

## THE FACTORS AFFECTING BANK LENDING: CASE OF TUNISIA

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### ABSTRACT

Bank lending is important in banking industry. Banks make different loans to increase its profitability and ameliorate his part of market. It is necessary to know the different factors of bank lending. The aim of this paper is to understand the factors affecting bank lending in Tunisia. We use a methodology of GLS applied to a sample of 11 banks in the period (2005....2020). We found that only (net interest margin; loans / deposits; inflation) have a negative impact on bank lending.

**Keywords:** Bank Lending, GLS, Profitability, Market.

### 1-INTRODUCTION

Lending is the main service provided by banks to their customers (individuals or corporations), banks mostly transfer its general asset to liquid asset and lend it as the order also banks use the customers' or other banks' deposits to support the credit line. Lenders or creditors extend funds based on beliefs that the borrower can be trusted to repay the debt. Loans are the primary source of funds to earn income for most banks, typically they make it for fixed term at fixed rates and sometimes secured with real property, banks generally make money by lending loans at rates higher than the cost of the loans they lend, by collect interest on loans as stated by Stephen (2015), most of financial activities and development organizations were funded by banks. Banks for the most part convert liquid reserves such as deposit into illiquid resources like advances and loans. This bank's activity is affected by a group of elements that is macroeconomic and industry level features. Therefore it is important to understand the factors of bank lending. In this article we adopt a methodology consisted of 3 sections. The first section is devoted to literature review, the second section concern the empirical study. We finish by a conclusion

### 2-LITERATURE REVIEW

There are many articles that studied the factors affecting bank lending in many parts of world. Sharma and Gounder (2012) inspected the bank credit delivered to the private sector in 7 countries in the south pacific during the period (1981...2009). The results showed that the average interest rate and the rate of inflation may have a negative impact on the rate of growth in loans; while strong economic growth; the volume of deposits and assets have a positive impact on credit growth. Rababah (2015) studied the determinants of commercial bank lending in Jordan. The study sample consisted of 10 Jordanian commercial banks during the period (2005....2013). The results show that the ratio of nonperforming loans; liquidity ratio and window rate have a negative and significant impact on the ratio of credit facilities. But the economic growth have a positive and significant on the ratio of credit facilities granted by

commercial banks in Jordan. Moreover Kim and Soln (2017) claim that US banks with more capital only expand their lending aggressively after they store enough liquidity. Roulet (2018) finds that capital ratios induce negative impact on retail lending in the post 2008 financial crisis. Hanh (2014) used financial data for 146 different countries at the level of economic growth in the period (1990...2013). He found that country's economic growth affect bank credits. Isa and al(2019) examined the specific internal factors influencing the commercial bank lending behavior sampling for the years (2009...2018). This study evidences that the volume of deposit; level of liquidity and bank size significantly influences the lending behavior of commercial banks in Malaysia after the (2007/2008) global financial crisis.

Adzis and al (2018) investigated the bank specific and macroeconomic determinants of commercial bank lending in Malaysia using sample of 27 banks covering the period form (2005...2014). Employing random effect estimation; the findings demonstrate that bank size and volume of deposits positively influence commercial bank lending in Malaysia while liquidity negatively influence the lending activities. Khalef (2021) studied 13 banks in Jordan over the period (2010-2016). He found that credit risk and liquidity have a significant effect on bank lending while there is a positive relationship between lending; ROA; and size of banks. In Nigerian context Akinlo; Omi (2015) utilized the error correction modeling technique to investigate the lending factors influencing bank credit presented over the period (1980...2010). The results show credit was likely increased by the effect of broad money; cyclical risk premium, and liquidity ratio. On the contrary prime lending rate and reserve ratio cause a reduction in credit. Moreover; private credit rises with inflation but not are to use; sense that inflation tends to reduce real bank credit.

Bruno and al (2017) investigate bank lending patterns and their determinants in Europe and the USA over the period (2008...2014).Precisely they relate bank characteristics prior to the financial crisis to their lending behavior during and after the crisis period. Their analysis confirms the existence of a bank lending channel; that is stronger in Europe than in the USA and especially if they look at corporate loans rather than at the whole loan portfolio. Hien and Van Dan (2020) examined the bank specific determinants of loan growth in the Vietnamese banking system for the period (2007...2019). They found a large capital buffers tend to boost bank lending expansion faster. High asset quality management positively contributes to high loans growth. Also they found less efficiently managed banks are more likely to adopt an aggressive lending strategy. More profitable banks with excellent competitive advantages could expand this lending activity to large extent. Liquidity is positively related to the loan growth of banks.

