

## The Relationship Between Economic Growth and Bank Lending: Case of Tunisia

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The economic growth and bank lending are important in banking industry. The economic growth has a positive effect on revenues of bank and attract a new customer. The purpose of this article is to study the relationship between these two variables. We used a sample of 11 banks in Tunisia over the period (2005.2020). By applying a method of panel static, we found that economic growth has a positive impact on bank lending.

**Keywords:** Bank Panel, Economic Growth Lending.**1. Introduction**

The economic growth and bank lending are important in financial development. However, very recently, using indicators of development in banking sector and stock market found that stock market development indicators have positive significant effect on growth [1]. However, it was found that in the presence of stock market development indicators, banking sector development negatively influenced economic growth. Recently, found a positive correlation of financial development with economic growth for 27 European Union Countries and five BRICS countries between 1980 and 2006 [2]. Again, using dynamic GMM model for 24 selected African countries over the period 1981-2010 found a positive relationship between financial development and economic growth [3].

Further, using pairwise granger causality testing, they supported the evidence of bidirectional causality between financial development and economic growth. Besides economic growth has multiple benefits in revenues of bank and attract a new customer. In this article we studied the relationship between economic growth and bank lending. we adopt a methodology of three section. The first section is devoted to literature review; than we make an empirical study. Finally, we make a conclusion.

**1.1. Literature Review**

Argued that financial intermediaries play a vital role in economic development because they choose which firms yet to use society's saving [4]. According to this view; the financial intermediary sector alters the path of economic progress by affecting this allocation of savings and not necessarily by altering the role of savings. Examined the link between bank lending and economic growth for European Countries for the period (1990...2010)

[5]. He applied a dynamic panel data (GMM system estimator). The results show that domestic credit discourages the growth. studied a sample of Indonesian commercial banks between (2003...2011) [6]. They found that GDP growth not influence significantly the bank lending. studied the banks in Jordan for the period (1993...2014) [7]. They found that economic growth foster bank credit. Wale studied a sample of banks in Nigeria for the period (1980...2016). The results proved that a unit percent decrease bank lending rate will bring about 118% increase of economic growth. Wachtel underlines that the development of financial activities (credit expansion) may faster economic growth; but credit expansion often led to a financial crises and deep contractions [8]. Tridio opened that low bank lending rate stimulates economic growth. However, Giovanni; Shambagh; Goushe and Oitsefor; Agu; Williams found inverse relationship between bank lending and economic growth [9]. Mukhanyi has examined the lending behavior among commercial banks in Kenya by employed panel data from (2006...2015) of 35 commercial banks. He found that GDP growth rate was negative and significant role in bank lending.

Also, the banking system has the role to eliminate the fund deficit by transferring the Capital awards investments in order to support the economic growth. Economic development is possible if there is an adequate level of capital in the economy that will ensure efficient business conditions. (Pop (2015)) used the methodology of vector error correction (VECM) and Granger Causality test from the (1980-1981) to (2014-2018) [10]. The Granger causality test reports the biderctional causality of disclosure in total bank loans for all sectors and real GDP. The author identified short term links between bank credit allocations for different sectors (agriculture; industry;

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services and export) and real GDP in the Ethiopian economy. Investigated the bank specific and macroeconomic determinants of commercial bank lending in Malaysia using a sample of 27 banks covering the period from 2005 to 2014 [11]. This study also examines the impact of macro prudential policy measure implemented in 2010 on the lending activities of Malaysian commercial banks. Employing random effects estimation, the findings demonstrate that bank size and volume of deposit positively influence commercial bank lending in Malaysia, while liquidity negatively influences the lending activities. With regard to macroeconomic determinants, this study does not find any conclusive evidence to support the influence of gross domestic product (GDP), lending rate and cash reserve requirement on commercial bank lending activities in Malaysia. Alshammari and El Sakka investigates the determinants of credit growth in the private sector across some of the Organization for Economic Cooperation and Development (OECD) countries. The data set covers 24 countries and uses quarterly data over a period from the fourth quarter of 2001 to the fourth quarter of 2013. Panel unit root tests, indicate that the series used are stationary at their first difference form, and cointegration tests indicate that a longterm relationship exists among the series in the panel. Generalized impulse response functions and forecast variance decomposition are analyzed. The results indicate that, in the long-run, the main determinants of bank credit growth for OECD countries are exchange rates, foreign liabilities, money supply, interest rates, inflation, GDP, and fixed capital formation (FCF). Focuses on the role of financial development in the economic growth of Central, Eastern and South-Eastern European (CESEE) countries in the post-communist era (1995–2014), which coincides with the opening up of financial markets to foreign investors and the global financial crisis [12].

