Bank Credit Maturity Structure and Economic Growth in Saudi Arabia

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Abstract: The commercial banks occupy a prominent position in stimulating economic activity through the role of financial intermediary between savers and borrowers, and contributing in the money supply. The study attempts to answer the question: Is there a relationship between Bank credit maturity structure and economic growth in Saudi Arabia?. to answer this question the study uses annual data during the period 1995 - 2020, using the vector auto-regression VAR, Granger causality tests, the Impulse Response Function, and the Variance Decomposition. The results of both the Impulse Response Function, and the Variance Decomposition indicate that the increases in RGDP are associated with higher bank credit, especially the long-term credit, which confirms the effectiveness of the credit channel in Saudi Arabia. Further, Granger causality tests suggest a bi-directional causal relationship between RGDP growth and long-term bank credit in KSA.

The analytical results supported the hypothesis that the expansion of bank credit enhances economic growth. Where the study concluded that the expansion of bank credit, especially long-term credit in the KSA acts as a credit channel to stimulate economic growth. Therefore, economic growth is faster as commercial banks provide more long-term credit. The study recommends the need for more long-term bank credit as it is an important channel through which economic growth is nourished.

Keywords: Saudi Arabia, Bank Credit, Economic Growth, VAR.
JEL Codes: E51, G21, O11.

INTRODUCTION

The financial system prosperity occupies a wide space in the economic literature as well as in the economic policy makers. Where the connection is usually made between finance and economic growth. Commercial Banks, as one of the most important and largest financial intermediaries, accumulate individual savings and operate them on economic bases, therefore it helps in building the economic structure through its contribution to providing financial resources for various economic activities, which affecting aggregate demand through investment and consumer loans, Moreover, banks reduce the need for self-financing of investments, also, banks work to provide liquidity, money supply, and diversification of risks (Bencivenga & Smith 1991). Thus, it has been argued that through various credit channels economic growth can be promoted.

Theoretical and practical interest in the relationship between the Commercial Banks activities and economic growth goes back to the writings of the early economists (Abu-Bader, & Abu-Qarn, 2008), Where they stressed the importance of the financing role of the banking sector in promoting economic growth, in addition to banking services improve the business environment. Economists explained that financial intermediation services attract savings and direct them to productive investments to encourage economic growth. The commercial banks occupy a prominent position in stimulating economic activity through the role of financial intermediary between savers and borrowers. The impact of financing on growth depends on the country's economic and institutional environment (Valev & Tasic, 2008). On the other hand, any shortage of financing results in negative effects on the production process and the exploitation of available resources, and this hinders economic activities. Economists considered that the imposition of restrictions on the banking sector by governments leads to weakening the role of financial intermediation institutions, reducing savings and investment, and thus deteriorating economic growth. (Mushabeb, 2015). So, it can be observed that growth rates are higher in economies that have an active financial intermediate sector (Bencivenga & Smith 1991).

Bank credit can be defined as the amount of funds provided by commercial banks to individuals, businesses, and government. Individuals obtain credit for consumption purposes, business sector borrow to further investment, whereas government borrows to finance budget as well as capital accumulation purposes. More specifically, bank credit is understood as the provision of financial resources such as the granting of a loan by the creditor to the debtor, whereby the debtor does not pay the loan to the lender immediately, they arrange the repayment of loans at a later time, thus creating debt.

There are several types of bank credit according to the classification criterion, where there is short, medium and long-

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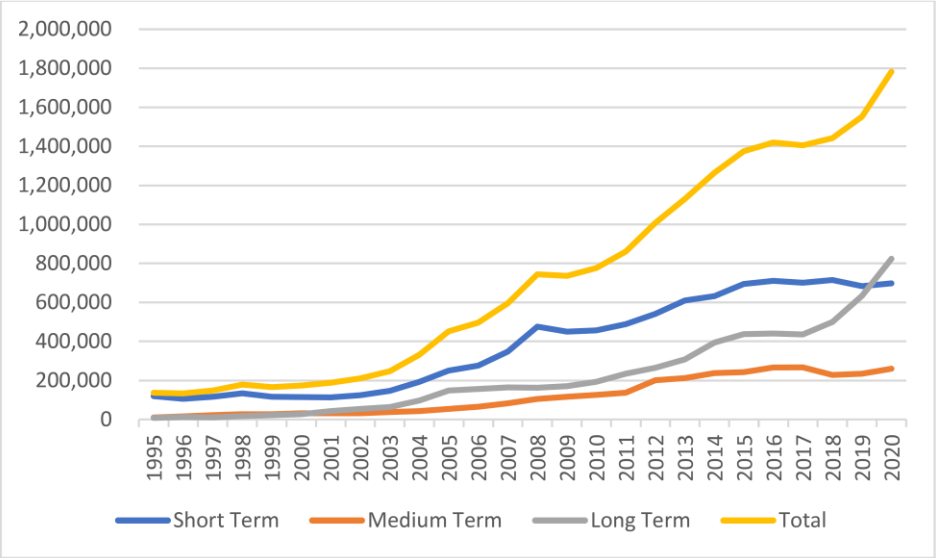

Fig. (1). Bank Credit in Saudi Arabia Classified by Maturity.

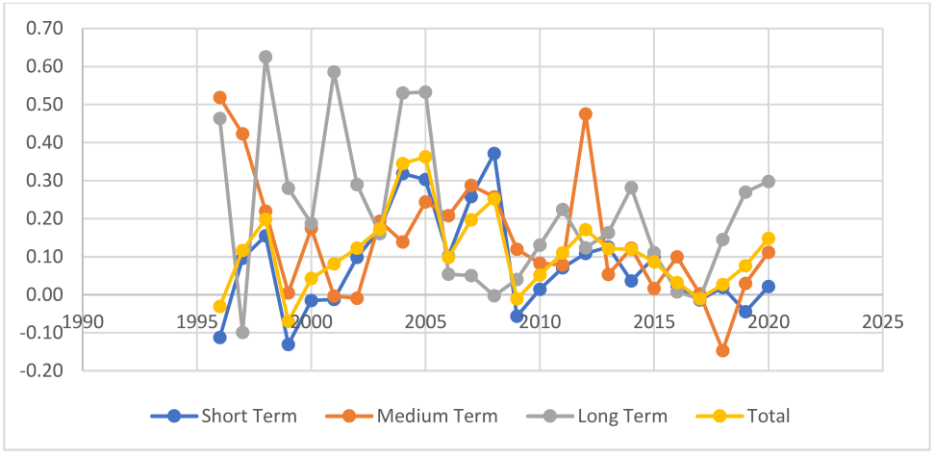

Fig. (2). Annual growth rates of bank credit in Saudi Arabia.

term credit according to the maturity's criterion, there is consumer, commercial and investment credit according to the purpose of credit, and there is public and private credit, according to the authority that requested credit. Therefore, the amount of credit or credit maturities may differ in promoting economic growth. Economic growth may increase with the proportion of savings invested in long-term project. Savings that are invested in high-productivity projects enhance economic growth. Where high-return projects require a long capital commitment. Among the many insights in the literature is that when intermediaries tend to encourage capital investment, they will also tend to raise growth rates risks (Bencivenga & Smith 1991).