Yitayaw (2021) investigated the bank specific, industry specific and macroeconomic determinants of commercial bank lending in Ethiopia using balanced panel date of 15 commercial banks form (2011...2019). The model result of the study indicated that bank specific factors such as volume of deposits; capital adequacy; bank size have a positive and statistically significant effect on bank lending. Industry specific factors such as cash reserve requirements; bank concentration and average lending of rate have a negative and statistically significant effect on bank lending. Makanile and Pastory (2022) assesses the determinants of lending of 6 commercial banks in Tanzania from (2015...2019) using a quantitative research design. The results show that liquidity and capital adequacy have a significant relationship with lending;

whereas interest rate and management efficiency have no statistically significant influence on lending.

### 3-EMPIRICAL STUDY

#### 3-1-Sample

We will utilize a sample consisted of 11 banks quoted in Tunisian stock financial market for the period (2005...2020).

#### 3-2 Specification of model

We estimated The following model:

$$(1) \quad TLA_{i,t} = b_0 + b_1 ROA_{i,t} + b_2 ROE_{i,t} + b_3 NIM_{i,t} + b_4 Size_{i,t} + b_5 ALA_{i,t} + b_6 CD_{i,t} + b_7 CAP_{i,t} + b_8 CE_{i,t} + b_9 CFC_{i,t} + b_{10} Tdeposits_{i,t} + b_{11} TPIB_{i,t} + b_{12} TINF_{i,t} + E_{i,t}$$

$B_0$  = constant

$B_1, b_2, \dots, b_{12}$  : Parameters to be estimated

$i$  = bank ;  $t$  = time

$E_{i,t}$  = Error term

**Table 1: specification of variables**

Variable	Name	Measure
ALA	Liquid assets	Liquid assets / total assets
ROA	Return on assets	Net income / total assets
ROE	Return on equity	Net income / total equity
NIM	Net interest margin	Net interest income / total equity
TLA	Bank lending	Total loans / total assets
Size	Bank size	Logarithm of total assets
CAP	Capital	Total capital / total assets
CEA	Operating costs	Operating costs / total assets
CFC	Financial credits	Financial expenses / total credits
Tdeposit	Part of deposits	Total deposits / total assets
TPIB	Economic growth	GDP Growth
TINF	Rate of inflation	Growth of inflation

We will estimate the following hypothesis:

**H1: Bank return on assets have a significant effect on bank lending**

**H2: Bank return on equity have a significant effect on bank lending**

**H3: Net interest margin have a significant effect on bank lending**

**H4: Capital have a significant effect on bank lending**

**H5: Deposits have a significant effect on bank lending**

**H6: Operating costs have a significant effect on bank lending**

**H7: Size a have a significant effect on bank lending**

**H8: Financial expenses have a significant effect on bank lending**

**H8: Bank liquidity have a significant effect on bank lending**

**H9: Economic growth have a significant effect on bank lending**

**H10: Inflation have a significant effect on bank lending**

**Table 2: Descriptive statistics**

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
<b>ALA</b>	<b>176</b>	<b>0.0285</b>	<b>0.0225</b>	<b>0.0028</b>	<b>0.10426</b>
<b>TLA</b>	<b>176</b>	0.775	0.1142	0.12	0.9817
<b>ROA</b>	<b>176</b>	0.012	0.0094	0.000881	0.0975
<b>ROE</b>	<b>176</b>	0.111	0.0631	0.0029	0.2976
<b>NIM</b>	<b>176</b>	0.026	0.0132	0.0083	0.16391
<b>Size</b>	<b>176</b>	15.35	0.92	12.52	18.29
<b>CAP</b>	<b>176</b>	0.1051	0.0632	0.0086	0.48
<b>CEA</b>	<b>176</b>	0.032	0.026	0.000237	0.35
<b>CFC</b>	<b>176</b>	0.038	0.0153	0.01849	0.1689
<b>T deposit</b>	<b>176</b>	0.7657	0.1181	0.099	0.956
<b>TPIB</b>	<b>176</b>	0.022	0.0361	-0.1051	0.064
<b>TINF</b>	<b>176</b>	0.061	0.0167	0.0340	0.08543

**-ALA (Mean = 0.0285)**. The liquid assets represent on average 2.85% of total assets. The standard deviation is not high. **CD (mean = 1.193)**. Total credits represent on average 1.193 of total deposits. The standard deviation is high. There is big difference between banks in term of part of credits to deposits.

