The impact of credit volume on money supply and economic growth in Azerbaijan: an econometric analysis

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Abstract Banks are one of the financial entities that perform the work of financial intermediation and, as a result of the loans they provide, help to promote productivity, jobs, and economic development. By increasing their lending volumes, banks will be able to expand their money supply, which will result in a boost to the economy's overall performance. Therefore, substantial research has been carried out to identify the relationship among bank loans as well as economic progress. This study aims to analyze the link among loan volume and money supply in the economy of Azerbaijan. As a method, FMOLS, DOLS and Granger Causality tests, which show co-integration, causality and correlation coefficient from econometric models, were chosen for the data containing quarterly time series of 2006:M1-2021:M9 period. There is a one-way causal connection between money supply and domestic credit volume, so there is a one-way causal correlation among economic growth and domestic credit volume resulting from the findings. It was also discovered that there is a long-term link between the quantity of money and credit accessible to citizens in their nation and the rate at which their economy expands. On the basis of FMOLS test, a 1 percent increase in domestic loan volume results in a 1.078183 percent increase in the money supply. (1.022554 according to DOLS). Performing the FMOLS test does not affect economic development. The FMOLS test found that for every one percent increase in domestic loan volume, economic growth improves by 0.44243 percentage points, based on the number of domestic loans (0.439953 percent according to DOLS).

Keywords: credit volume, money supply, economic growth, causality

1. Introduction

Within the fast growing and developing economic systems, financial markets, where especially those who supply funds and those who request funds come together, have become markets that not only institutions but also individuals can easily access with the development of information systems. Banks, which are one of the most important actors of the said market, have an impact on the fundamental indicators of the economy, particularly in emerging countries, whether directly or indirectly. The healthy functioning of banks, which are organized institutions that bring together those with fund deficit and those with surplus funds, has effects on macro variables such as gross domestic product (GDP), inflation and money supply (Karaman 2020).

It is very important for the development of the financial structure, the conversion of savings into investments and economic growth. Especially in the financial crises, the loans provided by the financial sector were critical in the nation's recovery from the crisis and the process of manufacturing their products. In this paradigm, a rise in the loan volume of the banks increases the money supply, increasing production, employment and thus economic growth (Kamaci et al 2017).

A clear correlation in Figure 1 shows how loan volume and economic growth are associated closely. As seen in Figure 1, the volume of credit will increase private consumption expenditures and investments in the economy. This will increase domestic demand and increase economic growth. In this research, the question of "does financial development influence growth in the economy or does economic growth affect financial development?" is analyzed, and the correlation between credit volume, economic development, and money supply is studied. In this research, it has been scientifically explored how the development of financial markets affects the growth of the Azerbaijani economy's GDP. This background includes, first and foremost, the provision of theoretical knowledge on the issue, followed by an explanation of relevant literature. The link between loan volume and economic development in Azerbaijan was then explored. This section introduces the data collection and procedures that were used, as well as provides some preliminary empirical results.

Increasing output and national revenue for products and services can be used as indicators of economic development in the economy over the long run. An *economic development strategy* is defined as a procedure for bringing about structural

changes in an economy's socioeconomic, political-cultural, and political environments while simultaneously increasing the number of products and services given and received by the country. The fact remains that strategies designed to increase the quality of life of goods and services do nothing except raise the standard of living for those who use them. This is why it is critical to examine economic growth from the environmental, social progress, and economic development perspectives to maintain the long-term viability of development. However, this needs to establish a conceptual framework for social and cultural development components (Akbulaev and Huseynova 2019). To this day, the government effectively promotes and supports the collaboration of businesses and academic facilities involved in creating and implementing social innovations via financial assistance and grants (Khanlarzadeh 2021).
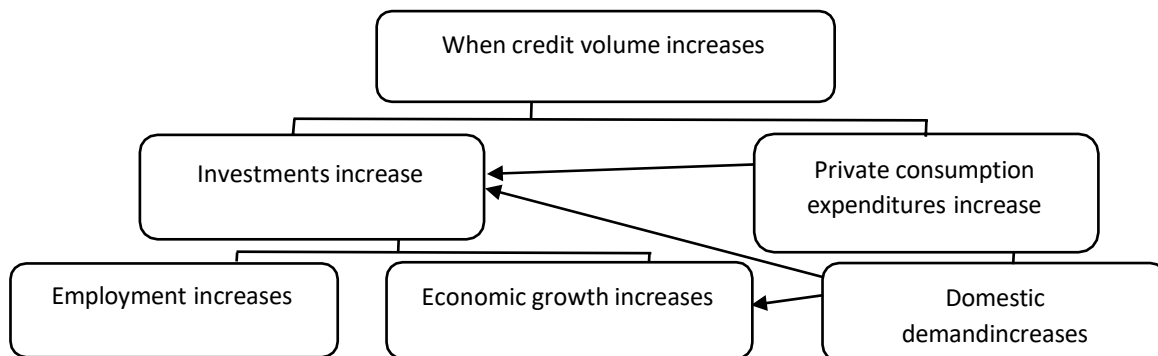

