Print ISSN: 2288-4637 / Online ISSN 2288-4645
doi:10.13106/jafeb.2021.vol8.no2.0809

Sectoral Banking Credit Facilities and Non-Oil Economic Growth in Saudi Arabia: Application of the Autoregressive Distributed Lag (ARDL)*

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Received: November 05, 2020 Revised: January 05, 2021 Accepted: January 15, 2021

Abstract

The study aimed to investigate the impact of sectoral bank credit facilities provided by commercial banks on the non-oil economic growth in Saudi Arabia. Bank credit facilities are given for nine economic sectors: agriculture, manufacturing, mining, electricity and water, health services, construction, wholesale and retail trade, transportation and communications, services, and finance sector. The study employs annual data from 1970 to 2019. The study employs the Autoregressive Distributed Lag (*ARDL*) approach to identify the long-run and short-run dynamics relationships among the variables. The main results reveal that the overall impact of total bank credit has a significant and positive effect on non-oil economic growth in KSA. The results revealed that the effect of bank credit on the non-oil GDP growth in the short and long run was uneven. The study finds that all sectors have a positive and significant impact in the long run, except for the agricultural and mining sectors. Likewise, all sectors have a positive and significant impact in the short run, except for construction, finance, services, and transportation & communications. As a result, bank credit facilities in different sectors have played an important role in enhancing the non-oil economic growth in the KSA.

Keywords: Saudi Arabia, Bank Credit, Economic Growth, Financial Development, ARDL

JEL Classification Code: G21, E51, O47, B26

1. Introduction

Financial development is associated with higher rates of economic growth (Sahay et al., 2015). It is now well recognized that financial development is crucial for economic growth. Furthermore, the direction of causality between financial development and economic growth is crucial because it has significantly different implications for development policy (Calderon & Liu, 2003). Causality is the influence by which one event, process, state, or object (a cause) contributes to the production of another event, process, state, or object (an effect) where the cause is partly responsible for the effect, and the effect is partly dependent on the cause. Financial development generally leads to economic growth; the causality from financial development to economic growth and the causality from economic growth to financial development coexist. Empirical results also indicate that there is no clear consensus on the direction of causation between financial development and economic growth and the results are country-specific (Deltuvaitėa & Sinevicienėb, 2014). Many researchers around the world have confirmed the positive relationship between financial development and economic growth (Belinga et al., 2016). Others have pointed out that economic growth interacts differently with financial development, where the relationship between financial development and economic growth takes a U-shape (Tariq et al., 2020). Therefore, the existence of the relationship between financial development and economic growth appears to be indisputable (Belinga et al., 2016). The debate is the trend of causality between financial development and economic growth. A well-functioning

***Acknowledgments**:
[1] The author extends the appreciation to the Deanship of Post Graduate and Scientific Research at Dar Al Uloom University for funding this research.
[2] The authors declare no conflict of interest.

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financial sector is necessary to facilitate growth in the real sector which resultantly leads to economic growth. In other words, economic growth is reliant on how well the financial sector is deepened or developed. When the causality flows from financial development to economic growth, the financial sector deepens (activities of financial sector increases), there is an increase in the supply of financial services. The route through which financial deepening promotes economic growth is explained in the supply-leading hypothesis (Calderon & Liu, 2003). Likewise, when growth within the economy results in an increase in the demand for financial services, this subsequently stimulates financial development (Belinga et al., 2016), this is known as the demand-following hypothesis (Calderon & Liu, 2003).

Empirical literature used several indicators, to measure financial development; financial development refers to both the stock market development as well as the banking sector's growth (Kumar & Paramanik, 2020). For the banking sector, they used the ratio of liquid liabilities to GDP, monetary aggregates M1 and M2 to GDP, size of deposits to GDP, and bank credit to the private sector to GDP (Barajas et al., 2013). Literature emphasized that bank credit to the private sector is the most appropriate measure of financial development (Beck et al., 2000; Masih et al., 2009; Hamdi et al., 2014). Banks are the largest and most important financial institutions that facilitate financial services. Bank credit is one of the important elements of financial development, which enhances economic growth. Given the importance of bank credit, many studies focused on the economic variables affecting bank credit, especially after the global financial crisis (Miyajima, 2020). In developing countries, the existence of economic links between financial development and economic growth is crucial (Aslanishvili, 2020).