Also **TLA (mean = 0.775)**. Total loans represent on average 77.5% of total assets. The standard deviation is not high. There is no big difference between banks in term of credits. **ROA (mean = 0.012)**. Net income represent on average 1.2% of total assets. The standard deviation is low. There is no big difference between banks in term of ROA. Besides **ROE (mean = 0.111)**. The net income represent on average 11.1% of total equity. The standard deviation is not high. Also **NIM (mean =0.026)**. Net interest margin represent 2.6% of total assets. The standard deviation between banks is low. The net interest margin is not very different between the banks of sample. **Size (mean =15.35)**. The most of banks are medium size.

**CAP (mean =0.1051)**. The equity represent on average 10.51% of total assets.

**CEA (mean = 0.032)**. The operating costs represent on average 3.2% of total assets. The standard deviation is low. There is no big difference of CEA between banks of sample.

**CFC (mean =0.038)**. The financial expenses represent on average 3.8% of total credits. The standard deviation is low. There is no big difference of CFC between banks of sample

**Tdeposit (mean =0.7657)**. Total deposits represent on average 76.57% of total assets.

**T PIB (mean = 0.022)**. The average economic growth is 2.2% in the period (2005...2020) in Tunisia. There is negative economic growth in 2022 because of negative effect of COVID19.

**TINF (mean =0.061)**. The average inflation is 6.1% in the period (2005...2020) in Tunisia

**3-3 Estimation method**

In statistics, generalized least squares (GLS) is a technique for estimating the unknown parameters in a linear regression model when there is a certain degree of correlation between the residuals in a regression model. In these cases, ordinary least squares and weighted least squares can be statistically inefficient, or even give misleading inferences. GLS was first described by Alexander Aitken in 1936.

**Table 3: Multicollinearity test**

	ALA	CD	TLA	ROA	ROE	NIM	Size	CAP
ALA	1.000							
CD	0.0730	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	0.3921	1.000			
NIM	0.0158	0.0833	0.2478	0.1073	0.0834	1.000		
Size	0.0973	-0.2745	0.1577	0.0857	0.3635	0.255	1.000	
CAP	-0.0775	0.6962	0.1346	0.2912	-0.1852	0.0615	-0.3575	1.000
CEA	0.2036	0.0159	-0.0661	-0.0267	0.075	-0.0641	0.1237	-0.0076
CFC	-0.0378	-0.0258	-0.0117	-0.0076	-0.047	-0.1476	0.1384	-0.0227
Tdeposit	-0.2385	-0.5547	0.0531	0.0169	0.3814	-0.0711	0.4336	-0.6191
TPIB	0.0604	0.0589	-0.1125	0.0679	-0.0117	-0.0250	-0.2505	0.0123
TINF	-0.1198	-0.0893	0.3496	-0.0374	0.2111	0.043	0.4291	-0.1064

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

	CEA	CFC	Tdeposit	TPIB	TINF
CEA	1.000				
CFC	0.3142	1.000			
Tdeposit	-0.1459	-0.1598	1.000		
TPIB	-0.1394	-0.2233	-0.0303	1.000	
TINF	0.1031	0.1271	0.1602	-0.5512	1.000

All the coefficients are inferior to 0.80. There is no problem of multicollinearity

**Table 4: VIF**

Variable	VIF	1/VIF
T deposit	<b>2.20</b>	<b>0.4542</b>
CAP	2.13	0.4689
TINF	1.90	0.5260
Size	1.67	0.5992
ROE	1.56	0.6422
TPIB	1.53	0.6519
ROA	1.43	0.6720
TLA	1.31	0.762
CFC	1.27	0.788

CEA	1.17	0.825
NIM	1.12	0.8902

Variance inflation factor (VIF) is a measure of the amount of multicollinearity in a set of multiple regression variables. Mathematically, the VIF for a regression model variable is equal to the ratio of the overall model variance to the variance of a model that includes only that single independent variable. This ratio is calculated for each independent variable. A high VIF indicates that the associated independent variable is highly collinear with the other variables in the model. VIF inferior to 5. There is no problem of multicollinearity.