Saying that long-term lending promotes economic growth is not a universal absolute. Short-term credit can have a positive effect on growth, as more short-term credit means more efficient investments. Therefore, this study attempts to examine practically the impact of credit maturity on economic growth in Saudi Arabia. Addressing the shortfall in the finance and growth literature regarding bank credit maturities.

Bank credit in Saudi Arabia can be divided into three categories: short-term credit with a contractual maturity of one year or less, medium-term credit 1 – 3 years, and long-term credit with a maturity over 3 years. The volume of bank credit in the Saudi Arabia has witnessed a remarkable development during the past decades, as the demand for long-term credit has increased to finance investments in productive economic sectors. Consequently, the oil price boom prompted Saudi Arabia to make huge investments and thus boost the financial sectors (Alghfais, 2016), this led the banks to develop their strategies to meet the credit requirements. as shown in Fig. (**1**). Short-term bank credit constitutes the largest percentage of credit, actually, in recent years long-term bank credit has witnessed a steady growth, reaching 824 million riyals in 2020 compared to 689 million short-term, which is the first time that long-term credit exceeds the value of short-term credit. It is noteworthy that the ratio of short-term bank credit to total credit declined from 78% in 1995 to 39% in 2020, compared to an improvement in the ratio of medium and long-term credit, as long-term credit constituted 6% in 1995 and rose to 46% of total credit in 2020. Notably, the bank credit has witnessed a structural change since the beginning of the past two decades. Moreover, the annual growth rates as shown in Fig. (**2**), also indicate that the long-

and short-term bank credit growth rates witnessed increases during the years (1995 – 2020).

The Saudi Vision 2030 focused on the banking sector and the role of credit in stimulating economic activities, thus enhancing the contribution of private sector activities to non-oil GDP growth. The Financial Sector Development Program was launched in 2017 to enable financial institutions to support private sector growth, develop an advanced capital market, and enhance and enable financial planning (Saudi Vision 2030). It is clear that the government supported banks in Saudi Arabia, especially during the Corona pandemic. About 30 billion riyals were deposited in banks and financing companies to delay payment for a period of six months. Likewise, financing the lending program: In addition to granting 13.2 billion riyals to banks and financing companies to grant loans to support business. Within the loan guarantee program, 6 billion Saudi riyals were deposited to enable banks and insurance companies to exempt small and medium enterprises from financing costs (Alzyadat & Asfoura, 2021).

Previous studies in the case of the Saudi economy focused on the role of financial development in economic development, most studies used bank credit as a proxy of financial development variables. this study based on dividing bank credit according to maturity to know its impact on economic growth in Saudi Arabia. The evolution of the volume of credit reflects the development of financing patterns in the economy, which is the main source of capital financing and thus stimulate investment and push the growth of macroeconomic variables, including the gross domestic product. The effects of credit vary in the short or long term, as well as the demand and supply sides.

This study attempts to contribute in the discussion about financing and economic growth by investigating the relationship of bank credit maturity and economic growth in Saudi Arabia in the context of VAR technology. Saudi Arabia was chosen because of its good track record in financial reforms along with sound macroeconomic policies. The economy of Saudi Arabia has also gone through a series of reforms in the financial system. This provides the necessary impetus for assessing the banking sector in Saudi Arabia in relation to its economic growth. According to the researcher's knowledge, this is the first attempt to investigate the relationship between bank credit maturity and economic growth. Therefore, the importance of the study lies in answering the question: Does bank credit maturity have an impact on economic growth in Saudi Arabia?

LITERATURE REVIEW

Economists generally argue that bank credit is a key to economic growth, the banking sectors development is the main force that sustains economic growth, where banks contribute to economic growth by providing liquidity services and increasing the supply of long-term credit capable of investing funds in various investment opportunities (Timsina & Pradhan, 2016). However, they may disagree about the degree to which bank loan maturities contribute to economic growth. As a result, many countries have adopted development strategies that prioritize banking sector reforms (Pradhan, et al. 2014).

The bank credit and economic growth nexuses has been widely discussed by economists and finance scholars. Different applied studies in different countries have shown different views on the effect of credit on economic growth. Empirical studies have concluded that there is a positive relationship between bank credit and economic growth in various economies, among other, (Abu-Bader & Abu-Qarn, 2008; Cristea & Dracea, 2010; Iqbal, et al. 2012; Murty, et al., 2012; Banu 2013; Barajas, et al., 2013; Hasanov & Huseynov, 2013; Zaghdoudi, et al., 2013; Alkhuzaim, 2014; Timsina, 2014; Oladapo & Adefemi, 2015; Akujuobi & Nwezeaku, 2015; Armeanu, et al, 2015; Ismail & Masih, 2015; Mohanty, et al. 2016.; Timsina & Pradhan, 2016; Singh, et al. 2016; Okafor, et al. 2016; Ananzeh, 2016; Abusharbeh, 2017; Bist, 2018; Hacievliyagil & Eksi, 2019; Awad & Al Karaki, 2019; Zıdan, 2019; Camba & Camba, 2020). Furthermore, Mushabeb, (2015) confirms the small positive impact of bank credit on Yemeni economy. Previously mentioned studies are consistent with the theoretical literature that assumes a positive impact of bank credit on economic activity. while others point out the inverse or the inverted U-shaped nonlinear relationship between credit and economic growth variables (De Gregorio, & Guidotti, 1995; Dudian & Popa, 2013; Petkovski & Kjosevski, 2014; Drozdowska, 2019; Bui, 2020; among others). Similarly, Judith, et al. (2014) concluded that the bank credit does not affect the economic growth of the Nigerian economy in the short run, due to the fact that the banking sector in Nigeria does not support the most active sectors. Moreover, Al-Malkawi, et al. (2012) reached the inconclusive conclusion between financial intermediaries and economic growth in the UAE, this result was explained by that the financial intermediaries operate in a weak regulatory environment, as the UAE economy is becoming more mature, and more vulnerable to a strong and unpredictable global economy. Interestingly, most studies justified the negative impact of bank credit on economic growth due to the weak institutional arrangements in these countries. That is, the reasons are not due to the bank credit itself, but to the environment of the economy and business.

