

Credit to Economic Sectors and the Economic Growth: Evidence from Jordan



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Abstract The banking sector efficiently reallocates financial resources in the economy. Based on this firm belief, it is clear that the economic sectors need capital to grow the economy, and Jordan needs to get rid of its accumulated economic problems. Therefore, relying on the banking sector to reallocate resources is important. This paper studies the relationship between the share of banking facilities in Jordan's economic sectors and the rate of growth in real gross domestic product (RGDP). Data from the 2008 first quarter until the 2022 fourth quarter and the VEC model were used to analyze the model. We studies the impact of percent of direct credit facilities granted to the agricultural sector as a percent of the overall direct credit facilities granted by licensed banks (DCFA), percent of direct credit facilities granted to the industrial sector as a percent of the overall direct credit facilities granted by licensed banks (DCFI), percent of direct credit facilities granted for transportation services as a percent of the overall direct credit facilities granted by licensed banks (DCFTR), percent of direct credit facilities granted to the construction sector as a percent of the total direct credit facilities granted by licensed banks (DCFC), percent of direct credit facilities granted to the tourism, hotels and restaurants sector as a percent of the total direct credit facilities granted by licensed banks (DCFTO) and percent direct credit facilities granted to public services and facilities as a percent of the total direct credit facilities granted by licensed banks (DCFPS) on RGDP growth rate. We found that the model successfully explained the relationships between the variables DCFTO, DCFI, DCFC, DCFPS, and RGDP. The result showed a positive effect of DCFI on RGDP, a negative effect of DCFC, and an inverse relationship between DCFPS and RGDP. It was also found that DCFTR and DCFTO negatively affect RGDP. The results also showed that the increase in the sectors' financing shares in the total appears to impact the model within nine months; that is, the RGDP responds after nine months to the changes occurring in the independent variables.

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1 Introduction

The growth in economics is the technique by which a country's wealth grows over time [2], and economic growth is the productive ability of an economy in the long run, usually measured by real growth in GDP [8]. It is also defined as an increase in the economy's ability to expand the production of goods and services over long periods. It can be measured in nominal value, including inflation, or measured in real value, which does not include inflation [1], and real GDP growth is dealt with in this search.

Bank loaning is the significant key to economic growth, as banking institutions are considered to be of great importance for collecting savings, allocating financial resources, and directing them towards lending to companies and economic sectors that need them for the growth and development of the economy [12]. Also, according to [6], banks' primary function in the economy is to efficiently facilitate the supply of loans and credit, ensure increased investments, and enhance production growth.

Credit to the private sector will help enhance the productivity and development potential of the economy. It thus promotes economic growth, creates job opportunities and prospects, and increases the economy's competitiveness. Through loans, agricultural production can be increased by investing in seeds, fertilizers, tractors, and other agricultural implements. Industrial companies can also increase industrial production by using loans to purchase equipment, raw materials, etc. Moreover, credit is essential in the prosperity of the service sectors, the tourism sector, and all components of the GDP, as they require bank lending for growth purposes. The banking sector, a financial intermediary, generates economic growth by financing resources required in various investment areas in different sectors [10].

Increased and sustainable economic growth depends on the ability of economic sectors to raise rates of physical capital buildup [5], and only access to bank credit can make this possible since banking institutions effectively intermediate financial and extend credit and Banking help accumulate capital and create economic growth [3].

2 Review of Literature

Olannye et al. [7] analyzed the relationship between the relative contributions of private and public sector domestic credit to economic growth for data from 1981 to 2020 in Nigeria. The researchers used a lag-distributed autoregressive model to obtain short—and long-run relationships between relative contributions of private and public sector domestic credit to economic growth. Olannye et al. found that loans

to the private sector significantly impact economic growth, while credit provided to the public sector has an insignificant effect.

Florence and Nathan [4] studied the impact of short- and long-term commercial bank credit extended to the agricultural sector on its growth, using an ARDL approach for a sample covering Uganda from the third quarter of 2008 to the fourth quarter of 2018. Florence and Nathan indicated that credit has a significant positive impact on agricultural production in the long run, and credit explicitly directed to the production process has a much more significant impact on agricultural production than credit for agricultural processing and agricultural marketing. Hence, a 1% increase in credit for production leads to 13.8% in agricultural GDP, while a 1% increase in credit for processing and manufacturing leads to a 5.9% increase in agricultural GDP. In the short term, bank credit does not immediately impact agricultural production.

