

Macroeconomic Determinants of Bank Credit: Evidence from Jordan

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This paper aims to show the effect of macroeconomics on bank credit through the period 1980 - 2017 in Jordan. Models such as vector error correction and cointegration were used to detect long and short-term bank credit relationships with such macroeconomic variables. It turns out that these variables have strengthened bank credit in Jordan. Hence the existence of a long-term relationship.

Keywords: *Unit-root test, bank credit, cointegration, vecm, monetary policy; Jordan*

Introduction

The global economy has witnessed various macroeconomic variables during the study period. It is evident that significant rates have ended at a global level. However, at the Jordanian national level, the total direct figures for the branches and the general rate of prices are known. Further, the Jordanian economy is witnessing a state of openness and economic liberalisation. The followers of macroeconomic activity during the study period noted that the macroeconomic conditions in the region are affected by increasing overall liquidity. This is as a result of increased oil revenues and the flow of investments to take advantage of excess liquidity in the rest of the region.

The Jordanian banking sector has undergone liberalisation over the past three decades, including amendments to enhance banking infrastructure, standing ownership structures, lending practices and capital needs, and deregulation to increase competition. The government has driven banks towards implementing Basel II or managerial standards. Therefore, the study seeks to review the weight of macroeconomic variables on bank credit in Jordan for the period 1980 - 2017.

Many reasons encourage people to take advantage of bank credit activities. Banks offer different types of loans to meet the individual's needs. Consumers have the choice to use their credit cards, i.e. to spend more, at the expense of spending less in the future. Due to the individual's purchasing power limits, individuals can only purchase luxury commodities such

as land, cars, and houses after acquiring loans from banks. This consumption contributes significantly to gross domestic product (GDP). On the other hand, businessmen are applying for loans to invest in securities, co-financing, and derivatives. Thus, this shows the components of investment in GDP.

There is a relationship between GDP and financial development, including banking. Will GDP growth be correlated positively with the swift increase in credit actions of a bank? In answering this question, the following hypotheses were put forward:

- Bank credit is determined in Jordan at the rate of lending
- Bank credit in Jordan are decided by the CPI
- Bank credit in Jordan is defined by GDP

Therefore, this study aims at showing the link between GDP growth and the growth of bank credit activities positively.

Theoretical Framework

In this research, the literature review is split into three classifications: ratio of lending, consumer price index, and GDP, which we regard as the significant factors of bank credit.

It is presumed that the lending rate and bank credits are directly correlated. The loan rate is strongly related to the central bank's financial policy. If the country is in recession, the central bank will purchase government bonds to boost expenditure, and in the market, there will be an increase in the money supply. Consequently, the rate of lending will decline, thanks to the surplus money supply. As a result, this will benefit buyers and manufacturers. This enables customers to give up future consumption and consume more in the services and products industry at present. For manufacturers, the rate of interest is decreased by purchasing more raw resources, machinery, and houses as an incentive to borrow for investment. If this becomes an uncontrolled situation, the expansion of the supply of money will constantly raise prices when the output grows.

However, there is a positive correlation between interest rates on deposits and banking activities. Bank loans rise considerably and quickly when interest rates rise. Classical economists, the new traditional, and modern classical have always regarded interest rates as one of the variables deciding the economy's savings level. When interest rates rise, people are more willing to abandon current consumption, and more money will be saved.

A beneficial connection between CPI and bank credit also needs to be established. The CPI is used as an indicator of inflation.

Review of Previous Literature

Research on the relationship between the growth of the economy and bank credit have been carried out.

Ibrahim (2006) has shown a significant correlation between GDP and banking activities, as GDP growth improves both the demand and supply of loans also increases. Subsequently, as GDP rises, because of the rise in deposit volume, banks have more cash to give loans.

The study of Malawi and Majali (2008) showed the impact of bank credit on Jordanian economic activity during the period of 1970-2003. The research findings revealed the presence of a relationship of reciprocal effect between the two variables of the study. The explanatory power of credit was found in the interpretation of most of the changes. The research findings showed that there is a positive and significant effect of credit on Jordanian economic activity. The findings of this research are in line with the economic theory and prior research related to Jordan and other countries.