This aspect of the credit channel has been controversial, some claiming that banks can easily substitute other forms of financing. Negative results found at the macro level that the lending channel has little or ambiguous macroeconomic impact. More research is needed to determine to what degree varying capacity use, changes in inventories, or changes in the form of financing can protect firms from banking shocks (Driscoll, 2004). The bank credit maturity varies across countries, even if the countries have a similar level of economic and financial development, begin with Bencivenga and Smith (1991) developed a model of the relationship between the maturity of banks' credit and economic growth. Valev, and Tasic, (2008) show that bank credit maturity is shorter in countries with less rule of law, higher inflation, less developed financial markets, and greater economic instability. Some empirical evidence has supported the hypothesis that longer credit maturity enhances economic growth. for example: (Bencivenga, & Smith,1991: Valev, & Tasic, 2008; Chaya, 2021). Therefore, the economies benefit from both long- and short-term bank credit. However, long-term

financing attracts future production and higher productivity growth.

In the case of Saudi Arabia, some studies have been conducted related to financial development and its role in economic growth, using bank credit as an indicator of financial development, beginning with Masih et al. (2009) concluded that the financial sector enhances economic growth in Saudi Arabia, while, Mahran (2012) found that financial intermediation has negative impact on economic growth. On the other hand, Ibrahim (2013) found that domestic bank credit has a significant and positive effect on economic growth in the long run but its effect is insignificant and negative in the short run for the period 1989-2008. Also, Samargandi et al (2014) found that financial development has a positive effect on the non-oil sector growth in Saudi Arabia, and a negative or negligible effect on oil sector growth and GDP growth, as well as, Osman (2014) emphasized the positive long- and short-run relationship between bank credit to private sector and economic growth during the period 1974 - 2012. Similarly, Al-Mahsh (2016) showed that financing has a positive impact on economic growth in Saudi Arabia, moreover, Haque, (2020) found a positive relationship between bank credit and the private sector GDP in Saudi Arabia. The scholars attributed this positive role of bank credit in the Saudi economy to the good management of banks' financial resources by allocating them to large investments to promote economic growth. The results by Hamdi et al. (2014) revealed a positive relationship between credit to the private sector and economic growth in the GCC, as the financial sector began to positively impact the economies of the GCC through the allocation of credits and financing of small and medium-sized enterprises.

Recently, a study by Alzyadat (2021), about the sectoral distribution of bank credit provided by commercial banks in Saudi Arabia. Based on annual data from 1970 to 2019 and ARDL methodology. The study concluded that, in general, the overall impact of bank credit on non-oil economic growth is positive. The study provides evidence that bank credit to all economic sectors have a positive impact in the long run, with the exception of the agriculture and mining sectors, Bank credit to these sectors contributes positively to the growth of non-oil GDP only in the short run.

Notably, most of the above-mentioned empirical work are consistent with the theoretical literature that assumes a positive impact of bank credit on economic activities, as well as dealing with the subject from different sides using different methods of analysis and reached similar results. But these studies focused on bank credit to the private sector as an indicator of banking activity or financial development. Therefore, as far as the researcher knows, no effort has been made in the area of bank credit maturity structure, this study attempts to fill this gap in Saudi Arabia by using time series data. The paper also considers VAR technique to test the hypothesis that bank credit maturity structure, has no effect on economic growth in Saudi Arabia.

METHODOLOGY

Economists have introduced financing as one of the determinants of macroeconomic growth models. Generally economic growth is defined as an increase in real gross domestic product RGDP. Therefore, (RGDP) is considered as proxy of economic growth in this study. The study uses the Vector Autoregression VAR model, which is widely applied in the time series analysis (Scott Hacker & Hatemi-J, 2008). VAR allows for the dynamic's interaction between the variables especially when the data-generating process is characterized by unit-roots. VAR is used as an alternative to simultaneous equations. In the VAR eliminates the endogeneity problems, all variables are treated as endogenous variables. Thus, allows for the assessment of the interaction between variables without presuppositions about causality and the length of time over which the variables affect each other. The only required is to identify the variables that can be assumed to influence each other over time. Allows investigation of long-run relationships between variables in combination with short-run dynamic adjustments. VAR also requires determining the number of time-lag length for the variables. In the VAR model, each variable is written as a linear function with the variable itself in lagged values, the lagged values of other variables in the model, and an error term. VAR helps to examine how each variable response is affected by other variables through the impulse response functions and variance decomposition, the VAR (p) of order p form is written as

$$Y_t = C + AY_{t-i} + ... + A_{p-1}Y_{t-p} + U_t$$
$$Y_t = \left[RGDP_t, ST_t, MT_t, LT_t\right] \quad (1)$$

Y_t the vector of variables, Where RGDP: the real Gross domestic product, ST: Oil sector GDP, PGDP: Private sector GDP, GGDP: the public sector GDP. $Y_{t\text{-}i}$ Indiçâtes the variables value with i time lag. C : Is a k-vector of constants as the intercept of the model. A : is (k × k) matrix, and U_t is a k-vector of the white noise error termes.