Figure 1 The Relationship between Credit Volume and Economic Growth. Source: Göçer et al (2015).

Commercial loans are one of the important instruments offered by banks to their customers for years. Of course, money politicians have always seen these loans as an economic intervention. Therefore, whenever an expansionary monetary policy is to be followed in the country, commercial loans have become one of the indispensable monetary policy tools. As a result, the existence and attractiveness of these types of loans has always been a product of economic understanding when there is an increasing expansion in the volume of emissions, that is, in times of increased money supply. In order to revive the market, banks have offered commercial loans from time to time with very low interest rates for businesses to invest. However, on the other hand, by giving high-rate commercial loans in periods of economic stability, they enabled the market to stay away from commercial loans in a sense. In line with the definitions of selected monetary aggregates within the scope of this study, the FMOLS, DOLS, and Granger causality tests will be employed to examine the link among credit volume, currency value, and economic expansion between the periods under consideration. In this context, for the Granger causality test, at the first stage, the stationarity levels of the series will be determined and the cointegration relationship between the series will be investigated. As per to the findings, causality analysis will be carried out.

The purpose of this article is to analyze the relationship between credit volume, money supply, and economic growth in Azerbaijan using econometric techniques. Specifically, we aim to investigate the impact of changes in credit volume on the money supply and economic growth in Azerbaijan, taking into account other relevant macroeconomic variables. By conducting this analysis, we hope to provide insights into the factors that drive economic growth in Azerbaijan and to inform policy decisions aimed at promoting sustainable economic development.

2. Theoretical and Conceptual Framework

Schumpeter is recognized for establishing a framework for the relationship between loan volume and economic development. By directing the finances of financial intermediaries to initiatives involving technological advancements, Schumpeter (1912) predicted that economic development would be enhanced (Becsi and Wang 1997). With this statement of Schumpeter, it is concluded that a well-functioning economic system increases economic growth because it increases savings and investments in the economy and encourages entrepreneurs to the innovation process. Later, Gurley and Shaw (1955) added the financial development process to Schumpeter's views. Gurley and Shaw stated that as the quality and characteristics of the financial system increase, that is, economic growth will expand in tandem with the acceleration of financial development (Ceylan and Durkaya 2010). According to Robinson (1952), the link between economic and financial development expansion might be seen entirely differently. In Robinson's perspective, financial development is associated with economic progress. Financial services will become more popular as the financial system develops. The need for financial services will rise as the private economy expands, a natural result of this demand being derived from the real sector. In short, as economic growth increases, the financial sector also develops (Çeştepe and Yıldırım 2016). Robinson (1952), "enterprise leads, finance follows", with his statement, he claimed that financial development emerged as a consequence of financial growing (Tuna and Bektaş 2013). Patrick (1966) was inspired by Robinson's ideas and established demand- and supply-following theories. He looked at the relationship between financial development and economic growth from a different perspective than Robinson had before. The link among financial development and economic growth has been a source of

debate for quite some time now. It is common for individuals to consider the importance of the connection among financial institutions, banking crises, and economic activity when a financial crisis occurs. (Mamadov and Ahmadov 2021).