They investigate whether economic growth in CESEE countries has benefited from the presence of foreign-owned banks. To this end, they introduce some refined measures of financial development and control for banks' financial strength. Their results challenge the idea that bank credit fosters economic growth and that foreign-owned banks are indisputably a positive addition to local markets able to foster economic growth. Analyzed the role of commercial bank lending on economic growth in Malaysia. By using VECVM model they found that real income is directly affected by an increase in commercial bank credit to private sector and vice versa [13]. Joseph examined the causal relationship between bank credit by borrowing sector and economic growth and between overall financial intermediation and economic growth. Time series data for the period (1993-2017) is used. Causality test and vector error correction is applied. Results show that there is no causal relationship between bank credit and economic growth and between economic growth and bank credit. In the long run, bank credit has a significant positive effect on economic growth. Morina and Ozen studied a sample of banks in Kosovo. They found that bank lending has positive impact on economic growth.

The bank credit affects real GDP per worker through its role of domestic capital accumulation and efficient resource allocation (efficiency) and hence, in total factor productivity in the long-

run. Accordingly, a pro-active policy of growth and reform of the financial sector will help enhance economic growth in an open developing economy like Saudi Arabia. By making use of a panel dataset that covers 61 provinces of Vietnam over the period 1997 to 2006, Anwar and Nguyen examine the link between financial development and economic growth. Our analysis, which is based on endogenous growth theory, reveals that financial development has contributed to economic growth in Vietnam. We find that high ratio of credit to Gross Provincial Product (GPP) has accelerated economic growth in Vietnam. We also found a strong positive link between financial development and economic growth when alternative measures of financial development were used. The impact of foreign direct investment on economic growth will be stronger if more resources are invested in financial market development.

In addition, the efficient development of modern banking sector of bank lending is a useful instrument to promote economic growth in Nepal. With reference to negative causality, the relationship between financial sector development and economic growth, using a sample of northern and southern Mediterranean countries (Algeria, Egypt, Israel, Jordan, Lebanon, and Libya, Morocco, Palestine, Syria, Tunisia, and Turkey) during the years 1985–2009. The results on the large sample indicate that credit to the private sector and bank deposits are in many specifications negatively associated with growth, meaning that there are problems of credit allocation in the region and weak financial regulation and supervision.

One of the most important tasks of any state is to ensure stable economic growth. Banks can play an important role in performing this task, primarily by providing loans. The purpose of the study of is to identify the relationship between indicators of banks' lending activity and general indicators of economic development [14]. Index of physical volume of GDP and index of physical volume of fixed capital investment were selected as resultant economic indicators, and growth rate of debt on bank loans (overall and by loan types), the share of loans in fixed capital investment, and the ratio of debt on bank loans to GDP were used as factor variables. The study of the dynamics of these indicators showed that the trajectory of economic indicators has a general tendency to decrease their values; the dynamics of economic indicators depends more on bank lending to legal entities than on lending to individuals, and often reflects the change in the share of loans in fixed capital investment with a time lag; economic growth is more strongly influenced by bank lending to legal entities than by lending to individuals.

## 1.2. Empirical Study

### A-Sample

We studied a sample of 11 banks in Tunisia for the period (2005.2020).

### B-Econometric Method

We used a panel static because it controls the heterogeneity and temporal dimension of variables.

### C-Model

TLA<sub>i,t</sub> = b<sub>0</sub> + b<sub>1</sub> ROA<sub>i,t</sub> + b<sub>2</sub> ROE<sub>i,t</sub> + b<sub>3</sub> NIM<sub>i,t</sub> + b<sub>4</sub> Size<sub>i,t</sub> + b<sub>5</sub> CAP<sub>i,t</sub> + b<sub>6</sub> ALA<sub>i,t</sub> + b<sub>7</sub> CD<sub>i,t</sub> + b<sub>8</sub> CEA<sub>i,t</sub> + b<sub>9</sub> Tdeposit<sub>i,t</sub> + b<sub>10</sub> CFC<sub>i,t</sub> + b<sub>11</sub> TPIB<sub>i,t</sub> + b<sub>12</sub> TINFi<sub>t</sub> + Ei<sub>t</sub>