Saudi Arabia is an oil-dominated economy and is currently trying to diversify itself away from excessive dependence on oil. Between 1970 and 2019, the contribution of the oil sector to GDP decreased from 43% to 31%; the average contribution of the oil sector to GDP during the period 1970–2019 was about 34%. The contribution of the non-oil (government and private) sector increased from 57% to 69%; the average contribution of the non-oil sector to GDP during the period 1970–2019 was about 57%. The contribution of the private sector to the non-oil sector increased from 66% to 67% with an average of 69%. Whereas, the contribution of the government sector to non-oil decreased from 34% to 33%. Moreover, the ratio of bank credit facilities to the non-oil GDP increased from 11.9% to 76.6% between 1970 and 2019. Therefore, this study explores the impact of the commercial bank credits facilities provided to the private sector on the non-oil economic sectors growth in the Saudi Arabia economy over the period (1970–2019), using the Autoregressive Distributed Lag (ARDL) approach to examine the dynamics relationships in the short and long run empirically.

2. Literature Review

Empirical literature considered bank credit as one of the important elements of financial development, which enhances economic growth, bank credit contributes to economic growth in several ways (Timsina & Pradhan, 2016). Bank credit is an important link in transferring money; finance production, consumption, and capital formation, which in turn boost economic activity. The monetary policy transmission mechanism can be strengthened and monetary policy objectives achieved, especially if the banking system is well functioning and managed under certain regulations. Bank credit facilities to the private sector in an environment of banking discipline will be an effective factor in enhancing the productive potential and the bright development scenario of the economy. Thus, it leads to economic growth, job creation, and increased competitiveness of the economy. More bank credit facilities will stimulate economic growth. Empirical studies found that bank credit had a positive impact on economic growth (Cristea & Dracea, 2010; Murty et al., 2012; Barajas et al., 2013; Zaghdoudi et al., 2013; Oladapo & Adefemi, 2015; Armeanu et al., 2015; Ismail & Masih, 2015; Singh et al., 2016; Abusharbeh, 2017; Hacievliyagil & Eksi, 2019; Awad & Al Karaki, 2019; Zıdan, 2019). Bist (2018) investigated the long-run relationship between financial development and economic growth in 16 selected low-income countries for the period of 20 years from 1995 to 2014. The results revealed the positive impact of financial development on economic growth in the majority of the countries. Likewise, it was found that the flow of credit to the private sector is very low in this region of the world

Okafor et al. (2016) revealed a significant relationship between bank lending activities and economic growth in Nigeria. Adeola and Ikpesu (2016) indicated that commercial loans to the agriculture sector positively affect agricultural output in Nigeria but the effect is very low. Hasanov and Huseynov (2013) indicated that bank credit has a positive impact on non-oil tradable sector output in the long and short run in Azerbaijan. Ananzeh (2016) pointed out the importance of bank credit facilities in a major economic sector in the Jordanian economic growth. Timsina and Pradhan (2016) showed that bank lending has positive effects on the economic growth in Nepal. Banu (2013) showed that credits to households contribute largely to economic growth than credits offered to public administration.

On the other hand, some studies have found that bank credit has a negative effect on economic growth in some countries. Hasan and Barua (2015) found that the financial sector credit to the private sector has not yet played an influential role, and insignificantly promoting economic growth in developing countries in the South Asian region. Krishnankutty (2011) found that bank credit in North-East India does not have much impact on economic growth.

Petkovski and Kjosevski (2014) showed that credit to the private sector is negatively related to economic growth. Dudian and Popa (2013) and Drozdowska et al. (2019) found evidence of a negative impact of bank credit on economic growth. Bui (2020) confirmed the inverted U-shaped nonlinear impact of domestic credit on economic growth. The increase in domestic credit enhances the economy when the credit exceeds the optimal point and the impact becomes negative on economic growth. Amoo et al. (2017) showed that bank credit is growth-enhancing even when trade openness, monetary policy, investment climate, and infrastructure are low. Some empirical studies confirmed the causality between bank credit and GDP and approved that unidirectional causality runs from GDP to bank credit (Belinga et al., 2016; Ben & Harrathi, 2017; Awad & Al Karaki, 2019). While Camba Jr and Camba (2020) found that domestic credit has a significant short run causal relationship with economic growth in the Philippines. Alkhuzaim (2014) indicated that in the long-run, there is a bidirectional causal relationship between the broad money supply to the GDP ratio and the growth rate of real GDP as well as a unidirectional causality, which runs from domestic credit provided by the bank sector as a percentage of GDP to the growth rate of real GDP. However, a causality relationship does not exist between bank credits to the private sector ratio to GDP and economic growth. In the short-run, the findings showed a unidirectional causality running from the growth rate of real GDP to domestic credit provided by the banking sector. However, no causal relationship between the growth rate of real GDP and the other two financial development indicators was found.