The co-integration test measures the long-run relationship between the variables, provided that the variables subject to the test are non-stationary in their level, but have the same degree of stationary, then determine the degree of co-integration of the variables, the co-integration test assumes the presence of at least one integrated vector. Cointegration testing is important to determines the most appropriate model in VAR. The cointegration tests are carried out based on the Johansen (1991) and Johansen and Juselius (1990) maximum likelihood framework. Johansen procedure uses two likelihood ratio tests: the Maximum Eigenvalue statistic and the Trace statistic. The trace statistic as shown in equation (2) below:

$$\lambda_{trace} = -T\sum_{i=r+1}^{q} Ln(1-\hat{\lambda}) \quad (2)$$

where T is the total number of observations, q is the number of variables, r is the i correlation between the variables λ_{trace} has a chi-square distribution with q–r degrees of freedom. The trace statistic tests the null hypothesis that there are at most r of the co-integration vectors against the alternative hypothesis that there is more than r.

The maximum eigenvalue statistic calculated according to the following formula

$$\lambda_{\max} = -T\ln(1-\lambda_{r+1}) \quad (3)$$

The formula (3) is used to test the null hypothesis that there are exactly r cointegrating vector(s) against the alternative hypothesis that there is r + 1. both the trace test and maximum eigenvalue statistics reject the null of $r \leq 0$ against the alternative $r \geq 1$ at 5% level of significance suggesting the evidence for the presence of one cointegrating vector in the models. However, there is no cointegration in model. Since VAR models are sensitive to lag, Therefore, there is a need to determine lag-length for the model, three criteria that are most often used are the Akaike Information criteria (AIC), the Schwarz Information criteria (SC), and the Hannan-Quinn Information criteria (HQC) (Scott Hacker, & Hatemi-J, 2008). using AIC, SC and HQC selection criteria all which suggest the use of VAR lag-length for the model.

The study uses Granger's causality test approach to know the direction of the causal relationship between the variables, according to (Granger, 1988), the variable x causes y if it is possible to predict y more accurately using the past values of y in addition to the past values of Xt. Causality may be binary in that the past value of Xt for each variable is determined by its past values, in addition to the past values of the variable for another, and this means that there is causation from two directions, the effect or consequence of Xt should not mean that Xt causes Yt. This test depends mainly on the F-test. This hypothesis is tested by comparing the calculated value with its critical tabular value at the absolute (F) level of a certain significant (F). And the null hypothesis is rejected if the calculated one is greater than the tabular one (in absolute value), which indicates that there is an influence relationship between the variables. The study tests the null hypothesis that bank credit structure (ST, MT, LT) does not cause economic growth (RGDP) and vice versa. The procedure for economic growth and bank credit can be defined as:

$$LRGDP_t = \alpha_0 + \sum_{i=1}^{n} \begin{bmatrix} \delta_i LST + \alpha_i LMT_t + \beta_i LL_T \\ + \gamma_i \Delta LRGDP_{t1} \end{bmatrix} + \varepsilon_t \quad (4)$$

Where the variables as previously defined; ε_t is the white noise error process; and n is the number of lagged variables.

The impulse response function measures the responses to shocks that an endogenous variable is exposed to within a model on the current and future values of other endogenous variables of (VAR) model. That is, it helps to explain the response of a variable to a random shock by one standard deviation in the same or other variables of a model over time.

The Variance decomposition is an approach to measure the relative importance of the variable in explaining the variance of the forecast errors for the variables in the model, Ensuring the accuracy of the results whenever the results are close after rearranging, this indicates the validity of the results. Thus, by proportioning the variance of the forecast error of a certain variable into proportions attributable to "shocks" in each variable in the system including itself, since an innovative shock in each of the variable produces changes in their future values as well as the other variables, it is possible to break down forecast error variance of each variable in each future period, and determine the percentage of variance that each error variance explains.

The study employs annual secondary data from Saudi Central Bank during the period from 1995 to 2020, using VAR approach for data analysis.

DISCUSSION OF THE ECONOMETRICS RESULTS

The descriptive statistics results of the mean and standard deviation of bank credit maturity structures indicate that short-term bank credit is the largest in terms of value compared to long and short-term credit, which reflects the volume of fluctuations in short-term bank credit, that is, the short-term credit has the largest variation among the other bank credit maturity structures. However, the maximum values were for long-term credit, because in the recent period the value of long-term credit began to increase at higher rates than short-term credit.

Table 1. The Descriptive Statistics.

	ST	MT	LT
Mean	385240.3	119921.5	224001.0
Median	398613.2	93910.16	163811.4
Maximum	714927.1	267154.5	823642.2
Minimum	106007.9	10305.22	8174.679
Std. Dev.	241496.4	95310.40	215849.4
Skewness	0.127119	0.386960	1.089637
Kurtosis	1.379439	1.496879	3.544483
Jarque-Bera	2.915092	3.096518	5.466173
Probability	0.232807	0.212618	0.065018
Sum	10016247	3117959.	5824027.
Sum Sq. Dev.	1.46E+12	2.27E+11	1.16E+12

Usually, time series analysis begins with testing the stationary for each variable, the time series behavior subjected to tests to determine the series as stationary or non-stationary. Primary tests include the time-series unit root tests such as the augmented Dickey-Fuller test (ADF) and tests for cointegration, which determine whether the model should be estimated as a VAR in differences (no cointegration), or Vector Error-Correction Model (VECM) In the case of cointegration or a VAR in levels if the null hypotheses are rejected. The results of the augmented Dickey Fuller (ADF) presented in Table (**2**) show that all the time series of the variables are non-stationary in their level. But they are stationary in the first differences I(1). The results confirm that the all variables are integrated of order one, this indicates that the variables can be tested for cointegration to verify if there is a long-run relationship.

Economic theory suggests that economic processes are dynamic, but it does not help much with regard to the length of those dynamic processes. VAR models are sensitive to lag. The results of the lag order selection criteria in Table (**3**) show that 3 lag lengths for Akaike Information criteria (AIC), one lag length for Schwarz Information Criteria (SC), and three lag lengths for Hannan-Quinn Information criteria

Table 2. The Augmented Dickey-Fuller Test.

Variable	Level			1st difference		
	Intercept	Trend and Intercept	The result	Intercept	Trend and Intercept	The result
RGDP	-0.367066	-2.452318	Non	-3.369873	-3.195083	I (1)
ST	-0.037004	-1.988970	Non	-3.833702	-3.718732	I (1)
MT	0.076758	-1.808213	Non	-4.087110	-4.048845	I (1)
LT	3.278906	1.470521	Non	-3.752946	-4.416345	I (1)

Table 3. VAR Lag Order Selection Criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1159.116	NA	9.88e+38	101.1405	101.3380	101.1902
1	-1073.124	134.5960*	2.31e+36	95.05428	96.04167*	95.30261
2	-1055.495	21.46115	2.33e+36	94.91265	96.68994	95.35963
3	-1034.265	18.46127	2.26e+36*	94.45783*	97.02503	95.10347*

* Indicates lag order selected by the criterion.

