

THE IMPACT OF INNOVATIVE FINANCIAL AND BANKING DEVELOPMENT ON THE ECONOMIC GROWTH OF BOSNIA AND HERZEGOVINA

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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 innovative banking sector in developing countries becomes particularly important due to the insufficient evolution 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. In this study we applied ARDL model to determine long-term and short-term relationship between observed variables. The results show that the increase in total loans granted by the banking sector to companies from the non-financial sector has a 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 0.08% in long run and about 0.20% in short run.

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

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; Rousseau & 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 long-term 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., 2005). 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., 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 & Saadaoui, 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 & Jovanović, 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). (Fraisie 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 correlation 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. Although the financial system in Bosnia and Herzegovina is based on the existence of a currency board, (Mastilo et al., 2021) conclude that the currency board is not a limiting factor in development. The authors also conclude that foreign currency reserves and money supply have a positive influence on economic growth in Bosnia and Herzegovina.

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. MATERIALS AND METHODS

3.1. DATA

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](#))/

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.).

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

Author's adaptation.

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.

3.2. METHODOLOGY

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.

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

Source: Author's presentation.

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.

We evaluate the quantification of the influence of the independent variables on the dependent variable using the Autoregressive Distributed Lag (ARDL) approach. ARDL approach presented by (Pesaran et al., 2001) is best method in case when variables are $I(0)$ or integrated of order $I(1)$, and not integrated of order $I(2)$. This method is useful when we have small sample time series for estimating long-term and short-term coefficients based on OLS method of estimation (Duasa, 2007). Applying of ARDL method we start with conducting of following model which uses logarithmic transformation of research variables:

$$\log GDP_t = \alpha_0 + \alpha_1 \log CPS_t + \alpha_2 \log LIQUID_t + \alpha_3 \log CAP_t + \varepsilon_t \quad (1)$$

where α_0 is constant, α_1 and α_3 are coefficient for independent variables *CPS*, *LIQUID* and *CAP*, respectively and ε_t is error term. ARDL approach is based on lags of observed variables, so previous equation in ARDL form is given by:

$$\log GDP_t = \alpha_0 + \sum_{k=1}^n \Delta \alpha_1 \log CPS_{t-k} + \sum_{k=1}^n \Delta \alpha_2 \log LIQUID_{t-k} + \sum_{k=1}^n \Delta \alpha_3 \log CAP_{t-k} + \lambda_1 \log GDP_{t-1} + \lambda_2 \log CPS_{t-1} + \lambda_3 \log LIQUID_{t-1} + \lambda_4 \log CAP_{t-1} + \varepsilon_t \quad (2)$$

Study uses the Akaike information criterion (AIC) for choosing the lag length. After finding the long-run association existing between variables, the ARDL approach uses the error correction model (ECM) to find the short-run dynamics. The ECM general form is formulated as:

$$\Delta \log GDP_t = \alpha_0 + \sum_{k=1}^n \Delta \alpha_1 \log CPS_{t-k} + \sum_{k=1}^n \Delta \alpha_2 \log LIQUID_{t-k} + \sum_{k=1}^n \Delta \alpha_3 \log CAP_{t-k} + \phi \log ECT_{t-1} + \varepsilon_t \quad (3)$$

where ϕ is parametar of speed of adjustment in long-run equilibrium after a shock in the short run. Existence of cointegration between observed variables we confirm based on F-bounds with calculated F-statistics Decision of existence of cointegration between variables we confirm by comparing F-statistics value to lower and bound values (Pesaran & Shin, 1999). If F-statistics value is larger than the lower and upper bound then we can conclude that cointegration between variables is there. By confirming that the long-run associations exist between variables, the study applies the cumulative sum (CUSUM) and cumulative sum of square (CUSUMSQ) tests (Brown et al. 1975). Previous studies (Pesaran & Shin 1999; Pesaran et al. 2001) suggested these tests portray the good fitness of the ARDL model. These tests are used to plot the residual of ECM. If the statistics in the plot fall in critical bounds at a 5% significant value, the results suggest that the coefficients of the ARDL model are stable.

4. 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.

	LOGGDP	LOGCPS	LOGLIQUID	LOGCAP
Mean	23.975	8.485	3.432	-1.954
Median	24.011	8.858	3.381	-1.953
Maximum	24.228	9.109	3.798	-1.359
Minimum	23.629	6.774	3.231	-2.280
Std. Dev.	0.179	0.730	0.152	0.214
Skewness	-0.546	-1.186	0.651	0.980
Kurtosis	2.243	2.982	2.516	4.079
Jarque-Bera	1.617	5.154	1.768	4.592
Probability	0.446	0.076	0.413	0.101
Sum	527.449	186.668	75.509	-42.981
Sum Sq. Dev.	0.672	11.184	0.486	0.965
Observations	22	22	22	22

Source: Author's calculations.

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

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

Source: Author's calculations

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 a negative direct 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.