Some studies dealt with sectoral bank credit and their mutual effects on economic growth as a whole or sector growth. Abubakar and Kassim (2016) investigated the sectoral impact of bank credit on economic output by analyzing the long- and short-run effects of bank credit on the output of five major economic sectors in Malaysia. The results revealed that bank credit has an uneven impact on the economic sectors, with significant effects, particularly in the short run on the mining and quarrying, and manufacturing sectors, but no effect on the agriculture sector. In contrast, bank credit is found to have a larger long-run impact on the output of the construction and services sectors compared to the short run.

Paul (2017) showed that credit to agriculture is bi-directionally related to economic growth while credit to the manufacturing sector granger causes economic growth without a feedback effect. On the other hand, Chisasa and Makina (2013) found that bank credit has a negative impact on agricultural output in South Africa. Ubesie et al. (2019) revealed that deposit money banks' credit to agriculture, industries, building & construction, and wholesale & retail trade has no significant effect on agricultural, industrial, building & construction and wholesale & retail trade contribution to real gross domestic product. While, Sipahutar (2018) found that banks credit for investment, agricultural, industrial, trade, and services, have a significant role on economic growth in Indonesia, Further, its role depends on the size of the credit portfolio of the total bank credit. Majeed et al. (2020) attempted to distinguish the role of banking sector credit to enterprise and household in the economic growth of Pakistan for the period from 1982 to 2017. Their results confirmed that enterprise credit has a positive and significant impact on the economic growth of Pakistan for the sample period. In contrast, the other component of private credit, i.e., household credit is not a positive driver of economic growth.

There are also some studies on the Saudi economy, regard to financial development, and the bank credit as an indicator of financial development. Mahran (2012) used the commercial bank credit to the private sector as a ratio to nominal GDP an indicator of financial intermediation in Saudi Arabia. The study found that financial intermediation has a significant negative impact on economic growth. On the other hand, Masih et al. (2009) found that the financial sector enhances economic growth in Saudi Arabia. Likewise, Ibrahim (2013) investigated the relationship between financial development and economic growth for Saudi Arabia for the period 1989–2008. Financial market development has been represented by the effect of credit market development (bank credits to the private sector) and stock market development (The general stock market index). The results indicate that the domestic bank credit to the private sector has a significant and positive effect on economic growth in the long run, but an insignificant and negative effect in the short run. On the other hand, the stock market index has an expected positive but insignificant effect in the long run but an unexpected and insignificant effect in the short run. Finally, the growth of industrial production has an expected positive and significant effect on economic growth either in the short or long run. Samargandi et al. (2014) found that financial development has a positive impact on the growth of the non-oil sector. In contrast, its impact on oil-sector growth and total GDP growth is either negative or insignificant. This suggested that the relationship between financial development and growth may be fundamentally different in resource-dominated economies. Haque (2020) found private sector's gross domestic product has a negative relation with the supply of money, positive relation with bank credit to the private sector, and no significant relationship with share market capitalization, as shown by the results of the study. Besides, the private sector's growth has a positive and significant relationship with government expenditure, investment, and trade openness. A 1% increase in bank credit to the private

sector increases the private sector's GDP by 0.88%. Al Mahish (2016) showed that financing has a positive effect on economic growth in KSA. Hamdi et al. (2014) investigate the causal relationship between financial development and economic growth in Gulf Cooperation Council (GCC) countries, i.e. Bahrain, Oman, Kuwait, Qatar, United Arab Emirates, and Saudi Arabia, over the period 1980–2012. The results revealed that the financial sector development contributes significantly to economic growth in the GCC countries. Their results could be of great interest for policymakers since the financial sector could play a crucial role in lowering the dependency of the governments on oil revenues and could contribute significantly to spur economic growth.

3. Data and Methodology

The study aimed to investigate the impact of sectoral bank credit facilities provided by commercial banks on non-oil economic growth in Saudi Arabia. The period of this study spans from 1970 to 2019. The study was carried out by using the time series annual data taken from the annual statistical bulletin of the Saudi Arabian Monetary Agency (SAMA).