According to the demand-followed theory, economic growth raises demand for financial intermediaries, banking sectors, and financial products, and financial development happens due to economic expansion. Assuming the demand-following theory is correct, financial development results from expanding the economy rather than being a cause of that expansion in and of itself. The circumstances in England towards the close of the 18th and beginning of the 19th century lend support to the demand-following theory. Increases in economic growth have also increased financial development. In the supply-followed hypothesis; the development of financial intermediaries will enable the development of modern sectors, which are the pioneers of economic growth, and thus financial development will increase economic growth. The supply-followed model serves two purposes. The first is the movement of capital from conventional (non-growing) industries to technological sectors, and the second is the encouragement of entrepreneurship in modern sectors. In this way, financial development will accelerate, which will stimulate economic growth (Patrick 1966). Alternatively, one may say that financial growth and economic expansion impact. The rise in demand for financial services and financial intermediaries due to increasing economic activity leads to the growth of the financial sector. As a result of its role as a conduit between the real sector and the supply of resources it needs (Türedi and Berber 2010), the financial sector contributes to economic development. The supply-following or demand-following concept is true in most nations; nevertheless, it is observed that this connection is bidirectional in developing markets, which are essential players in the global economy. However, since the direction of the interaction is one-dimensional in industrialized nations, Patrick's points of view continue to be valid in this context. Even though there is a positive relationship between financial growth and economic progress, their orientations are diametrically opposite. By the Human Capital Theory, which Lucas and others established, there is no direct relationship between financial success and economic growth. According to Lucas, there is no link between financial development and economic growth in the long term since he stressed the significance of physical and human capital as fundamental sources of progress.

A considerable lot of study has been done on the relationship between loan volume and economic progress. Unlike the last relationship, this one connects financial development with economic growth in the first instance. Several theoretical discoveries relating financial development to economic growth have been made due to a study conducted for a variety of country types. According to the findings, a one-way association among financial development and economic growth has been identified in particular study studies conducted for certain countries. In contrast, bidirectional causality between two variables has been identified in other research. However, there was no evidence of a causal link between the two factors in several research.

3. Literature Review

Using data from 80 nations between 1960 and 1989, King and Levine (1993) performed a panel regression study on the money supply, bank loans, and GDP variables. The researchers concluded that the expansion of financial markets had a favorable impact on economic growth and credit availability. Luintel and Khan (1999) 10 countries (1951-1995) Panel VAR model Total bank deposits and GDP A bidirectional causal relationship has been identified between the two variables. Kar and Pentecost (2000) Turkey (1963-1995) Analysis of causation Volume of domestic loans and economy development A one-way correlation was found between growth and financial development. Aretis et al (2001) 5 countries (1968:Q2-1997:Q4) Causation and cointegration tests GDP and bank loans Financial development has been shown to boost economic growth, according to researchers. Jalilian and Kirkpatrick (2002) found that 42 nations were included in their study (26 developing, 16 developed countries). The study of regression panels GDP and bank loans Economic growth is increased by 0.4% for every 1 percent improvement in financial development, according to the study's findings. Shan and Jianhong are a couple (2006), and the People's Republic of China is a country in East Asia (1978-2001). According to the results of the VAR study, bank loans, financial development, and economic growth all have a bidirectional causal influence on the economy. According to Akinlo and Egbetunde (2010), several countries in Sub-Saharan Africa were classified as in need of help (1980-2005). Data from a panel is being analyzed. The link between bank lending and the economy has demonstrated that the development of financial markets helps economic growth, consistent with previous findings. Ceylan and Durkaya are a couple from Turkey (2010). Turkey is a nation with a lengthy history of civil wars and revolutions (1998-2008). The relationship between the amount of domestic credit and the economic growth rate is shown by a one-way causal relationship between economic growth and loan volume. Türedi and Berber are two languages spoken in Morocco (2010). Turkey is a country with a long history of conflict (1970-2007). Cointegration and causality tests are performed. The amount of domestic credit, the ratio of international trade to GDP, and economic growth are all critical indicators. It has been shown that there is a unidirectional causal link between financial development and economic growth. The characters' names are Özcan and Ari (2011). Turkey is a country with a long history of conflict (1998-2009). Özcan and Ari (2011) Turkey (1998-2009) Causality analysis Domestic credit volume and real GDP A unidirectional causal relationship from economic growth to financial development has been determined. Tuna and Bektaş (2013) Turkey (1998-2012) Cointegration and causality test Domestic credit volume and GDP