Yusof and Usman (2015) examined the dynamic relationship between macroeconomic variables (Stock prices, GDP, price of housing, as well as interest rates) and mortgage finance supplied in Malaysia by Islamic banks utilising quarterly information data for the period 2007-2014. This study used regression model (ARDL) to test common integration, response function, and analysis of variance error projections for long-term analysis and brief interactions between chosen macroeconomic factors and size of Islamic real estate finance. The study found that macro-economic variables have a long-term relationship with the impact on Islamic real estate finance. The results revealed that Islamic banks' policy of intervention to boost or reduce mortgage financing could concentrate on monetary policy, price of houses, and GDP in the long term. This confirms the real sector's relationship with lending to Islamic banks. The research also offers proof that the interest rate is not dependent on Islamic finance in Malaysia, at least in the short term. This, therefore, requires a feasible alternative rate, potentially the rental rate, to be used as a benchmark rather than the present traditional rate of interest.

To some extent, the results show that Islamic banks were able to increase to an optimal level in achieving Shariah objectives without a base of interest. This is achieved by promoting actual industries to boost the financing of Islamic real estate. This research is one of very few research that has explored the relationship between the real economy industry and Islamic real estate finance.

Al-Jazrawi and Al-Naimi (2010) explained that banking credit plays a key role in supporting the economic development process. This is due to the fact that it is a financial intermediary

between savers and investors. This is carried out by transferring the money received from the bank in the form of bank deposits from a person who has cash surplus to a person in dire need of this surplus. The bank is involved in directing economic activity towards investment projects in general and strategic investment projects in particular. Bank credit is the most crucial source of revenue that increases its profitability.

Touny (2014) examined macroeconomic factors for the development of the banking industry in Egypt and Saudi Arabia, such as growth in the economy, financial liberalisation, trade openness, economic globalisation, and monetary policies. The research relied on the co-integration analysis to discover the relationship of long-term equilibrium between the variables of the model. The findings indicated that the long-term effect of economic development was negative. On the other hand, in both Egypt and Saudi Arabia, fiscal liberalisation, as well as interest rates, had a substantial beneficial effect on private sector credit. In Saudi Arabia, economic globalisation has a significant beneficial effect.

Furthermore, trade transparency has a favourable and substantial effect on Egypt's private sector credit, whereas the rate of growth in the supply of money has a beneficial impact on Saudi Arabia's banking sector development. The research disclosed some consequences about the significance of liberalisation measures for policymakers. Furthermore, additional reforms are needed in local banks to conform to global competition and globalisation requirements.

Methodology

The Model

This research utilises the VECM model to demonstrate the effect of macroeconomic variables on Jordanian bank credit. The methodology includes the stationarity and co-integration test. Then, VECM is used to estimate the long-term relationship, short-term relationship, and the presence of error correction. The study adopted the model used by Thaker et al. (2014) to show the impact on bank credit of macroeconomic factors. However, the current model is being adjusted to take into account the impact of the financial crisis in 2008. A model of bank credit is developed as a function of the main macroeconomic variables: real GDP growth, inflation, and interest rates.

$$bc = f(r, cpi, gdp) \quad (1)$$

Where:

bc = Natural logarithm of bank credit/loans

r = The natural logarithm of the ratio of lending/interest

cpi = The natural logarithm of the consumer price index (2010 = 100)

gdp = Natural logarithm of GDP

The VAR representation of equation (2) is specified below:

$$bc = \delta_0 + \sum_{i=1}^n \delta_1 bc_{t-i} + \sum_{i=1}^n \delta_2 r_{t-i} + \sum_{i=1}^n \delta_3 cpi_{t-i} + \sum_{i=1}^n \delta_4 gdp_{t-i} + \varphi D + \varepsilon_t \quad (2)$$

Where D = dummy variable

The VAR model is a general framework used to describe the dynamic relationship between stationary variables. The Central Bank of Jordan obtained annual time series data for the period 1980-2017.

Therefore, we check if bank credit reverses the imbalance. It has a causal relationship between the dependent variables and the independent variables, and it can be formulated as follows:

$$\begin{aligned} \Delta bc_t = & \gamma_0 + \sum_{i=0}^n \gamma_{1i} \Delta bc_{t-i} + \sum_{i=0}^n \gamma_{2i} \Delta r_{t-i} + \sum_{i=0}^n \gamma_{3i} \Delta cpi_{t-i} \\ & + \sum_{i=0}^n \gamma_{4i} \Delta gdp_{t-i} + \gamma_5 ECT_{t-1} + \varphi D + \varepsilon_t \end{aligned} \quad (3)$$

Where the ECT is the error correction term of the bank credit and "Δ" is the first difference.