(HQ). That is, the least of the three criteria is the optimal lag length, so, based on the results is one lag length.

Co-integration Tests

The Co-integration tests are carried out based on the maximum likelihood framework. The essence is to establish whether long-run relationship exists among the variables of interest. The results of the Cointegration Test in Table (**4**) show that the Trace and Max-eigenvalue tests indicate the cointegration at the 0.05 level. the trace test and maximum eigenvalue statistics suggesting the evidence for the presence of one cointegrating vector in the model, Both the trace test and maximum Eigen-value statistics rejected the null hypothesis of no cointegration at the 5% level of significance for the bank credit structure indicators. Therefore, when the time series I(1) and not cointegrated, in this case, the appropriate model is VAR in first differences. Co-integration is not rejected, indicating a strong long-term correlation between bank credit structure and long-term economic growth. as can be seen from the results, there is one integral equation. This means that there is a long-term relationship between the variables under study. The results confirm the existence of a stable long-run relationship between the bank credit structure indicators and real GDP for KSA.

Table 4. Cointegration Test.

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.826287	70.75861	54.07904	0.0008
At most 1	0.485329	30.50059	35.19275	0.1470
At most 2	0.378988	15.22333	20.26184	0.2138
At most 3	0.169295	4.266040	9.164546	0.3739

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.826287	40.25802	28.58808	0.0011
At most 1	0.485329	15.27725	22.29962	0.3526
At most 2	0.378988	10.95729	15.89210	0.2550
At most 3	0.169295	4.266040	9.164546	0.3739

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Causality Test

The study uses Granger's causality tests to investigate the direction of the short run dynamics relationship between economic growth and the bank credit maturity structure indicators. The P-values were compared to 5% level of significance, the Granger's causality results indicate that there is a bi-directional causal relationship between GDP growth and long-term bank credit. It can be called the growth hypothesis based on long-term financing. However, it is also clear that the impact of RGDP on long-term credit is strong as suggested by the Granger's causality analysis. further the short-term credit, no statistically significant causal relationship was found. As for medium-term bank credit, the results reflected the existence of a unidirectional relationship from real GDP to short-term credit, meaning that economic growth has a role in influencing the of bank credit structure in Saudi Arabia.

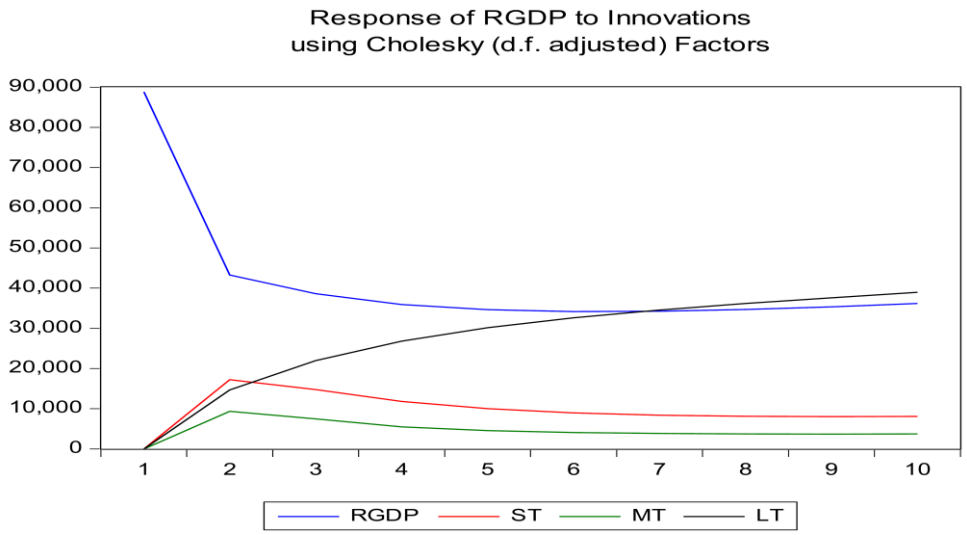

Fig. (3). The results of Impulse Response Function of RGDP.

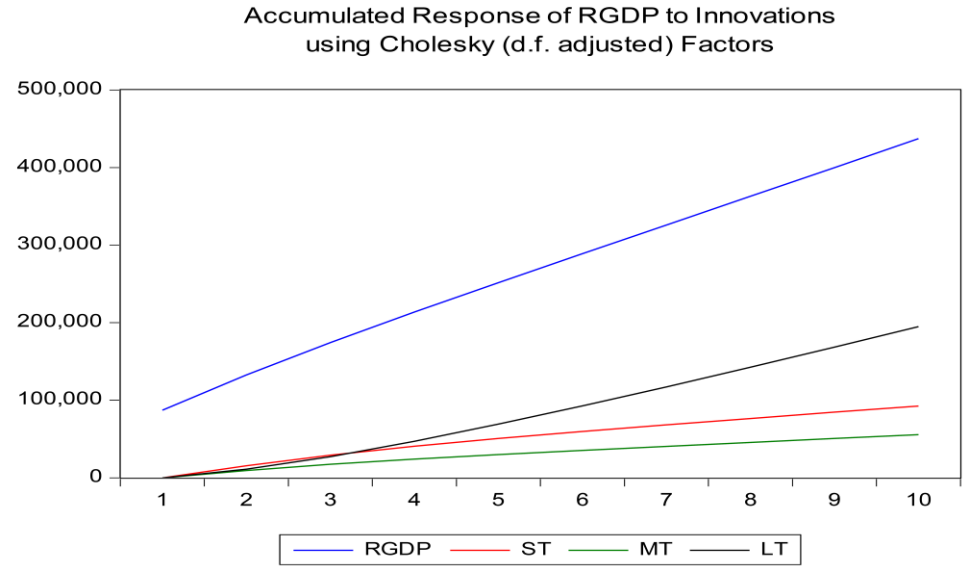

Fig. (4). The accumulative Response of RGDP.

Table 5. Granger Causality Tests.