No causal relationship was determined between the two variables. Vurur and Özen (2013) Turkey (1998:Q1-2012:Q1) Causality analysis Deposits, loans and economic growth Increases in deposit volume increase economic growth and loan amount. Alshammary (2014) is a Saudi Arabian author (1993-2009). VAR analysis is a kind of statistical analysis. Money supply, bank loans, and gross domestic product Historically, there has been a strong and positive correlation among financial development and growth. Göçer and colleagues (2015) Turkey (2000:Q1-2012:Q4) Test of co-integration in structural breach Credit volume and national income are two important variables to consider. Economic growth is increased by 0.28 percentage points for every one percent increase in loan volume. Turkey, according to Çeştepe and Yıldırım (2016) (1986:Q1-2015:Q3) Analysis of causation, Bank loans, money supply, and real GDP are all indicators of economic growth. It was discovered that there is a bidirectional connection among financial development and growth. According to Turgut and Ertay (2016) (2003:Q1-2013:Q4), Turkey, Analysis of causation Bank loans and the gross domestic product. It has been shown that there is a one-way causal link between bank loans and economic development. Ümit (2016) is a Turkish author (1989-2014). Cointegration and causality tests are performed. Trade openness, loan volume, and economic development are critical factors to consider. It was discovered that there is a bidirectional causal link between loan volume and economic development. In Turkey (1998-2014), Karamelikli and Keskingöz (2017) conducted a causality analysis among Bank loans and the gross domestic product. It was discovered that there is a bidirectional causal link between loan volume and economic development. Pehlivan and colleagues (2017) Turkey (2002:Q1-2015:Q4) Cointegration and causality tests are performed. Bank loans and the gross domestic product The existence of a bidirectional causal link among bank loans and GDP has been shown. The findings of 12 separate investigations conducted in Turkey are presented. In their respective studies, Kar and Pentecost (2000), Ceylan and Durkaya (2010), and zcan and Ari (2011) discovered a one-way causal relationship between economic growth and financial development in Turkey. They tried to argue that the demand-following hypothesis is correct for Turkey in their respective findings. Several researchers, including Türedi and Berber (2010), Vurur and Zen (2013), as well as Turgut and Erday (2016), discovered unidirectional causation extending from financial development to economic growth in Turkey. They concluded that the supply-followed theory is genuine. In Turkey, however, researchers such as Göçer et al (2015), Çeştepe and Yıldırım (2016), Ümit (2016), Karamekli and Keskingöz (2017), and Pehlivan et al (2017) discovered bidirectional causation between financial development and economic growth in the country. In the most recent evaluation of the literature, Tuna and Bektaş (2013) were unable to identify any causal association between the two variables in their investigation and came to the same conclusion that Lucas did. In investigations completed for various nation groupings, researchers came up with various conclusions. Several studies, like those by Arestis et al (2001), Jalilian and Kirkpatrick (2002), and Akinlo and Egbetunde (2010), discovered unidirectional causation going from development to economic growth, indicating that the supply-followed theory was correct.

Akbulaev and Huseynova (2019) examined the effect of credit volume on economic growth in Azerbaijan. In his research, the relationship between domestic credit volume and gross domestic product in public and deposit banks was made using the quarterly data of the 2006-2019 period, using Granger causality analysis. According to the result obtained, there is a bidirectional causality relationship between credit volume and economic growth.

Khanlarzadeh (2020) pointed out in his study that the difficult financial situation of innovative businesses is an inevitable consequence of changes in the fundamental basis of the functioning of the economy. He emphasized that changing existing organizational structures will facilitate the formation of an adequate economy innovation. He also concluded that boosting innovation is the most important way to achieve the final results that get the country out of the crisis, stabilize the economy and then make it grow.

Akbulaev and Tahirzade (2021) Engle-Granger cointegration test was used to test financial sustainability in Azerbaijan. In order to reveal the effects of public revenues and public expenditures separately, these items were separated and analyzed. According to the results they obtained, it shows that there is financial sustainability in Azerbaijan for the period of 2007-2020.