The data used in this study include; the non-oil Real Gross Domestic Product (NRGDP) at the current basic price which refers to the non-oil economic growth as the dependent variable. This study uses ten independent variables that represent bank credit provided by commercial banks for all private non-oil economic sectors. The total bank credit facilities provided by commercial banks for all sectors is (TBC). Bank credit facilities for the agriculture sector is (AG). Bank credit facilities for the manufacturing sector is (IND). Bank credit facilities for the mining sector is (MIN). Bank credit facilities for electricity & water& health services sector is (EL). Bank credit facilities for the construction sector is (CONS). Bank credit facilities for the retail and wholesale trade sector is (COM). Bank credit facilities for transport & communications sector is (TRANS). Bank credit facilities for the finance sector is (FIN). Bank credit facilities for the services sector is (SER). All variables are converted to logarithm for analysis.

3.1. Model Specification

Empirical studies that examined and analyzed the relationship between bank credit and economic growth applied many statistical procedures. Some studies used Johansen Multivariate Co-Integration (JMC) test and Vector Error Correction Model (VECM) approaches (Masih et al., 2009; Belinga et al., 2016; Chisasa & Makina, 2015; Ananzeh, 2016; Al Mahish, 2016; Paul, 2017; Sipahutar, 2018; Awad & Al Karaki, 2019). Other studies applied ordinary least square OLS techniques (Ibrahim, 2013; Oladapo & Adefemi, 2015; Ubesie et al., 2019; Cristea & Dracea, 2010; Abusharbeh, 2017). Some studies used VAR analysis (Mutlugun, 2014; Hamdi et al., 2014; Adeola and Ikpesu, 2016; Okafor, et al., 2016). The Generalized Method of Moments (GMM) estimation was applied to estimate the structural long run association amongst variables in a dynamic panel (Zaghdoudi et al., 2013; Petkovski & Kjosevski, 2014; Bui, 2020).

This study applies the Autoregressive Distributed Lag (ARDL) approach following: (Mahran, 2012; Hasanov & Huseynov, 2013; Samargandi et al., 2014; Osman, 2014; Ismail & Masih, 2015; Abubakar & Kassim, 2016). ARDL approach used due to its several advantages over other alternatives. ARDL cointegration technique does not require pretests for unit roots, unlike other techniques. Consequently, the ARDL cointegration technique is preferable when dealing with variables that are integrated of a different order, I(0), I(1) or a combination of them both and, robust when there is a single long run relationship between the underlying variables in a small sample size (Nkoro & Uko, 2016). The long run relationship of the underlying variables is detected through the F-statistic (Wald test). In this approach, long run relationship of the series is said to be established when the F-statistic exceeds the critical value band. The major advantage of this approach lies in its identification of the cointegrating vectors where there are multiple co-integrating vectors In ARDL each of the variables stands as a single equation, endogeneity is not an issue in ARDL as all variables are assumed to be endogenous. When there is a single long run relationship, the ARDL can distinguish between dependent and explanatory variables. That is, the ARDL assumes that only a single reduced form equation relationship exists between the dependent variable and the exogenous variables (Nkoro & Uko, 2016). Besides, ARDL is preferred to examine variables with a small sample of time series data (Mahran, 2012).

ARDL models are linear time series models in which both the dependent and independent variables are related not only contemporaneously but also across historical (lagged) values. In particular, the dependent variable and the explanatory variables, in a general ARDL model approach to cointegration, Pesaran and Shin (1998) give testing as follows:

$$\Delta Y_t = \delta_{0i} + \sum_{i=1}^{q} \alpha_1 \Delta y_{t-i} + \sum_{i=1}^{k} \alpha_2 \Delta X_{t-i} + \delta_1 Y_{t-i} + \delta_2 X_{t-i} + \varepsilon_{it}$$

Where Xs are the explanatory variables and Y is the dependent variable, `q and k are the numbers of maximum lag order in the form of (*ARDL*) mode - the maximum lag lengths of q and k for the dependent and explanatory variables respectively. In this study, the ARDL model can be specified as:

$$\Delta GDP_t = \delta_{0i} + \sum_{i=1}^{q} \alpha_1 \Delta GDP_{t-i} + \sum_{i=0}^{k} \alpha_2 \Delta AG_{t-i} + \sum_{i=0}^{k} \alpha_3 \Delta IND_{t-i} + \sum_{i=0}^{k} \alpha_4 \Delta MIN_{t-i} + \sum_{i=0}^{k} \alpha_5 \Delta EL_{t-i} + \sum_{i=0}^{k} \alpha_6 \Delta CONS_{t-1} + \sum_{i=0}^{k} \alpha_7 \Delta COM_{t-1} + \sum_{i=0}^{k} \alpha_8 \Delta TRANS_{t-i} + \sum_{i=0}^{k} \alpha_9 \Delta FIN_{t-i} + \sum_{i=0}^{k} \alpha_{10} \Delta SER_{t-i} + \sum_{i=0}^{k} \alpha_{11} \Delta TBC_{t-i} + \delta_1 YGDP_{t-1} + \delta_2 AG_{t-1} + \delta_3 IND_{t-1} + \delta_4 MIN_{t-1} + \delta_5 EL_{t-1} + \delta_6 CONS_{t-1} + \delta_7 COM_{t-1} + \delta_8 TRANS_{t-1} + \delta_9 FIN_{t-1} + \delta_{10} SER_{t-1} + \delta_{11} TBC_{t-1} + \varepsilon_{it}$$

Where $(\delta_0 - \delta_{11})$ represent the coefficients of the long-run relationships, while $(\alpha_1 - \alpha_{11})$ represent the coefficients of short run dynamics relationships of the underlying variables in the model. And ε is the speed of short run adjustment of the model's convergence to long run equilibrium. The error correction term (ECT) takes enough lags to capture the data generation process in general for the specified modeling framework (Nkoro & Uko, 2016). After regression of the above model, F- statistic (Wald test) is carried out irrespective of whether the underlying variables are purely *I*(0), purely *I*(1), or mutually cointegrated (Pesaran et al., 2001). Then, test the coefficients of the lagged to differentiate the long-run relationship between the underlying variables.

The null and alternative hypotheses are as follows:

$$H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = \delta_8 = \delta_9 = \delta_{10} = \delta_{11} = 0 \quad \text{no long run relationship exists}$$

Against the alternative hypothesis

$$H_A : \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq \delta_7 \neq \delta_8 \neq \delta_9 \neq \delta_{10} \neq \delta_{11} \neq 0 \quad \text{the long run relationship exists}$$

3.2. Empirical Results and Interpretations

Table (1) shows the descriptive statistics of the underlying variables time series. Data indicated that the bank credit to the private sector as a ratio of non-oil GDP reached 40% on average during the period (1970–2019), the highest rate reached 86%. The percentage of bank credit granted to each sector of the total bank credit was found to be low. The retail and wholesale trade sector ranked first, with only a rate of 10%, followed by the manufacturing sector and the construction sector by 4.4% and 4.3% respectively. As for the rest of the sectors, it did not exceed 2% on average during the period (1970–2019).

The first step is using the *ADF* unit root test to examine the stationarity of the series of variables involved in the model. The null hypothesis is that the variable in question has a unit root (non-stationary), which was been tested against the alternative hypothesis that the variable has no unit root (stationary). Table (2) shows the unit root tests using the ADF test. All variables are stationary in the first difference, with the trend and intercept which means that the time series used in the study are stationary from the first-time lag (1). The null hypothesis was rejected because of the non-stationary and the unit root test from the first difference of time series data at a significant level (5%, 10%). ARDL technique is adopted irrespective of whether the underlying variables are *I*(0), *I*(1), or a combination of both.

Table 1: The Descriptive Statistics of the Variables

	AG	IND	MIN	EL	CONS	COM	TRANS	SER	FIN	TBC
Mean	0.5	4.4	0.37	0.9	4.3	9.8	1.7	2.0	0.02	42.25
Median	0.47	3.7	0.24	0.5	4.6	8.4	1.8	1.9	0.02	38.28
Maximum	1.3	9.9	1.3	3.0	6.3	20.5	4.4	4.9	0.09	86.3
Minimum	0.04	0.59	0.05	0.16	1.76	3.15	0.13	0.11	0.002	9.13
Std. Dev.	0.323754	3.113939	0.331300	0.856225	1.134200	4.762613	1.082809	1.403449	0.021223	25.38120
Skewness	0.328542	0.510263	1.365275	1.205398	-0.689658	0.428756	0.352454	0.313743	2.020574	0.317082
Kurtosis	2.297821	1.801179	3.686702	2.892621	2.926903	1.996524	2.552272	1.910033	6.862862	1.600622
Jarque-Bera	1.926697	5.163845	16.51554	12.13223	3.974703	3.629770	1.452826	3.295346	65.10954	4.917546
Probability	0.381613	0.075628	0.000259	0.002320	0.137058	0.162857	0.483641	0.192497	0.000000	0.085540
Sum	24.86151	221.3346	18.45441	46.82952	214.7413	491.8991	86.37785	101.1974	1.066330	2112.621
Sum Sq. Dev.	5.136018	475.1343	5.378229	35.92297	63.03402	1111.442	57.45131	96.51382	0.022070	31566.06
Observations	50	50	50	50	50	50	50	50	50	50

