.9)	0.577
3	15.88546	16	0.461	0.98479	(16, 12.9)	0.5191
Null hypothesis: No serial correlation at lags 1 to h						
Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	19.65964	16	0.2359	1.359143	(16, 12.9)	0.2926
2	NA	32	NA	NA	(32, NA)	NA
3	NA	48	NA	NA	(48, NA)	NA
*Edgeworth expansion corrected likelihood ratio statistic.						