In the study conducted by Mamadov and Ahmadov (2021), monthly data were taken between 2005-2019 and financial development and economic growth VECM model estimation and Granger causality analysis were performed in Azerbaijan. As a result of their analysis, they concluded that there is a bidirectional relationship between financial development and economic growth in Azerbaijan.

4. The Relationship between Credit Volume and Growth in Azerbaijan

"Domestic credit volume" is a metric used to control a country's monetary policy. This metric refers to the total amount of credit issued and monitored by a country's central bank. The domestic credit volume includes various types of loans such as commercial loans of banks, consumer loans and government loans. These loans can increase or decrease the money supply in an economy. The "money supply", on the other hand, refers to the total amount of money in circulation in an economy. The money supply includes currencies printed by the central bank and other payment instruments such as credit cards, checks and electronic money issued by banks. When the money supply increases, prices usually rise, while a decrease in the money supply can pose a risk of deflation. Central banks use interest rates and other tools to manage the money supply.

After the 2001 crisis, the transition to a flexible exchange rate led to the restructuring of the banking sector. In this period, the banking sector strengthened again and contributed to economic growth with the loans it provided.

Domestic credit volume in Azerbaijan has increased approximately 13 times from 2005 to 2020. Although domestic loans shrank in that period due to the impact of the 2008 crisis, the increase in loan volume continued in the following periods. In the same period, there was an increase of approximately 6 times in the money supply, while there was an increase of approximately 60% in the GDP. The fierce competition between banks in recent years has also increased the loans given by banks to a significant extent.

The banking system in Azerbaijan is governed by the "About Banks" legislation, which governs the activities of banks. Under this legislation, the country's banking system comprises the two-digit Central Bank of Azerbaijan and credit institutions, with the latter being the most important. The primary stage, the Central Bank of the Republic of Azerbaijan, and its activities are governed by the Law of the Republic of Azerbaijan, the statute "On the Central Bank of the Republic of Azerbaijan," the Azerbaijani Civil Code, and other normative legislative acts. A license to conduct bank business is granted and issued by the Central Bank, which supervises the bank's operations in compliance with applicable laws. Credit institutions are the second tier of the banking system in terms of importance. Azerbaijan's credit institutions operate under the authority of the Constitution of the Republic of Azerbaijan, the Banks Law, the Civil Code, the laws "On the Central Bank of the Republic of Azerbaijan," "On Non-Bank Credit Institutions," and "On Credit Unions," among other legal frameworks, which are controlled by normative legal rules. The ratio of total assets to gross national product (GNP) indicates the degree of development of the banking industry. In nations with a low degree of economic growth, analysts estimate that the banking industry's total assets do not exceed 5 percent of the country's gross national product (GNP). In Azerbaijan, the banking sector's total assets are projected to account for 32 percent of the nation's gross domestic product. The total assets of the bank in 2010 amounted to 13290.81 million Azerbaijani manats. Average bank assets amounted to 295.35 million Azerbaijani manats. The level of concentration in the country's banking system is 60.7%. The assets of 5 banks (International Bank, Kapital Bank, Bank Standard, Halk Bank and Paşabank) constitute 60.7% of the total assets. 39.2% of the registered capital of the banks in the country, 61.9% of their deposits and 58.2% of their loan portfolios belong to these five banks. In the banking system, the only state bank is the International Bank. 41.6% of the assets belong to International Bank. 41% of the loan portfolio and 36% of the deposits in the country are managed by this bank.

5. Data Set, Econometric Methods and Results

It will be discussed in this part how the data collection and econometric approach were developed and the empirical results that were achieved.

In the study, cointegration test (Engle-Granger) and unit root test (ADF) were used to test the stationarity of credit volume, money supply and GDP data. For this reason, the ADF unit root test was developed to add the delayed values of the dependent variables to the model as an independent variable for stability testing in economics writing and to eliminate autocorrelation (DEMİR 2019). The concept of cointegration entered the time series econometrics in the 1980s. Many economists identified this new concept as the most important development of experimental modelling. It is possible to define this concept as a long-term equilibrium relationship between variables. Engle and Granger suggested estimating cointegration relationships using regression analysis. Although the series are subject to cyclical shocks, it is possible to have a long-term equilibrium relationship. Therefore, cointegration tests are important (Inal 2020). In the studies, the cointegration between the series whose integration degree was determined as a result of unit root tests was examined. Cointegration tests have been used to evaluate whether or not there is a long-term link between the series in question.