As mentioned earlier, the condition for adopting the ARDL aproach is that the series must be integrated of order I(0) or integrated of order I (1). If the time series are stationary or non-stationary in levels, and stationary after the first derivative, i.e. if they are integrated of order I (1), then we can test the existence of a cointegration relationship, which can be interpreted as a long-term relationship between the observed variables, and apply the model with error correction. Therefore, the following table shows the results of the ADF test of stationarity of time series in levels and after differentiating the time series:

Table 5. Results of the ADF stationarity test.

Series		Critical values of the ADF test	p-value
GDP	Levels	-1.615556	0.7517
	The first difference	-3.724723	0.0442
CPS	Levels	-6.884804	0.0000
	The first difference	-1.563283	0.4820
LIQUID	Levels	-1.896925	0.6204
	The first difference	-8.429093	0.0000
CAP	Levels	-2.620484	0.1072
	The first difference	-3.269877	0.0305

Source: Author's calculations.

In ADF test for stationarity we make assumptions in null hypothesis that there is unit root in time series which confirms that the observed series is non-stationary. Contrary to the null hypothesis, the alternative hypothesis assumes that the time series does not have a unit root, so it is stationary. If the value of the obtained test statistic is smaller than the critical value, then we accept the alternative hypothesis of the absence of a unit root, while otherwise we discard the alternative and accept the null hypothesis. From Table 5. we are in position to conclude that variable GDP is not stationary at the levels, but after differencing we get stationary variable, so GDP is integrated of order I(1). Variable CPS is integrated of order I(0) so we do not have to make differencing of this variable to make it stationary. Also, variables LIQUID and CAP are stationary after first differences and they are integrated of order I(0). In ADF test for stationarity we used trend and constant for testing stationarity.

Before calculating long- and short-run coefficient between observed variables, it is important to use F-bounds test for confirmation of cointegration (Pesaran et al., 2001). The decision of existence of cointegration we make by comparing F-statistic with upper and lower bound:

Table 6. Results of the bounds test.

Equation	Model	F-statistics		p-value
$GDP = f(CPS, LIQUID, CAARDL(1,1,0,1))$		6.638		0.000
Significance				
Critical value	10%	5%	2.5%	1%
Lower bound I(0)	2.97	3.38	3.80	4.30
Upper bound I(1)	3.74	4.23	4.68	6.36

Source: Author's calculations.

Decision of existence of cointegration based on F-Bounds test follows rule: if F-statistics value is larger than the lower and upper bound then we can conclude that cointegration between variables is confirmed. Calculated F-statistics in our ARDL model is 6.638. Value of this statistics is higher than upper bound of 6.36 so we have right to conclude that there is cointegration between observed variables.

Based on these results in the next of study we'll present long- and short-run ARDL model with coefficients to determine direction of relationship between these four variables. After verifying the existence of a long- and short-run association between variables from the ARDL bound test, the study finds the short- and long-run parameters of the variables. Results of long-term coefficients are presented in next table:

Table 7. Long-term coefficients in ARDL model.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\log CPS$	0.0763	0.0341	2.2385	0.0433
$\log LIQUID$	0.0436	0.0779	0.5587	0.5859
$\log CAP$	-0.1164	0.0559	-2.0790	0.0580
@TREND	0.0202	0.0021	9.5414	0.0000

Source: Author's calculations.

As we can see from previous table, in long run credits to private sector increases GDP. Namely, 1% in rise of CPS increases GDP for 0.08% with statistical significance of 5%. Other variables, LIQUID and CAP are not statistically significant in this estimation. Also, as we see from previous results trend component is statistically significant in long-term and there is positive trend in model.

Table 8. Short-term coefficients in ARDL model.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
<i>logCPS</i>	0.1996	0.0591	3.3730	0.0050
<i>logLIQUID</i>	0.0356	0.0671	0.5300	0.6050
<i>logCAP</i>	-0.0064	0.0642	-0.1002	0.9217
<i>C</i>	1.6370	0.4475	3.6576	0.0029
ϕ	-0.8169	0.1240	-6.5878	0.0000
<i>@TREND</i>	0.0164	0.0035	4.6426	0.0005

Source: Author's calculations.

From previous results we can see that rise in CPS for 1% increases GDP for 0.20% in short-term. This coefficient is statistically significant at level of 1%. Also, speed of adjustment parameter is negative with value of 0.82 which means that adjusting of short-term fluctuations to long-term equilibrium is 0.82% per year. Also, this calculated parameter is estimated with at level of 1% significance.

Numerous diagnostic tests are used to find potential errors in model. Diagnostic tests that we applied using F-statistics are R-square and Adjusted R-square tests for fitness of model, Durbin-Watson statistics for autocorrelation, Ramsey RESET test for stability of model, ARCH and Breusch-Pagan-Godfrey test for heteroscedasticity, Breusch-Godfrey Serial Correlation LM Test and Jarque-Bera test for normality of residuals. Table 9. presents results of these tests:

Table 9. Results of diagnostic tests.