Tacinur [11] studied the impact of loans provided by banks on sector growth on a sectoral basis, and the real credits provided by banks to sectors are construction, metals, personal credits, textiles, food, wholesale and retail trade, and transportation. This is for data from Turkey extending from the first quarter of 2004 to the second quarter of 2021. Tacinur used the VAR method, the Johansen cointegration test, and the Engel-Granger causality test, and the researcher concluded that there is cointegration between the data in the long run. According to the results of the Engel-Granger test, at the 10% significance level, there is unidirectional causality from GDP to personal credits, transportation, and building in the long run. There is unidirectional causation in the long run from the mining sector to GDP.

3 Methodology

3.1 Data Sources

The data used in this research covers the period from the first quarter of 2008 to the fourth quarter of 2022 and is collected from the Central Bank of Jordan (CBJ). The variables used are the Growth rate in the real gross domestic product (RGDP), percent of direct credit facilities granted to the agricultural sector as a percentage of the total direct credit facilities granted by licensed banks (DCFA), percent of direct credit facilities granted to the industrial sector as a percentage of the total direct credit facilities granted by licensed banks (DCFI), percent of direct credit facilities granted for transportation services as a percentage of the total direct credit facilities granted by licensed banks (DCFTR), percent of direct credit facilities granted to the construction sector as a percent of the total direct credit facilities granted by licensed banks (DCFC), percent of direct credit facilities granted to the tourism, hotels and restaurants sector as a percent of the total direct credit facilities granted by licensed banks (DCFTO) and percent direct credit facilities granted to public services and facilities as a percent of the total direct credit facilities granted by licensed banks (DCFPS).

3.2 Model

We used the vector error correction model (VECM) in this paper, and verifying, creating and analyzing a VECM approach requires a series of steps. We start by conducting a unit root test to verify the stability of the variable. Standard unit root tests include the Augmented Dickey-Fuller (ADF) test. Then, VEC models are constructed based on the above tests. In this study, VEC models for RGDP were created as follows:

$$\begin{aligned} \Delta RGDP_t = & \alpha_0 + \sum_{i=1}^m \beta_{1i} \Delta RGDP_{t-1} + \sum_{i=1}^m \beta_{2i} \Delta DCFA_{t-1} + \sum_{i=1}^m \beta_{3i} \Delta DCFI_{t-1} \\ & + \sum_{i=1}^m \beta_{4i} \Delta DCFTR_{t-1} + \sum_{i=1}^m \beta_{5i} \Delta DCFC_{t-1} + \sum_{i=1}^m \beta_{6i} \Delta DCFTO_{t-1} \\ & + \sum_{i=1}^m \beta_{7i} \Delta DCFPS_{t-1} + \beta_8 ECT_{t-1} + \varepsilon_t \end{aligned} \quad (1)$$

We used t-tests to determine the significance of the parameters and to reject or fail to reject the null hypothesis; it is as follows in the model:

H0: There is no statistically significant relationship at the 5% significance level between RGDP and each of the following independent variables: DCFA, DCFI, DCFTR, DCFC, DCFTO, and DCFPS.

3.3 Estimate Result and Discussion

In this part of the research, we will explain the analysis results, which include unit root tests for the variables in the model. We will then conduct the VECM analysis mentioned in 3.3.2 and perform diagnostic tests for the model. Everything analyzed relates to the use of Eviews 12 software.

3.3.1 Standard Unit Root Tests

Before the VECM analysis, it is necessary to ensure that the variables under cointegration are only integrated in order one, meaning I (1). However, the variables representing growth rates can be cointegrated at I (0) because the concept of growth rate is the first difference. Table 1 in the Appendix summarizes the unit root test results by employing ADF (Augmented Dickey-Fuller); the results of unit root tests reveal that all series are I (1).

3.3.2 Vector Error Correction Model

When the VEC model shown in Table 2 in the Appendix is used to examine the relationship between the variables in the model, the model tests the relationship and effect between RGDP as a dependent variable and DCFTO, DCFI, DCFC, DCFA, DCFPS, and DCFTR as independent variables. Table 2 also indicates the suitability of the model and the amount of co-integration that transfers the effect from the short to the long run.