It goes without saying that studies utilizing econometric approaches take a substantial amount of time to be analyzed (Al 2019). The credit volume, money supply, and gross domestic product (GDP) statistics utilized in the research were from 2006:M1 to 2021:M9. These statistics are based on monthly data and have been obtained from the Central Bank of Azerbaijan's official website.

Hypotheses to be tested in the research:
Hypothesis 1: There is no relationship between money supply and credit volume.
Hypothesis 2: There is no relationship between credit volume and non-oil GDP.
Hypothesis 3: There is no relationship between money supply and non-oil sector GDP.
Hypothesis 4: There is no relationship between money supply and oil sector GDP.
Hypothesis 5: There is no relationship between non-oil GDP and Credit volume.
Hypothesis 6: There is no relationship between oil sector GDP and Credit volume.

5.1. Data Set and Econometric Method

According to the findings of this research, the influence of domestic loan volume on money supply and economic development was studied using quarterly data for Turkey for the period between 2005:Q4 and 2017:Q1. The domestic credit volume indicator used in the study gives the value of the domestic credit volume in Azerbaijan and is included in the analysis

as "YIKH". The money supply, on the other hand, represents the M2 money supply and is shown as "m2" in the analysis. Finally, the economic growth indicator used in the study deals with the GDP value in Azerbaijan in US dollars and is expressed as "GDPD" in the analysis. All of the data used in the study were obtained from the Central Bank's data address "evds.tcmb.gov.tr". The model estimated in this study is shown in equation (1) and (2): m2it = α + β1 YIKHit + εiti=1,...,N; t=1,...,T (1) GDPDit = α + β1 YIKHit + εiti=1,...,N; t=1,...,T (2) The dependent variable of the model is domestic credit volume; The independent variables are money supply and economic growth. 5.2. Methods of Econometric Analysis and Evaluation of Results The "Extended Dickey-Fuller (ADF)" unit root test devised by Dickey and Fuller was used to analyze the stationarity of the time series under consideration in this work (1981). The following equation will be utilized in this research. ΔY= β1 + β2t + ΔyT-1 + ∑ki=1 αi Δ Yt-1 +εt (3) When the variable is examined for stationary behavior, ΔY is the first difference of the variable, t is the general trend variable, and ΔYt-1 is the delayed difference terms. This is done to verify that the error terms are sequentially independent, which is why lagged difference terms are included. For the ADF test to provide a positive result, there must not be any evidence of a sequential dependence issue in the estimated model. The Akaike or Schwarz information criterion is used to calculate the lag length, which is denoted by the letter k in the equation. (Gül and Ekinci 2006) In order to execute the cointegration test, it is required for the series under consideration to be stationary. Therefore, the unit root test was carried out. As a result, it will be determined whether the variables are stationary. The results of unit root tests on variables specific to Azerbaijan are shown in Table 1.

Table 1 Unit root test results of variables.

Variables	Stability Degree	ADF Test Statistic	Critical Value 5% level	Probability Value
LOGGDPNO	I(0)	-5.084589	-2.878829	0.0000
LOGM2	I(0)	-6.595686	-2.877544	0.0000
LOGTL	I(0)	-4.037810	-2.877729	0.0016
LOGGDPOIL	I(0)	-2.903668	-2.878829	0.0470

It can be shown that the collected data are steady at the 5% level of significance. Using the Enhanced Dickey-Fuller test, we can observe that the probability values are "0" and near to 0, and the series is stationary at the level since the critical values are much less than those found in the ADF test statistics when looking at total credit volume, economic growth, and money supply data. This series does not need to be stationary since it does not have a unit root issue. Hence it does not need the first difference. Cointegration analysis is done after the series has been tested to check whether it is stationary to evaluate whether there is a long-term connection. Cointegration analysis is a statistical test that examines whether or not several variables move in lockstep. Whether or not cointegration or cointegration (in which they function in concert over time) occurs due to the question test, the cause-and-effect link has been established. In order to investigate the relationship between two non-stationary time series, cointegration analysis was devised. If the linear combinations of two or more time series are not stationary, but the individual time series themselves are, then the time series are said to be cointegrated (Bal 2012). This study used the Johansen Cointegration test to determine whether or not there was a long-term link between the variables. It is shown in Table 2 that the findings of the Johansen Cointegration test between loan volume and economic growth are significant and positive.