Null Hypothesis:	F-Statistic	Prob.
ST does not Granger Cause RGDP	0.47962	0.4958
RGDP does not Granger Cause ST	2.71284	0.1138
MT does not Granger Cause RGDP	0.04887	0.8271
RGDP does not Granger Cause MT	12.2603	0.0020
LT does not Granger Cause RGDP	5.66946	0.0263
RGDP does not Granger Cause LT	4.66465	0.0420

Impulse Response Function and Variance Decomposition

In the VAR model, the time path of structural shocks can be traced on the dependent variable. Fig. (**3**) shows the RGDP response to a shock on long-term bank credit has a longer and stronger impact than the GDP response to medium- and short-term bank credit. The increasing positive impact of long-term bank credit on real GDP continues until the tenth year. While the positive impact of short- and medium-term bank credit on economic growth continues to decline since the third year. Accordingly, it can be said that the short-term links between economic growth and the of bank credit maturity structure have been explored using the Impulse response function that supports the evidence provided by Granger's causality analysis.

A positive shock in long-term bank credit leads to a cumulative rise in real GDP, and this positive relationship is rather significant, as the range of standard errors does not exceed zero. This direct relationship is to be expected, given the fact that bank credit fuels economic growth. Impulse responses of RGDP show a similar result. Specifically, a positive shock to bank credit leads to cumulative rises in real GDP.

The results of the variance decomposition Analysis as shown in Fig. (**5**) indicates that the long-term bank credit explains approximately 17% of the forecast error variance of RGDP, compared to other bank credit structure, where short-term

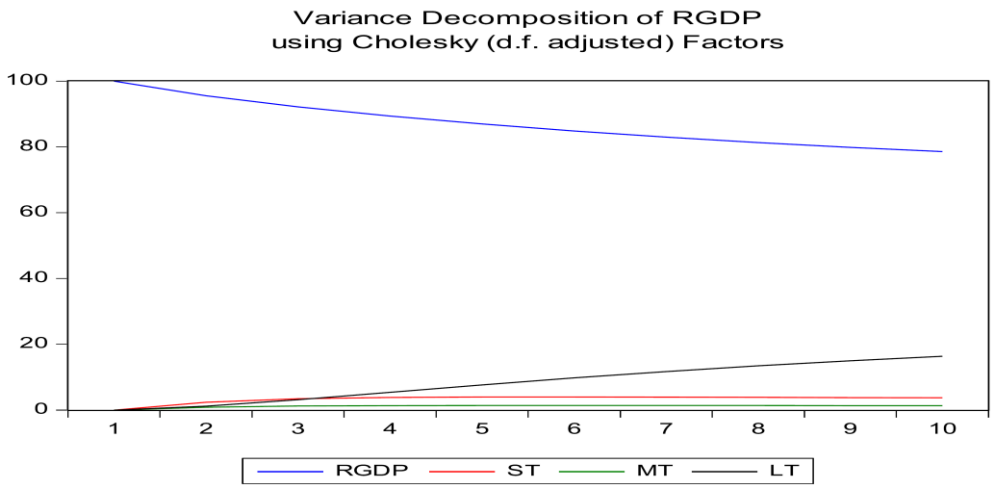

Fig. (5). The Variance Decomposition of RGDP.

bank credit explained a small proportion of the forecast error variance of RGDP, only explains approximately 3.7% of the forecast error variance of RGDP. also, the medium -term bank credit only explains approximately 1.3% of the forecast error variance of RGDP. Thus, the long-term bank credit is the most important bank credit variable affecting economic growth. Thus, long-term bank credit is the most important variable of bank credit that can promote economic growth. This result supported the obtained results of Granger's causality and the impulse response function.

CONCLUDING REMARKS

This study empirically attempts to answer the question: Is there a relationship between Bank credit maturity structure and economic growth in Saudi Arabia?. to answer this question the study, use annual data during the period 1995 – 2020. VAR techniques A Granger causality approach was employed within Cointegration framework. including the impulse response function and variance decomposition to provide a quantitative assessment of the relationship between bank credit maturity structure and GDP growth in Saudi araba Co-integration test indicating a strong long-term correlation between bank credit structure and long-term economic growth. The results confirm the existence of a stable long-run relationship between the bank credit structure indicators and real GDP for KSA.

The Granger's causality results indicate that there is a bi-directional causal relationship between GDP growth and long-term bank credit. It can be called the growth hypothesis based on long-term financing. it is also clear that the impact of RGDP on long-term credit is strong as suggested by the Granger's causality analysis. further the short credit, no statistically significant causal relationship was found. however, the results reflected the existence of a unidirectional relationship from real GDP to short-term credit, meaning that economic growth has a role in influencing the of bank credit structure in Saudi Arabia.

The Impulse Response Function indicates that the RGDP response to a shock on long-term bank credit has a longer and stronger impact than the real GDP response to medium and short-term bank credit. A positive shock in long-term bank credit leads to a cumulative rise in real GDP. While the positive impact of short- and medium-term bank credit on economic growth continues to decline since the third year. Accordingly, that supports the evidence provided by Granger's causality analysis. This direct relationship is to be expected, given the fact that bank credit fuels economic growth. Impulse responses of RGDP show a similar result. Specifically, a positive shock to bank credit leads to cumulative rises in real GDP.

The results of the variance decomposition indicates that the long-term bank credit explains approximately 17% of the forecast error variance of RGDP, compared to other bank credit structure, where short-term bank credit explained a small proportion of the forecast error variance of RGDP, only explains approximately 3.7% of the forecast error variance of RGDP. also, the medium -term bank credit only explains approximately 1.3% of the forecast error variance of RGDP. Thus, the long-term bank credit is the most important bank credit variable affecting economic growth. Thus, long-term bank credit is the most important variable of bank credit that can promote economic growth. This result supported the obtained results of Granger's causality and the impulse response function.

On the whole, the results support the findings of most empirical studies that have shown the positive role of bank credit in economic growth in KSA, as: (Othman, 2014; Al-Mahsh, 2016; Haque, 2020, Alzyadat, 2021). The scholars attributed this positive role of bank credit in the Saudi economy to the good management of banks' financial resources by allocating them to large investments to promote economic growth.