Table 2 in the Appendix shows the results of the VECM analysis for the model, where the inverse relationship with significance appears between banking facilities for the tourism sector as a percentage of total banking facilities and growth in real GDP, where if the DCFTO increases by 1%, the RGDP will decrease by approximately 1.8%. In contrast, the relationship showed a positive significance with the growth rate in public revenues.

The model in Table 2 in the Appendix also shows that banking facilities directed to the industrial sector as a percent of total banking facilities have a positive and statistically significant effect on growth in real GDP, such that whenever DCFI increases by 1%, RGDP increases by 0.72.

Also, according to Table 2 in the Appendix, the relationship between banking facilities and the agricultural sector is not statistically significant regarding the percentage of total banking facilities and RGDP. The model in Table 2 in the Appendix also shows that banking facilities directed to the public services sector as a percent of total banking facilities have a negative and statistically significant effect on RGDP, so whenever DCFPS increases by 1%, RGDP decreases by 0.74%.

According to the model, bank facilities allocated to the construction sector as a percentage of total bank facilities showed an inverse and statistically significant relationship with RGDP. If DCFC increases by 1%, RGDP will decrease by 0.4%. According to the model, the percentage of total banking facilities allocated to the transportation sector showed an inverse and statistically significant relationship with RGDP. If DCFTR increases by 1%, RGDP will decrease by 4.05%.

It is worth noting that the changes in the independent variables DCFTO, DCFI, DCFC, DCFA, DCFPS, and DCFTR explained 99% of the changes in RGDP according to the model presented in Table 2. One of the most important things to analyze in Table 2 is CoinEq1 , which represents the correction factor for the model and is the effect vector between the short term and the long term. It also shows the amount of the shock and how long it takes for the model to correct the shocks.

According to Table 2 in the Appendix, the adjustment rate or correction speed from the short term to the long term in the model is about -1.08 . This is sufficient to predict the long-term impact according to the model. The error correction factor means that the speed of transformation in the long term reaches 108%. This means the model has long-term relationships between the independent and dependent variables. There is a possibility to correct short-term errors to return to a long-term equilibrium position because the error correction coefficients were statistically significant, meaning that the model could exceed the errors by 108%, and thus by referring to the inverse ($1/1.08$), which shows the time required to recover. Balancing and correcting the model

for nine months is necessary to resolve and erase the effects of short-term shock if it occurs.

Figure 1 in the Appendix shows the VECM stability test. To explore the impulse response results, an inverse root of the AR Characteristic Polynomial test on the VECM was conducted. The results of a characteristic root test are shown in Fig. 1, all within the unit circle; thus, the model can be considered stable. As a final test of the model's suitability, the Cusum and Cusum squares test shows that the model is appropriate, and the curve is within the confidence limits in Fig. 2 in the Appendix. Since the straight blue curve in the two figures does not cross the confidence intervals, the model is statistically significant and suitable for moving towards long-range analysis and exploring the impulse response results.

Also, according to Fig. 3, which indicates the results of the expected error variance analysis for the model, external shocks to the independent variables did not significantly impact RGDP. Most of the variance was in the dependent variables themselves but note the presence of some influences. As a result of the analysis, the null hypothesis states that there is no statistically significant relationship at the 5% significance level between RGDP, DCFTR, DCFC, DCFPS, DCFTO, and DCFI.