Table 2 Johansen cointegration test results for credit volume vs. non-oil GDP.

Trace Test	Eigen value Statistic	Trace Test	5% Critical Value	Probability
None *	0.225131	62.53404	15.49471	0.0000
At most 1 *	0.095385	17.64325	3.841466	0.0000
Maximum Eigen Value Test	Eigenvalue Statistic	Max.Eigen Test	5% Critical Value	Probability
None *	0.225131	44.89079	14.26460	0.0000
At most 1 *	0.095385	17.64325	3.841466	0.0000

The cointegration equation between the loan volume and non-oil GDP variables indicating economic development is evident when Table 2 is assessed at the 5% significance level for both the Trace and Maximum Eagen variables. This finding demonstrates a long-term link between loan volume and non-oil GDP, which indicates economic expansion.

With a closer look at Table 3, it becomes clear there is a cointegration equation between the oil sector GDP variables indicating loan volume and economic growth that is significant at the 5 percent level for both Trace and Maximum Eagen values. This conclusion indicates a long-term link between loan volume and the oil sector's GDP, which reflects economic growth over a period of time.

With a closer look at Table 4, it becomes clear that there is a cointegrated relationship between loan volume and money supply at the 5% level of significance for both the Trace and Maximum Eagen values. This finding demonstrates a long-run link between loan volume and money supply in the economy. Because the two models under consideration have a cointegration connection, the FMOLS and DOLS tests are used to estimate the long-term coefficients. The results of the FMOLS and DOLS tests are shown in Table 4.

Table 3 Johansen cointegration test results for credit volume and petroleum sector GDP.

Trace Test	Eigen value Statistic	Trace Test	5% Critical Value	Probability
None	0.224755	62.43826	15.49471	0.0000
At Most	0.095331	17.63283	3.841466	0.0000
Maximum Eigen Value Testi	Eigenvalue Statistic	Max-Eigen test	5% Critical Value	Probability
None	0.224755	44.80542	14.26460	0.0000
At Most	0.095331	17.63283	3.841466	0.0000

Table 4 Johansen cointegration test results for credit volume and money supply.

Trace Test	Eigen value Statistic	Trace Test	5% Critical Value	Probability
None	0.169303	36.15068	15.49471	0.0000
At Most	0.019715	3.504456	3.841466	0.0612
Maximum Eigen Value Testi	Eigen value Statistic	Max-Eigen test	5% Critical Value	Probability
None	0.169303	32.64622	14.26460	0.0000
At Most	0.019715	3.504456	3.841466	0.0612

Table 5 shows the findings of the FMOLS and DOLS tests, which show that a rise in credit volume has a beneficial effect on money supply and economic growth. According to the FMOLS test, if the domestic credit volume grows by one percent, the money supply increases by one-hundred-and-eighth percent (1.022554 percent according to DOLS). According to the FMOLS test, a one percent increase in domestic loan volume enhances economic growth by 0.873358 percent, while a ten percent rise in household loan volume raises economic growth by ten percent (0.91319 percent according to DOLS). According to the FMOLS test, a 1 percent increase in domestic loan volume enhances economic growth by 0.444243 percent from the standpoint of economic growth (0.439953 percent according to DOLS).

Table 5 FMOLS and DOLS test results.

| | $m2_{it} = \alpha + \beta1\ KH_{it} + \varepsilon_{it}$ | | |
| | $GDPNO_{it} = \alpha + \beta1\ KH_{it} + \varepsilon_{it}$ | | |
	$GDPOIL_{it} = \alpha + \beta1\ KH_{it} + \varepsilon_{it}$		
	Coefficient	**t-statistics**	**Probability Value**
FMOLS LOGTL →LOGM2	1.078183	10.85771	0.0000
DOLS TL →M2	1.022554	13.68927	0.0000
FMOLS TL →GDPNO	0.873358	9.266807	0.0000
DOLS TL →GDPNO	0.913190	6.380874	0.0000
FMOLS TL →GDPNOIL	0.444243	4.502559	0.0000
DOLS TL →GDPNOIL	0.439953	3.217111	0.0015

The Granger causality test was used to determine if the FMOLS and DOLS tests were consistent. The findings of the Granger causality test are shown in Table 6.