Table 2: Augmented Dickey-Fuller Test

Variable	Level		1st difference		Order of Stationary
	Intercept	Trend and Intercept	Intercept	Trend and Intercept	
GDP	1.415985*	3.808425	–1.16737	– 2.465681*	*I*(1)
AG	1.072653	–0.912506	–3.120677	3.17862**	*I*(1)
IND	–1.306281	–0.7291	–3.330105*	–3.70134*	*I*(1)
MIN	0.15848	–1.950547	–1.729380	2.223602*	*I*(1)
EL	2.125647*	1.40971	–0.450574	–3.269221**	*I*(1)
CONS	–1.556725	–4.44568*	2.508538*	–3.29396**	*I*(1)
TRANS	1.391821	–0.403338	–1.539939	–3.213685**	*I*(1)
COM	–0.6131439	–2.771042*	–1.284376	2.003501**	*I*(1)
FIN	–0.715434	–3.153453*	–5.734221*	–5.71799*	*I*(1)
SER	1.642944	–0.54025	–1.39149	–2.175875*	*I*(1)
TC	–0.50328	–1.130788	–1.053235	–2.522428**	*I*(1)

* Means that it is significant at the level of 5%, ** Means that it is significant at the level of 10%.

Table 3: The Optimal Number of Lags

Lag	AIC	SC
0	222.7015	223.1432
1	206.1579	211.4575
2	196.7797	206.9372
3	170.9073	185.9227
4	-311.1087*	-291.2354*

* indicates lag order selected by the criterion.

Determining the lag length is crucial in ARDL because the optimal lag length will enable us to identify the true dynamics of the model. AIC (Akaike Information Criterion), and SC (Schwartz's Criterion) are used. The optimum number of lags for the model is not based on any economic theory; however, AIC and SC criteria are commonly used to determine the optimal lag length. Table (3) shows the results of the two tests AIC and SC. Based on the results, the number of time lags reaches (4), and this result is consistent with the data period and literature.

To examine cointegration between the variables. Table 4 and Table 5 show the results of the likelihood ratio tests based on the maximum eigenvalue and the trace of the stochastic matrix respectively. Both these tests confirm the existence of ten cointegrating vectors between the variables at the 0.05 level, i.e. the existence of a long run relationship between them. Since the ten variables are cointegrated, they can be represented.

ARDL bound tests the null hypothesis: No long-run relationships exist between the explanatory variables and the dependent variable (using the *F*-statistic (Wald test)) (irrespective of whether the underlying variables in the model are *I*(0) or *I*(1)). The critical values of the *F*-statistics for the different number of variables (*K*) and whether the ARDL model contains an intercept and/or trend are given below. They give two sets of critical values. *I*(0) the lower critical bound which assumes all the variables are *I*(0), which means there is no cointegration among the underlying variables, and another assumption is that all the variables in the ARDL model are *I*(1) upper critical bound which assumes all the variables are *I*(1), which means there is cointegration among the underlying variables (Pesaran et al., 2001). In Table (6), ARDL Bound tests for cointegration illustrated that the calculated *F*-statistics is 9.8 and it is higher than the upper bound for all significant at 1%, 5%, and 10% level in the economic model with the 10 explanatory variables. Thus, it can be concluded that there is a long run relationship between the explanatory variables (sectoral bank credit) and the dependent variable (Non-oil economic growth.

The next step is to estimate the dynamic relationships of the short and long run by applying the ARDL (1, 2, 3, 2, 3, 3, 3, 3, 3, 3). The long run and short run coefficients are shown in Table (7) and Table (8) respectively. Table (8) shows that the Error Correction Term (ECT) in the non-oil economic growth model is significant and negative. The negative value shows that there exists an adjustment speed from

Table 4: Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None*	0.976518	667.2676	263.2603	0.0001
At most 1*	0.917880	490.9462	219.4016	0.0000
At most 2*	0.878565	373.4662	179.5098	0.0000
At most 3*	0.738155	274.3724	143.6691	0.0000
At most 4*	0.733932	211.3923	111.7805	0.0000
At most 5*	0.609217	149.1641	83.93712	0.0000
At most 6*	0.552288	105.0027	60.06141	0.0000
At most 7*	0.528390	67.23322	40.17493	0.0000
At most 8*	0.335105	31.90788	24.27596	0.0045
At most 9*	0.236625	12.72598	12.32090	0.0427
At most 10	0.000759	0.035692	4.129906	0.8771