B<sub>0</sub>=constant

TLA = total credits / total assets

ROA = net profit / total assets

ROE = Net profit / total equity

NIM = net interest margin / total assets

Size = log of total assets

CAP= equity / total assets

ALA= asset liquid / total assets

CD= Total credits / total deposits

CEA= operating costs / total assets

T deposit = Total deposits / total assets

CFC = Financial expenses / Total credit

TPIB =Economic growth

TINF= rate of inflation

E= Error term

i= bank t= time

### D-Descriptive Statistics

	Observations	Mean	Standard deviation	Minimum	Maximum
ALA	176	0.028	0.0225	0.0028	0.10
CD	176	1.19	0.724	0.47	8.40
TLA	176	0.77	0.1142	0.12	0.9817
ROA	176	0.012	0.0094	0.0088	0.0975
ROE	176	0.111	0.0631	0.0029	0.2976
NIM	176	0.026	0.0132	0.0083	0.16391
Size	176	15.35	0.92	12.52	18.29
CAP	176	0.1051	0.063	0.0086	0.498
CEA	176	0.032	0.026	0.00023	0.35
CFC	176	0.038	0.0153	0.018	0.1689
Tdeposit	176	0.76	0.11	0.099	0.956
TPIB	176	0.022	0.036	-0.1051	0.064
TINF	176	0.061	0.016	0.0340	0.08543

Table 1: Descriptive statistics

### E-Multicollinearity Test

	ALA	CD	TLA	ROA	ROE
ALA	1.000				
CD	0.073	1.000			
TLA	-0.0844	0.1949	1.000		
ROA	-0.1684	0.1631	0.1191	1.000	
ROE	-0.2150	-0.1616	0.1176	0.3923	1.000
NIM	0.0158	-0.0833	0.2478	0.1073	0.0834
Size	0.0973	-0.27	0.1577	0.0857	0.3653

Table 2: correlation between variables

	ALA	CD	TLA	ROA	ROE
CAP	-0.0775	0.6962	0.1346	0.2912	-0.1852
CEA	0.2036	0.0159	-0.0661	-0.0267	-0.0754
CFC	-0.0378	-0.0258	-0.1179	-0.0076	-0.0447
T deposit	-0.2385	-0.5547	0.0531	0.0169	0.3814
TPIB	0.0604	0.0589	-0.1125	0.0670	-0.0117
TINF	-0.1196	-0.0893	0.3426	-0.038	0.2111

Table 3 : suite of correlation between variables

	NIM	Size	CAP	CEA	CFC	Tdeposit	TPIB	TINF
NIM	1.000							
Size	0.0255	1.000						
CAP	0.0615	-0.35	1.000					
CEA	-0.0641	0.12	-0.0076	1.000				
CFC	-0.1476	0.1384	-0.0227	0.3142	1.000			
Tdeposit	-0.0711	0.4336	-0.491	-0.1459	-0.1598	1.000		
TPIB	-0.0250	-0.25	0.0123	0.0123	-0.1314	-0.2233	1.000	
TINF	0.0434	0.42	-0.1064	-0.1064	0.1031	0.1271	-0.5512	1.000

**Table 4 : suite of correlation between variables**

All the coefficients are inferior to 80%. There is no problem of multicollinearity.

VIF test

VIF= variance inflation factor

VIF=  $1/1-R_i^2$

Where  $R_i^2$  represents the unadjusted coefficient of determination for regressing the  $i^{th}$  independent variable on the remaining ones. The reciprocal of VIF is known as tolerance. Either VIF or tolerance can be used to detect multicollinearity, depending on personal preference.

If  $R_i^2$  is equal to 0, the variance of the remaining independent variables cannot be predicted from the  $i^{th}$  independent variable. Therefore, when VIF or tolerance is equal to 1, the  $i^{th}$  independent variable is not correlated to the remaining ones, which means multicollinearity does not exist in this regression model. In this case, the variance of the  $i^{th}$  regression coefficient is not inflated.

Generally, a VIF above 4 or tolerance below 0.25 indicates that multicollinearity might exist, and further investigation

is required. When VIF is higher than 10 or tolerance is lower than 0.1, there is significant multicollinearity that needs to be corrected.

However, there are also situations where high VFIs can be safely ignored without suffering from multicollinearity. The following are three such situations:

- High VFIs only exist in control variables but not in variables of interest. In this case, the variables of interest are not collinear to each other or the control variables. The regression coefficients are not impacted.
- When high VFIs are caused as a result of the inclusion of the products or powers of other variables, multicollinearity does not cause negative impacts. For example, a regression model includes both  $x$  and  $x^2$  as its independent variables.
- When a dummy variable that represents more than two categories has a high VIF, multicollinearity does not necessarily exist. The variables will always have high VFIs if there is a small portion of cases in the category, regardless of whether the categorical variables are correlated to other variables.

Variable	VIF	1/VIF
CAP	2.93	0.34
Tdeposit	2.60	0.38
CD	2.09	0.47
Size	1.84	0.54
TINF	1.75	0.57
ROE	1.59	0.62
TPIB	1.53	0.65
ROA	1.49	0.67
ALA	1.40	0.71
CFC	1.32	0.75
CEA	1.20	0.83
NIM	1.07	0.93

**Table 5**

All the coefficient are inferior to 5. There is no problem of multicollinearity.