Table 6 Granger causality test results.

	Number of Observations	**Probability value**
LOGTL → LOGM2	180	0.2622
LOGM2→ LOGTL	180	0.2917
LOGTL →GDPNO	180	0.4989
GDPNO → LOGTL	180	0.7415
TL →GDPNOIL	180	0.6317
GDPNOIL → TL	180	0.0000

According to the Granger causality test results in Table 6, no causal relationship was found between money supply and credit volume, between credit volume and non-oil GDP, and between money supply and oil and non-oil sector GDP. Therefore, a unidirectional causality was found between the money supply and the domestic credit volume. When we look at the situation in terms of oil sector GDP and economic growth, there is a causality relationship at the level of 1% significance from economic growth to domestic credit volume; It was not possible to establish a causal association between domestic loan volume and economic growth in this study. As a result, the relationship between economic growth and domestic credit volume has been established unidirectional. The demand tracking theory, which was explored in the paper, was confirmed by this outcome. The demand tracking hypothesis is appropriate because of the unidirectional connection that exists between economic growth and financial development.

5.2. Discussion

Because the issue of economic growth is getting more complicated in current reality, it is necessary to study the nature of economic development throughout history. The investigation of economic growth variables, the most important of

which are the rates of consumption and investment, is brought to the forefront (Khanlarzadeh 2021). In Azerbaijan, the influence of loan volume on money supply has not been investigated, as can be observed from the examination of the literature on the subject. This makes the study important and contributes to the literature.

According to Granger causation:

Hypothesis 1: The hypothesis that there is no relationship between money supply and credit volume is accepted.

Hypothesis 2: The hypothesis that there is no relationship between credit volume and non-oil GDP was accepted.

Hypothesis 3: The hypothesis that there is no relationship between the money supply and the non-oil sector GDP is accepted.

Hypothesis 4: The hypothesis that there is no relationship between money supply and oil sector GDP is accepted.

Hypothesis 5: The hypothesis that there is no relationship between non-oil GDP and credit volume was accepted.

Hypothesis 6: The hypothesis that there is no relationship between oil sector GDP and credit volume is rejected. In other words, the oil sector affects the credit volume.

6. Conclusion

An analysis of the impact of loan volume on the money supply and economic development in Azerbaijan was conducted in this research. FMOLS and DOLS tests, which determine the coefficient of cointegration, causation, and connection, were performed on data including quarterly time series over 2006:M1-2021:M9. According to the conclusions of the research, a one-way causative link exists between the money supply and domestic credit volume and a one-way causal relationship between economic growth and domestic credit volume. This research provides evidence for the demand-following theory within the scope of the supply-following and demand-following hypotheses mentioned in the study. When one considers one-way causation, which runs from economic growth to financial development, the demand-following theory is correct. This finding demonstrates that economic expansion in the Azerbaijani economy increases the development of the financial sector and, as a result, the amount of credit extended. There was no evidence of a direct association between domestic loan volume and economic development. While doing so, researchers discovered that domestic credit volume, money supply, and economic growth all had a long-term cointegrated connection throughout time.

There is additional evidence for Granger causality findings from FMOLS and DOLS testing. As measured by the FMOLS test, a one-percent increase in domestic credit volume results in a 0.67 percent rise in the money supply. To put this in the framework of financial growth, according to FMOLS and DOLS, a rise in domestic credit volume of 1% raises economic growth by 0.22% (or 0.23%), respectively.

In future studies, the effect of the credit volume of state bank loans, commercial bank loans and non-bank financial institution loans on economic growth should be investigated separately. However, it would be more meaningful to investigate which bank loan affects which sector more. Money supply, loans and economic growth are also important issues for decision-makers.

Ethical considerations

Not applicable.

Conflict of Interest

The author declares no conflict of interest.

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