In conclusion, the findings show that long-term bank credit has a greater effect than other bank credit in explaining economic growth, it is granted to finance activities of a capitalist nature, such as building factories or establishing new projects. The empirical analysis was conducted that bank credit according to maturity in Saudi Arabia affects economic growth, and the rapid reform and change in the banking system has led to the provision of significant credit resources to the economy, and thus contributed to the growth of GDP in Saudi Arabia. However, it was also found that the strong long-term bank credit in the last years had a significant impact on economic growth by providing a solid credit base.

In light of the results, the study recommends the need to focus more on long-term bank credit. We do not lose sight of the importance of bank credit, whether short or medium-term, because bank credit as a whole has contributed to promoting economic growth in Saudi Arabia. Therefore, without credit, banks lose their main function as financial intermediaries in the economy.

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REFERENCES

Abu-Bader, S., & Abu-Qarn, A. S. (2008). Financial development and economic growth: empirical evidence from six MENA countries. *Review of Development Economics*, *12*(4), 803-817. https://doi.org/10.1111/j.1467-9361.2008.00427.x

Abusharbeh, M.T. (2017). The Impact of Banking Sector Development on Economic Growth: Empirical Analysis from Palestinian Economy. Journal of Emerging Issues in Economics, Finance and Banking, 6(2). www.globalbizresearch.org

Akujuobi, A.B.C. & Nwezeaku, N.C. (2015). Bank Lending Activities and Economic Development in Nigeria; An Empirical Investigation. *International Proceedings of Economics Development and Research, (85), 57 – 64.*

Alghfais, M. (2016). *Comparative analysis: The impact of financial sector development on economic growth in the non-oil sector in Saudi Arabia*. SAMA Working Paper, WP/16/5.

Alkhuzaim, W. (2014). Degree of financial development and economic growth in Qatar: cointegration and causality analysis. *International Journal of Economics and Finance*, *6*(6), 57-69. http://dx.doi.org/10.5539/ijef.v6n6p57

Al-Mahsh, M. (2016). The Impact of Financing on Economic Growth in Saudi Arabia. *International Journal of Economics and Finance*, 8(8). http://dx.doi.org/10.5539/ijef.v8n8p1

Al-Malkawi, H. A. N., Marashdeh, H. A., & Abdullah, N. (2012). Financial development and economic growth in the UAE: Empirical assessment using ARDL approach to co-integration. *International Journal of Economics and Finance*, *4*(5), 105-115

Alzyadat, J. A. (2021). Sectoral banking credit facilities and non-oil economic growth in Saudi Arabia: application of the autoregressive distributed lag (ARDL). *The Journal of Asian Finance, Economics and Business*, *8*(2), 809-820. https://doi.org/10.13106/jafeb.2021.vol8.no2.0809

Alzyadat, J. A., & Asfoura, E. (2021). The effect of COVID-19 pandemic on stock market: An empirical study in Saudi Arabia. *The Journal of Asian Finance, Economics and Business*, *8*(5), 913-921. https://doi.org/10.13106/jafeb.2021.vol8.no5.0913

Ananzeh, I. E. (2016). Relationship between bank credit and economic growth: Evidence from Jordan. *International Journal of Financial Research*, 7(2), 53-63. http://dx.doi.org/10.5430/ijfr.v7n2p53

Armeanu, D., Pascal, C., Poanta, D., & Doia, C.A. (2015). The Credit Impact on the Economic Growth. *Theoretical and Applied Economics, 12(1), 5-14.*

Awad, I. M., & Al Karaki, M. S. (2019). The impact of bank lending on Palestine economic growth: an econometric analysis of time series data. *Financial Innovation*, *5*(1), *https://doi.org/10.1186/s40854-019-0130-8*

Banu, I. M. (2013). The Impact of Credit on Economic Growth in the Global Crisis Context. *Procedia Economics and Finance*, (6), 25 – 30. https://doi.org/10.1016/S22125671(13)00109-3

Barajas, A., Chami, R. & Yousefi, S.R. (2013). The finance and growth nexus Re-examined: do all countries benefit equally? IMF Working Paper WP/13/130. https://www.imf.org

Bencivenga, V. R., & Smith, B. D. (1991). Financial intermediation and endogenous growth. *The review of economic studies*, *58*(2), 195-209.

Bist J. P. (2018). Financial development and economic growth: Evidence from a panel of 16 African and non-African low-income countries, *Cogent Economics & Finance*, 6(1). https://doi.org/10.1080/23322039.2018.1449780

Bui, T. N. (2020). Domestic Credit and Economic Growth in Asian Countries: A Nonlinear Approach. *International Transaction Journal of Engineering, Management, & Applied Sciences & Technologies*, 11(2). Doi: 10.14456/Itjemast.2020.34

Camba Jr, A. C., & Camba, A. L. (2020). The dynamic relationship of domestic credit and stock market liquidity on the economic growth of the Philippines. *The Journal of Asian Finance, Economics, and Business*, *7*(1), 37-46. https://doi.org/10.13106/jafeb.2020.vol7.no1.37

Chaya, J. (2021). Loan Maturity Structure and the Actualization of Production. *Applied Economics Quarterly (formerly: Konjunkturpolitik)*, *67*(1), 27-45.

Cristea, M., & Dracea, R. (2010). Does Credit Market Accelerate Economic Growth In Romania? Statistical Approaches. *Finance – Challenges of the Future*, University of Craiova, Faculty of Economics and Business Administration, 1(11), 184-190. http://Feaa.Ucv.Ro/Fpv/011-24.Pdf

De Gregorio, J., & Guidotti, P. E. (1995). Financial development and economic growth. *World development*, *23*(3), 433-448.