**F-Hausman Test**

It is useful to choose between the fixed effect model and random effect model.

• **Fixed Effect Model:** it is the statistical model in which the model parameters are fixed. In a panel data where, longitudinal observation exists for the same subject fixed effect represent the subject; or specifies means. In the panel data analysis; the term fixed effect estimator; also known as the within estimator; is used to refer to an estimator for the coefficients in the regression model including those fixed effects (on time invariant intercept of each subject). The assumption that if p value is inferior to 0.05 because that all coefficients of this model are not equal to 0.

• **Random Effect Model:** it also called a variance component model. It is the statistical model where the parameters are random. It is a kind of hierarchical linear model which assumes that the data bring analyzed are drawn from hierarchy of different population who's different relate to that hierarchy [15].

In our model  $P_v = 0.035$  we choose the model with fixed effects.

### G-Estimation and Interpretations of Model

TLA	Coefficient	t	p>t
ROA	-0.065	-0.08	0.933
ROE	-0.8454	-0.64	0.520
NIM	0.2476	0.50	0.616
Size	0.039	2.75	0.007
CAP	-0.34	-1.24	0.217
CEA	-0.26	-1.06	0.293
CFC	-0.74	-1.47	0.144
Tdeposit	0.049	0.44	0.658
CD	0.024	1.83	0.069
ALA	-0.058	-0.13	0.897
TPIB	0.24	1.18	0.239
TINF	1.74	3.30	0.001
Constant	0.062	0.38	0.704

Table 6: Estimations of Model

- There is a negative relationship between ROA and TLA (if ROA increase by 1% TLA will decrease by 0.065%). The increase of return on assets has a negative impact on bank lending. This result is similar to result found by Dan and al (2021) but contrary to result found by [16].
- There is a negative relationship between ROE and TLA (if ROE increase by 1% TLA decrease by 0.84%). The increase of return on equity has a negative impact on bank lending
- There is a positive relationship between NIM and TLA (if NIM increase by 1% TLA will increase by 0.2476%). The increase of net interest margin has a positive impact on bank lending
- There is a positive relationship between Size and TLA (if Size increase by 1% TLA will increase by 0.039%). The increase of size has a positive impact on bank lending. This result is similar to result found by (Dan and al (2021)), but contrary to result found by [16].
- There is a negative relationship between CAP and TLA (if CAP increase by 1% TLA will decrease by 0.34%). The increase of capital has a negative impact on bank lending. This result is similar to result found by (Berhe (2019) but contrary to result found by (Dan and al (2021), Makanile and Pastory, Kim and Sohn; Roulet [15, 17-24].
- There is a negative relationship between CEA and TLA (if CEA increase by 1% TLA will decrease by 0.26%). The increase of operating costs has a negative impact on bank lending
- There is a negative relationship between CFC and TLA (if CFC increase by 1% TLA decrease by 0.74%). The increase of

financial expenses to total credit has a negative impact on bank lending.

- There is a positive relationship between Tdeposit and TLA (if Tdeposit increase by 1% TLA will increase by 0.049%). The increase of deposits has a positive effect on bank lending. This result is similar to result found by Dan and al but contrary to result found by Berhe (2019). An increase of deposits of a bank is likely to improve its ability to lend more funds to its customers.
- There is a positive relationship between CD and TLA (if CD increase by 1% TLA will increase by 0.024%). The increase of (credits/ deposits) has a positive effect on bank lending.
- There is a negative relationship between ALA and TLA (if ALA increase by 1% TLA will decrease by 0.058%). The increase of asset liquid has a negative relationship with bank lending. This result is similar to result found by () but contrary to result found by.
- There is a positive relationship between TPIB and TLA (if TPIB increase by 1% TLA will increase by 0.24%). The increase of economic growth has a positive impact on bank lending. This result is similar to result found by Nguyen and Nguyen, Jessica and al [ 16].
- There is a positive relationship between TINF and TLA (if TINF increase by 1% TLA will increase by 1.74%). The increase of inflation has a positive impact on bank lending
- This result is similar to result found by Nguyen and Nguyen [16].

## 2. Conclusion

Economic growth is important to increase the creation of money and value for any country. Also bank lending is necessary to stimulate the investments and finance the people who need capital. It is necessary to understand the relationship between economic growth and bank lending. In this article we used a sample of 11 banks quoted in Tunisian stock exchange for the period (2005...2020). We employ a method of panel static. We found that economic growth has a positive impact on bank lending. This is mean that when economic growth increase; bank lending will increase also. This demonstrates the role of bank lending in fostering of Tunisian economic.

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