Table 5: Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.****
None*	0.976518	176.3214	67.07555	0.0001
At most 1*	0.917880	117.4800	61.03407	0.0000
At most 2*	0.878565	99.09374	54.96577	0.0000
At most 3*	0.738155	62.98016	48.87720	0.0010
At most 4*	0.733932	62.22817	42.77219	0.0001
At most 5*	0.609217	44.16138	36.63019	0.0055
At most 6*	0.552288	37.76949	30.43961	0.0051
At most 7*	0.528390	35.32533	24.15921	0.0010
At most 8*	0.335105	19.18190	17.79730	0.0308
At most 9*	0.236625	12.69029	11.22480	0.0274
At most 10	0.000759	0.035692	4.129906	0.8771

short-run disequilibrium towards the long run equilibrium, which means that the non-oil economic growth in KSA is converged to equilibrium due to the changes in sectoral bank credit. The ECT coefficient in the equation estimate is (-0.44) and this statistically indicates that the level of the back for equilibrium among variables, in the long run, reach 44% adjustment speed annually, through the contributions of the sectoral bank credit.

The long run coefficients of variables were shown in Table (7). It is observed that the coefficient of sectoral bank credit facilities provided by commercial banks is positive and significant for all sectors except bank credit to the agriculture sector (AG) and mining sector (MIN), which are negative and

Table 6: ARDL Bounds Test

Null Hypothesis: No long-run relationships exist		
Test Statistic	**Value**	***K***
F-statistic	9.803128	10
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	1.83	2.94
5%	2.06	3.24
2.5%	2.28	3.5
1%	2.54	3.86

Table 7: ARDL Estimate of Long Run Coefficients

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
LOG(IND)	0.244114	0.080801	3.021159	0.0234
LOG(AG)	*1.258608	0.113855	*11.054521	0.0000
LOG(MIN)	*0.126181	0.030484	*4.139289	0.0061
LOG(EL)	0.134100	0.028921	4.636703	0.0036
LOG(CO)	0.606829	0.092556	6.556332	0.0006
LOG(COM)	1.431113	0.231260	6.188321	0.0008
LOG(TRANS)	0.277081	0.055677	4.976591	0.0025
LOG(SER)	0.091400	0.089799	1.017823	0.3480
LOG(FIN)	0.455859	0.067576	6.745828	0.0005
LOG(TBC)	1.390020	0.472285	2.943183	0.0080
C	3.400524	0.488278	6.964314	0.0004

significant. As for the bank credit facilities for the service sector (SER), it was positive but not significant. The results suggest that an increase in bank credit facilities provided by commercial banks for the manufacturing sector (IND), electricity and water, health services sector (EL), construction sector (CONS), retail and wholesale sector (COM), transport and communications sector (TRANS), and finance sector (FIN), contribute to stimulating growth in Saudi Arabia's non-oil GDP in the long run. The results also showed that the total bank credit to the economic sectors contributes to enhancing the economic growth of the non-oil GDP in the long run in KSA, as the estimated coefficient was 1.39 and significant. The results are in line with the research by Ibrahim (2013) that the bank credit to the private sector has a significant and positive effect on economic growth in the long run in KSA. The results are also in line with the research by Samargandi et al. (2014) that financial development has a positive impact on the growth of the non-oil sector in KSA.

After establishing that there are long-run relationships between the explanatory variables and the dependent variable in the model, the next step is to estimate the short-run dynamics relationships. As shown in Table (8), the bank credit granted to the manufacturing sector has a positive and significant effect on the growth of non-oil GDP in the short and long run. Besides, the bank credit to the mining sector affects positively and significantly the growth of non-oil GDP in the short run, while its impact was negative in the long run. The bank credit to the agricultural sector has a positive and significant effect on the growth of non-oil GDP in the short run, while its impact was negative in the long run.

Bank credit facilities for electricity, water, and health services sector has a positive and significant effect on the growth of non-oil GDP in the short and long run. The bank credit to the wholesale & retail sector has a positive effect on the growth of non-oil GDP in the short and long run.