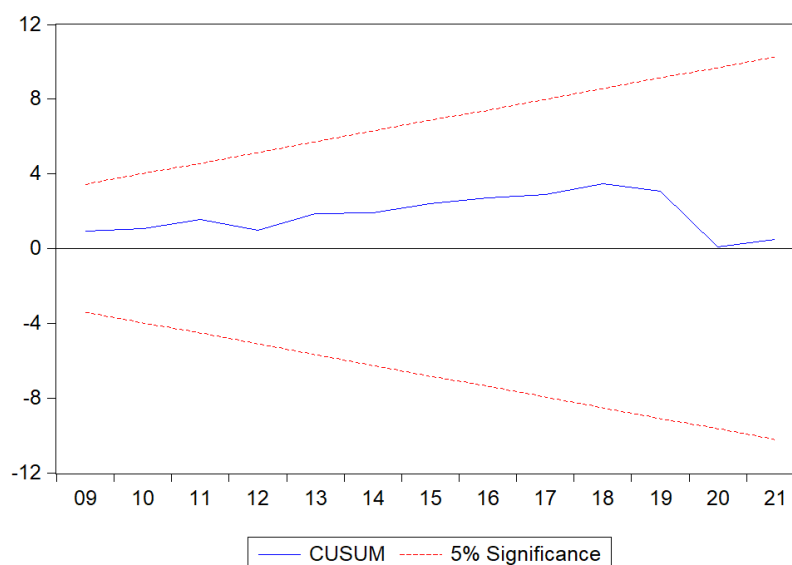
Test	Statistics	Prob.
R-square	0.8492	0.0000
Adjusted R-square	0.8226	0.0000
Durbin-Watson statistics	2.2891	-
Ramsey RESET	1.3405	0.2049
ARCH	0.0310	0.8621
Breusch-Pagan-Godfrey	2.0039	0.1324
Breusch-Godfrey Serial Correlation LM Test	0.8066	0.4711
Jarque-Bera	3.5397	0.1704

Source: Author's calculations.

As we see from Table 9. R-square and Adjusted R-square are 0.8492 and 0.8226 and this implies good fitness of estimated model. Durbin-Watson statistics of autocorrelation is 2.29 which suggests that model is free from autocorrelation. Durbin-Watson statistics uses values from 0 to 4, and optimal values which confirms no autocorrelation are on the range of 1.50 and 2.50. Based on Ramsey RESET test we conclude that model is stable because p-value is greater than 0.05. Also, ARCH and Breusch-Pagan-Godfrey test for heteroscedasticity witness that there is no heteroscedasticity in

estimated model. Based on p-value we conclude that model is free of autocorelation, and based on Jarque-Bera test for normality of residuals we conclude that residual are normally distributed. The study use cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests for checking stability in the short-run and long-run coefficients proposed by (Brown et al., 1975). The CUSUM and CUSUMSQ are at the 5% significance level over time, confirming the stability and good fitness of the ARDL model. Figure 1. presents results of CUSUM test of stability:

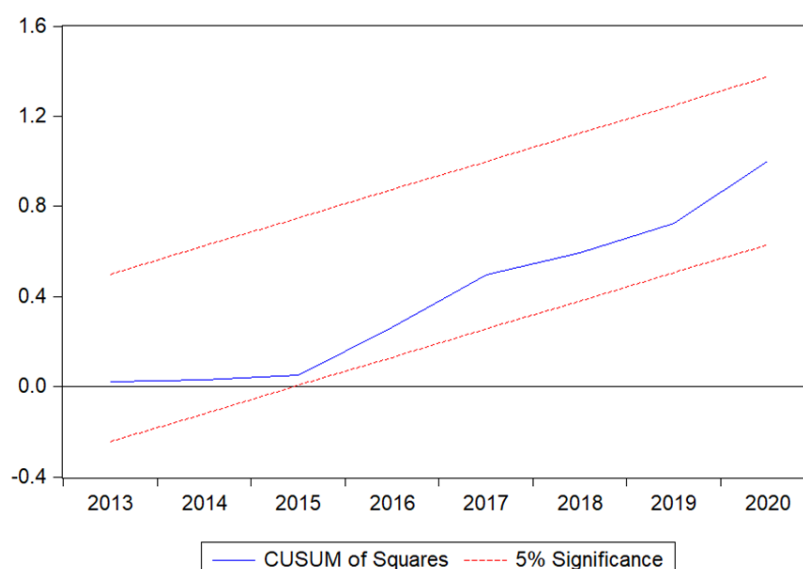
Figure 1. Stability of ARDL model based on CUSUM test.



Source: Author's calculations.

CUSUM test for stability of coefficients of model witness that cumulative sum of GDP lies within 5% significance boundaries. Next figure presents results of CUSUMQ test of stability:

Figure 2. Stability of ARDL model based on CUSUMQ test.



Source: Author's calculations.

As we concluded earlier stability of coefficients in our ARDL model is confirmed based on CUSUM, but also based on CUSUMQ test as we can see from previous figure. So we are able to conclude that our model is stable.

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 there is long-term relationship between credits granted by the banking sector to companies from the non-financial on GDP. Namely, rise of credits to private sector increases GDP for 0.08% in long run and for 0.20% in short run. Both coefficients are statistically significant at level of 1%.

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.

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