Unit Root Test: Co-Integration Test

In this research, the first step is to ascertain the stationary degrees of the model variables. If applied to non-stationary variables, classical regression methods may be invalid. This research utilises the generalised Dicky Fuller test (AD-GLS).

Table 1: Unit Root Test Results

Series	ADF		Order of Integration
	Level	First Difference	
Bank Credit (bc)	-3.291925	-3.615726	I(1)
Interest Rate (r)	-1.969458	-4.014628	I(1)
Consumer Price Index (cpi)	-2.074183	-3.804698	I(1)
Real Gross Domestic Product (gdp)	-2.361686	-5.191432	I(1)
5% Critical Values	-3.544284	-2.948404	

The results of the ADF test summarised in Table 1 showed that there were non-stationary variables at the level. However, when the first difference was taken, all variables at a significant level of 5% showed that these variables are stationary since the absolute value of the statistic is greater than the value of the McKinnon (as shown in Table 1).

The second step test of cointegration was carried out. Individual variables are not static, I(1) they have random directions, and the linear mixture may be stationary (Gujarati, 2009). Thus, these variables include cointegration. In case if they have a long-term relationship or balance, to test the relationship in the long term, we will use the Johansen and Juselius Cointegration test. If the trace statistics are higher than the critical value, cointegration occurs. Then we can proceed to analyse the Vector Error Correction Model.

Table 2: Johansen Juselius Cointegration Tests Results

Hypothesised No. of CE (s)	Eigenvalue	Trace Statistic	5% Critical Value	Eigenvalue	Max. Eigen Statistic	5% Critical Value
None *	0.549646	58.18055	47.85613	0.549646	28.71794	27.58434
At most 1	0.356983	29.46261	29.79707	0.356983	15.89702	21.13162
At most 2	0.312804	13.56559	15.49471	0.312804	13.50488	14.26460
At most 3	0.001685	0.060719	3.841466	0.001685	0.060719	3.841466

- Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 5% level

However, the existence of one co-integrating relationship is recognised owing to the outcomes of the trace test and the highest eigenvalue test. This establishes a long-term connection between bank credits and other macroeconomic factors, including interest rate, consumer price index, and real GDP. This relationship, such as the long-run relationship is presented in Table 2.

Long Run Results

The cointegration test results show the existence of a long-run relationship, as reported in Table 3. This indicates that bank credit is positively related to price level and real GDP with statistically significant coefficients at 5% level. For instance, a 1% change in the price level will cause an increase of 1.5% in bank credit. Also, the rate of interest decreases bank credit by 0.65%.

Table 3: The Long Run Relationship

Dependent Variable: bc			
Variable	Coefficient	Std. Error	t-Statistic
r	- 0.652567	0.14708	- 4.43682
cpi	1.477629	0.10504	14.0670
gdp	0.734020	0.734020	6.27771

The above equation demonstrates the long-term indications of all variables. A negative indication in the loan rate (or rate of interest) implies that any reduction in the interest rate will lead to a rise in bank credits. The bank credit relationship on loans is positive with actual GDP. If the economy does better, it will boost the number of activities that have become more lucrative in terms of net current value, thereby increasing credit demand. The increase in permanent income has a positive impact on loan demand (Friedman & Kuttner, 1993). On the other hand, raising money market prices increases the opportunity cost of many different types of finance, such as bonds, payment notes, and others, making loans more appealing. According to Gambacorta (2004), this system also promotes the demand for loans and raises the rate of interest on loans. Thus, in this scenario, the first theory is acknowledged as bank credit is determined by the rate of lending or rate of interest in Jordan.

Our estimate findings indicate that the cpi (consumer price index) has a positive impact on bank credits. Generally speaking, when the general price level of products and services rises, individuals will require more cash due to lower purchasing power. This will enhance banks' credit activity. Economic experts also adopted the perspective that enhanced spending is encouraged by the predicted rise in price levels. Hence, it can be concluded that bank credit is influenced by the cpi (consumer price index).