Bank credit granted to the construction, finance, services, transport & communications sectors affects negatively and significantly the growth of non-oil GDP in the short run, but its effect is positive in the long run. The overall impact of bank credit granted to all economic sectors on the growth of non-oil GDP was positive and significant in the short and long run. Moreover, bank credit granted to all economic sectors has a positive long and short-run relationship and the elasticity of non-oil GDP to the (TBC) was (0.87) and (1.39) for the long run and short run respectively. This result in line with the study by Osman (2014) who found that the elasticity of GDP to the bank credit was (0.054) and (0.068) for the long run and short run respectively.

4. Conclusions and Policy Implications

The results indicate that the long run relationship exists between the sectoral bank credit facilities provided by commercial banks and Saudi Arabia's non-oil GDP growth. The coefficient of sectoral bank credit facilities provided by commercial banks is positive and significant for all sectors except for agriculture and mining sectors which are negative and significant. Aas for the bank credit facilities for the service sector, it was positive, but not significant. The results suggest that an increase in bank credit facilities provided by commercial banks for manufacturing, electricity, water, health services, construction, retail and wholesale trade, transport and communications, and finance sector contributes to stimulating growth in Saudi Arabia's non-oil GDP in the long run.

The short-run relationship between the sectoral bank credit facilities provided by commercial banks and Saudi's non-oil GDP was uneven. Bank credit to the manufacturing, electricity, water, health services, retail and wholesale trade sectors has a positive and significant effect in the short and

Table 8: ARDL Estimate of Short Run Coefficients

Variable	Coefficient	Std. Error	*t*–Statistic	Prob.
DLOG(IND)	0.279679	0.048414	5.776807	0.0012
DLOG(IND(–1))	0.266024	0.028193	9.435876	0.0001
DLOG(AG)	–0.212399	0.013625	–15.588524	0.0000
DLOG(AG(–1))	0.132815	0.019962	6.653505	0.0006
DLOG(MIN)	0.046073	0.010269	4.486605	0.0042
DLOG(MIN(–1))	0.022246	0.011289	1.970640	0.0963
DLOG(EL)	0.120033	0.008934	13.435133	0.0000
DLOG(EL(–1))	0.057896	0.012655	4.574827	0.0038
DLOG(EL(–2))	0.022649	0.010612	2.134269	0.0768
DLOG(CO)	0.004271	0.038355	0.111348	0.9150
DLOG(CO(–1))	–0.146764	0.024438	–6.005596	0.0010
DLOG(CO(–2))	–0.255251	0.028742	–8.880717	0.0001
DLOG(COM)	0.251693	0.104860	2.400281	0.0533
DLOG(COM(–1))	0.098719	0.054364	1.815882	0.1193
DLOG(TRANS)	–0.050797	0.009710	–5.231506	0.0020
DLOG(TRANS(–1))	–0.034374	0.014834	–2.317283	0.0597
DLOG(TRANS(–2))	–0.069882	0.012201	–5.727363	0.0012
DLOG(SER)	–0.035327	0.017063	–2.070335	0.0838
DLOG(SER(–1))	0.002504	0.012770	0.196108	0.8510
DLOG(SER(–2))	–0.088343	0.018372	–4.808574	0.0030
DLOG(FIN)	0.036812	0.018714	1.967077	0.0967
DLOG(FIN(–1))	–0.039699	0.011427	–3.474229	0.0132
DLOG(FIN(–2))	–0.063668	0.007986	–7.972025	0.0002
DLOG(TC)	0.151734	0.158399	0.957924	0.3751
DLOG(TBC(–1))	0.576271	0.087460	6.588948	0.0006
DLOG(TBC(–2))	0.879014	0.071990	12.210164	0.0000
CointEq(–1)	–0.443991	0.045547	–9.748058	0.0001

long run. While bank credit to the agriculture and mining sectors affects positively and significantly in the short run, while its impact was negative in the long run. Bank credit to the construction, finance, services, and transport and communications sectors affects negatively and significantly, in the short run, but its effect is positive in the long run.

The results indicate that bank credit in the wholesale and retail trade sectors had the strongest impact on the non-oil GDP, Moreover, the bank credit ratio is the highest among the sectors, reaching 10%. This indicates that the higher the bank credit ratio to the sector, the greater its contribution to economic growth, especially in the long run.

The main results show that the overall impact of bank credit has a significant and positive effect on non-oil economic growth in the short and long run, which means, bank credit facilities to different sectors have played a positive role in enhancing the non-oil growth of the KSA economy. The study concludes that bank credit, which aims to finance the private sectors, as a growth-enhancing factor, is capable of stimulating non-oil economic growth in KSA.

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