Driscoll, J. C. (2004). Does bank lending affect output? Evidence from the US states. *Journal of monetary economics*, *51*(3), 451-471. https://doi.org/10.1016/j.jmoneco.2004.01.001

Drozdowska, M. I., Bongini, P., Smaga, P., & Witkowski, B. (2019). The role of banks in CESEE countries: exploring non-standard determinants of economic growth. *Post-Communist Economies*, 31(3), 349-382. https://doi.org/10.1080/14631377.2018.1505694

Dudian, M., & Popa, R.A. (2013). Financial development and economic growth in Central and Eastern Europe. *Theoretical and Applied Economics, 10(8), 59-68.*

Granger, C. W. (1988). Some recent development in a concept of causality. *Journal of econometrics*, *39*(1-2), 199-211. https://doi.org/10.1016/0304-4076(88)90045-0

Hacievliyagil, N., & Eksi, I. H. (2019). Micro Based Study on Bank Credit and Economic Growth: Manufacturing Sub-Sectors Analysis. *South East European Journal of Economics and Business, 14(1), 72-91. DOI: 10.2478/jeb-2019-0006*

Hamdi, H., Sbia, R., & Tas, B. K. O. (2014). Financial deepening and economic growth in Gulf cooperation council countries. *International Economic Journal*, *28*(3), 459-473. https://doi.org/10.1080/10168737.2014.913653

Haque, M. I. (2020). The Growth of Private Sector and Financial Development in Saudi Arabia. *Economies*, 8(2), 39. https://doi.org/10.3390/economies8020039

Hasanov, F., & Huseynov, F. (2013). Bank credits and non-oil economic growth: Evidence from Azerbaijan. *International Review of Economics & Finance*, (27), 597 610. https://doi.org/10.1016/j.iref.2013.02.005

Ibrahim, M. A. (2013). Financial development and economic growth in Saudi Arabian economy. *Applied Econometrics and International Development*, *13*(1), 133-144.

Iqbal, M. Z., Ahmad, N., & Hussain, Z. (2012). Impact of savings and credit on economic growth in Pakistan. *Pakistan Journal of Social Sciences (PJSS)*, *32*(1), 39-48

Ismail, M. A. M., & Masih, M. (2015) Causality between financial development and economic growth, and the Islamic finance imperative: A case study of Indonesia. MPRA Paper No. 65831, Online at https://mpra.ub.uni-muenchen.de/65831/

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica: journal of the Econometric Society*, 59(6). 1551-1580. https://doi.org/10.2307/2938278

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with amputations to the demand for money. *Oxford Bulletin of Economics and statistics*, *52*(2), 169-210.

Judith, M. N., Ugwuegbe, S., & Ugwuoke, R. O. (2014). The impact of bank credit on the growth of Nigerian economy: A co integration approach. *Research Journal of Finance and Accounting*, *5*(10), 87-95.

Kingdom of Saudi Arabia Vision 2030. (2016). Available at: https://www.vision2030.gov

Mahran, H. A. (2012). Financial intermediation and economic growth in Saudi Arabia: An empirical analysis, 1968-2010. *Modern economy*, *3*(5), 626-640 http://dx.doi.org/10.4236/me.2012.35082

Masih, M., Al-Elg, A., & Madani, H. (2009). Causality between financial development and economic growth: an application of vector error correction and variance decomposition methods to Saudi Arabia. *Applied Economics*, 41(13), 1691-1699. DOI:10.1080/00036840701320233

Mohanty, A. R., Kumar, S., & Patra, S. K. (2016). Bank credit and economic growth: Empirical evidence from Indian states. *International Journal of Current Research*, *8*(09), 39145-39151

Murty, K. S, Sailaja, K, Demissie, W. M. (2012). The long-run impact of Bank credit on economic growth in Ethiopia: evidence from the Johansen's multivariate Cointegration approach. *European Journal of Business and Management*. 4(14), 20 – 33

Mushabeb, G. (2015) Effect of Private Banking Credit on Economic Activity: A Case Study of Yemen. The Jordanian Journal of Economic Sciences, 2(2). 129 – 142.

Okafor, I. G., Ezeaku, H. C., & Ugwuegbe, U. S. (2016). Relationship between deposit money bank credit and economic growth in Nigeria under a VAR G-causality environment. *IOSR Journal of Economics and Finance*, *7*(2), 41-46.

Oladapo, F., & Adefemi, O. A. (2015). Sectoral Allocation of Banks' Credit and Economic Growth in Nigeria International *Journal of Academic Research in Business and Social Sciences, 5(6)*. http://dx.doi.org/10.6007/IJARBSS/v5-i6/1666

Osman, E. G. A. (2014). The impact of private sector credit on Saudi Arabia Economic Growth (GDP): An Econometrics model using (ARDL) Approach to Cointegration. *Am Int J Soc Sci*, *3*(6), 109-117.

Petkovski, M., & Kjosevski, J. (2014). Does banking sector development promote economic growth? An empirical analysis for selected countries in Central and South Eastern Europe. *Economic Research*, 27(1), 55–66. http://dx.doi.org/10.1080/1331677X.2014.947107

Pradhan, R. P., Arvin, M. B., Norman, N. R., & Hall, J. H. (2014). The dynamics of banking sector and stock market maturity and the performance of Asian economies: Time series evidence. *Journal of Economic and Administrative Sciences*.

Samargandi, N, Fidrmuc, J., & Ghosh, S. (2014). Financial development and economic growth in an oil-rich economy: The case of Saudi Arabia. *Economic modeling*, (43), 267 – 278 https://doi.org/10.1016/j.econmod.2014.07.042

Scott Hacker, R., & Hatemi-J, A. (2008). Optimal lag-length choice in stable and unstable VAR models under situations of homoscedasticity and ARCH. *Journal of Applied Statistics*, *35*(6), 601-615. https://doi.org/10.1080/02664760801920473

Singh, C., Pemmaraju, S., & Das, R. (2016). Economic Growth and Banking Credit in India. *IIM Bangalore Research Paper*, No. 531, http://dx.doi.org/10.2139/ssrn.2882398

Timsina, N. (2014). Bank credit and economic growth in Nepal: An empirical analysis. *NRB Economic Review*, *26*(2), 1-24.

Timsina, N., & Pradhan, R. S. (2016). Effects of Bank lending on economic growth in Nepal. *Journal of Advanced Academic Research*, *3*(3), 53-75.

Valev, N. T., & Tasic, N. (2008). The maturity structure of bank credit: Determinants and effects on economic growth. *Andrew Young School of Policy Studies Research Paper Series*, (08-12).

Zaghdoudi, T, Ochi A., & Soltani, H. (2013). Banking intermediation and economic growth: some evidence from MENA countries. *Advances in Management & Applied Economics*, 3(4):51–57.

Zıdan, K. (2019). The Impact of Banking Sector on Economic Growth: Empirical Analysis from Palestinian Economy. *International Journal of Economics and Financial Issues*, 9(1), 1-6. https://doi.org/10.32479/ijefi.7369

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