The positive GDP sign indicates that an increase in GDP leads to an increase in bank credit. In this case, the third hypothesis was accepted that bank credit is affected by GDP.

Short-Run Model (VECM)

VECM indicates the correlation between short and long term balance of instability. There might be an imbalance in the short term. The statistical significance of the lag error correction factor (ECT_{t-1}) determines how fast the balance is restored. VECM methodology enables us to differentiate in the long-term equilibrium between short-term and long-term dynamics.

Co-integration shows that at least one of the test variables has responded to long-term relationship deviations. We check, therefore whether bank credit corrects the imbalance. It has a causal relationship between the dependent variables as well as the independent variables.

If the term of error is substantial, it is important to slow down the dependent variable in predicting current bank credit movements. This means that bank credit modifies the error and returns to the previous equilibrium. Also, for the present bank credit, the past independent variables have a necessary explanation.

Based on Table 4, the estimated coefficient of the lag ECT is significant at a level of 1%, indicating that the disequilibrium of the past period of bank credit is corrected within two years. This value implies that, unless there are other shocks, any shock in bank credits will not take long for bank credit to return to their balance.

Table 4: Error Correction Model for bank credit

Error Correction term	Coefficient	Standard Error	t-statistics
ECT	-0.469910	0.09217	-5.09809

Notes: * indicates significance at 1%.

In this study, a VECM was used to estimate the short-term determinants of bank credit. The results of VECM, as shown in Table 4, indicate that the ECT coefficient is statistically significant with the (speed of adjustment) coefficient of -0.47. This implies that if there is any variation from the balance, about 47% of the bank credit is fixed in one year as the variables move towards re-establishing the balance. The results also reveal that the most critical short-term determinants are price levels, GDP, and interest rates.

The dummy variable refers to the Iraq war in 2003, and it had a negative impact on bank credit at 7%. Variance decomposition is also carried out to determine the comparative significance of shocks in interpreting variables differences. The analysis traces the percentage of expected error variance in bank credit illustrated by its innovations (shocks) and changes in its determinants. The research enables for 30-period variance decompositions to determine the impacts when explanatory variables allow for a relatively more extended period of effect on bank credit. As shown in Table 5, the results show that after the second year on the variance of expected errors, the special shock explains about 72 per cent of the difference in bank credit. This is due to price levels and fluctuation during the rest of the period, which was stabilised at 67, and GDP at about 13 per cent during the period. Nevertheless, interest rates accounted for about 2 per cent of the variance in bank credit.

Table 4: Variance Decomposition of bank credit

Period	S.E.	LNCRIDIT	LNR	LNCPI	LNGDPR
1	0.035019	100	0	0	0
2	0.051538	97.26047	0.110838	0.723142	1.905552
5	0.123199	33.69708	3.142022	48.92977	14.23113
10	0.216823	22.14409	2.058779	62.68828	13.10885
15	0.278486	20.30609	1.704434	64.92785	13.06163
20	0.328861	19.56018	1.60627	65.8438	12.98975
25	0.372585	19.12265	1.544961	66.37846	12.95393
30	0.411668	18.846	1.505702	66.71682	12.93147

Conclusion

The primary goal of this research is to evaluate bank credit's macroeconomic determinants in Jordan. There were three independent variables used: loan ratio, CPI, as well as GDP. The analysis was conducted using the VECM model and variance decomposition methods To analyse the long-term relationship between bank credit and macroeconomic variables. Annual time series data was used, which covered the period 1980 to 2017. The Johansen results revealed the existence of one cointegrating vector.

The results show that the three macroeconomic variables positively contribute to the banking credit activity in Jordan between 1980 and 2017, and have been statistically proven to have a substantial long-term relationship with bank credit.

Our analysis shows that, in the short run, CPI is the key determinants of bank credit during the review period.

Analysing the variance decomposition in bank credit suggests that own shocks explain the most significant variance in the price level, real GDP, and then the interest rate. The policy content that can be drawn from this study is that bank credit in Jordan is largely due to the problems of the macroeconomic determinants, including high prices, low economic growth, and high-interest rates. Therefore, the government must pursue policies that will reduce inflation, stimulate economic growth, and reduce interest rates to boost growth and to improve the financial situation in the economy.

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