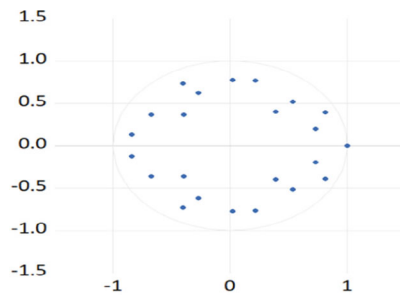


Fig. 1 Inverse Roots of AR Characteristic Polynomial in the model

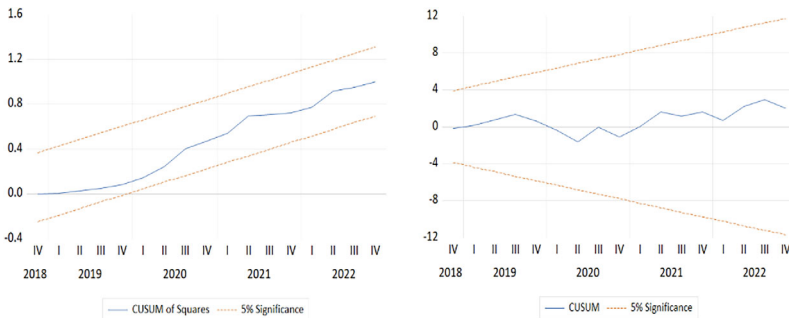
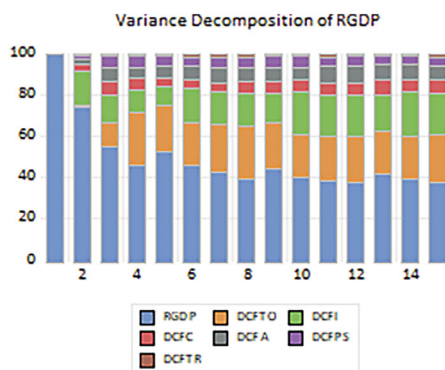


Fig. 2 The Cusum and Cusum squares test in the model

Fig. 3 Variance decomposition using Cholesky (d.f. adjusted) factors for the model



4 Conclusion

This paper studies the relationship between the share of banking facilities in Jordan's economic sectors and the rate of growth in real gross domestic product (RGDP). Data from the 2008 first quarter until the 2022 fourth quarter and the VEC model were used to analyze the model.

The first studies the impact of percent of direct credit facilities granted to the agricultural sector as a percent of the overall direct credit facilities granted by licensed banks (DCFA), percent of direct credit facilities granted to the industrial sector as a percent of the overall direct credit facilities granted by licensed banks (DCFI), percent of direct credit facilities granted for transportation services as a percent of the overall direct credit facilities granted by licensed banks (DCFTR), percent of direct credit facilities granted to the construction sector as a percent of the total direct credit facilities granted by licensed banks (DCFC), percent of direct credit facilities granted to the tourism, hotels and restaurants sector as a percent of the total direct credit facilities granted by licensed banks (DCFTO) and percent direct credit facilities granted to public services and facilities as a percent of the total direct credit facilities granted by licensed banks (DCFPS) on RGDP growth rate.

We found that the model successfully explained the relationships between the variables DCFTO, DCFI, DCFC, DCFPS, and RGDP. The result showed a positive effect of DCFI on RGDP, a negative effect of DCFC, and an inverse relationship between DCFPS and RGDP. It was also found that DCFTR negatively affects RGDP. The results also showed that the increase in the sectors' financing shares in the total appears to have an impact on the model within nine months; that is, the RGDP responds after nine months to the changes occurring in the independent variables.

Therefore, we recommend that decision-makers at the Central Bank of Jordan, the Association of Banks in Jordan, and relevant authorities provide financing facilitation programs for the significant sectors and increase the shares of these sectors from the total banking facilities provided in Jordan, as these sectors will raise the real gross domestic product within nine months.

Appendix

Table 1 Unit root test to determine the stationary of the variables in the model

Series	ADF			
	Level		First difference	
	<i>t</i> -stat	Prob ^b	<i>t</i> -stat	Prob ^b
DCFTO	-1.20	0.67	-8.51	0.00
DCFI	-2.09	0.25	-6.10	0.00
DCFC	-1.94	0.31	-7.31	0.00
DCFA	-2.08	0.25	-9.11	0.00
DCFPS	-1.08	0.71	-6.37	0.00
DCFTR	-0.82	0.80	-6.81	0.00
RGDP ^a	-4.15	0.00		

Table 2 Vector error correction estimates for data variables from the first quarter of 2008 to the fourth quarter of 2022

Variable	Coefficient	SE ^a	<i>t</i> -stat
RGDP (-1)	1.00		
DCFTO (-1)	-1.79	0.53	-3.42*
DCFI (-1)	0.72	0.08	9.11*
DCFC (-1)	-0.40	0.07	-5.41*
DCFA (-1)	-0.89	0.47	-1.91**
DCFPS (-1)	-0.74	0.08	-9.33*
DCFTR (-1)	-4.05	0.36	-11.10*
C	0.23		
CoinEq 1	-1.08	0.43	-2.53*
R ²	0.99		
F-Prob	0.00		

^a standard error. *significant. ** not significant

^a Growth rate. ^b MacKinnon-Haug-Michelis (1999) p-values

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