**Table: Estimation GLS (Generalized least square)**

TLA	Coefficient	Z	z<P
ROA	0.4579	0.48	0.631
ROE	-0.0613	-0.42	0.678
NIM	1.7391***	3.01	0.003
Size	0.0087	0.81	0.418
CAP	0.1854	0.93	0.353
CEA	-0.1776	-0.58	0.565
CFC	-0.6166	-1.12	0.264
T deposit	0.1535	1.52	0.128
CD	0.0375***	2.47	0.013
ALA	-0.1073	-0.28	0.782
TPIB	0.2579	1.02	0.308
TINF	2.55***	4.38	0.000
Constant	0.2845	1.81	0.070

**There is a positive relationship between TLA and ROA** (if ROA increase by 1%; TLA will increase by 0.4579%). The increase of return on assets has a positive impact on bank lending. This result is contrary to found by Yitayaw (2021).

**There is a negative relationship between TLA and ROE** (if ROE increase by 1%; TLA will decrease by 0.0613%). The increase of return on equity has a negative impact on bank lending.

**There is a positive relationship between TLA and NIM** (if NIM increase by 1%; TLA will increase by 1.7391). The increase of net interest margin has a positive impact on bank lending. This relationship is statistically significant at 1%.

**There is a positive relationship between Size and TLA** (if Size increase by 1%; TLA will increase by 0.0087%). The increase of Size has a positive effect on bank lending. This result is similar to found by Rababah (2015); Isa and al (2019), Khalaf (2017), Yitayaw (2021).

According to Bashir (2003) large sized banks have the advantage of providing a larger menu of financial services to their customers and thereby immobilize more funds. On the other side Berger; Udell (2006) provide that large and complex banks tend to lend few loans to small sale firms.

**There is a positive relationship between CAP and TLA** (if TLA increase by 1%; TLA will increase by 0.1854%). The increase of capital has a positive effect on bank lending. This result is contrary to found by Rababah (2015).

Thus capital adequacy ensures the availability of funds and strength to lend hence the ability to give more loans at competitive interest rates. Berrospide and Edge (2010), Carbon and al (2013) documented a positive effect of bank capital on bank lending. There are 2 stands of theories on how capital influence bank lending. According to the financial fragility crowding out; Berger and Bowman (2009) are argue that shareholders are more reluctant to offer loans when they invest more money in their banks. They also become more cautious with their investment decisions. Thus more capitalized banks may supply fewer loans their less capitalized banks. The impact of capital on lending are positive according to their risk absorption theory. In this vein holding a larger capital buffer improves the risk beasing capacity and protect banks against potential losses (Coval; Thakor (2005); Repullo (2004). Kim and Soln (2017) claim that US banks with more capital only expand their lending aggressively after they store enough liquidity. Roulet (2018) finds that capital ratios induce negative impact on retail lending in the post 2008 financial crisis.

**There is a negative relationship between CEA and TLA** (if CEA increase by 1%; TLA will decrease by 0.1776%). The increase of operating costs has a negative effect on bank lending  
**Also there is a negative relationship between CFC and TLA** (if CFC increase by 1% TLA will decrease by 0.6166%). The increase of financial expenses has a negative effect on bank lending.

**There is a positive relationship between Tdeposit and TLA** (if T deposit increase by 1% TLA will increase by 0.1535%). The increase of deposits has a positive effect on bank lending. This result is similar to result found by Rabbah (2015); Adzis and al (2018), Yitayawa (2021) , Sharma; Gounder (2012); Olokoyo (2011).

**There is a positive relationship between CD and TLA** (if CD increase by 1% TLA increase by 0.0375%). The increase of credit by deposits has a positive effect on bank lending. This relationship is statistically significant at 1%.

**There is a negative relationship between ALA and TLA** (if ALA increase by 1% TLA decrease by 0.1073%). The increase of liquid assets has a negative effect on bank lending.

Liquidity is the ability of bank to converts into cash with minimum losses (Mac Donald; Kach (2006). Theoretically the high proportion of liquid assets held by the bank will directly reduce the funds available for loans. Since loans are illiquid assets; an increase in the volume of loans and advances means an increase in illiquid assets in the asset of portfolio of a bank (Yitayaw (2021). The financial crisis has also reinforced the view of the relevance of asset liquidity; because banks with more illiquid assets on their balance sheets harded liquidity and reduced lending in crisis years more than liquid banks (Cornett and al (2011).

**There is a positive relationship between TPIB and TLA** (if TPIB increase by 1% TLA increase by 0.2579%). The increase of economic growth has a positive effect on bank lending. This result is similar to result found by (Alkhazaleh (2017); Rizky (2020). Good economic

conditions will certainly increase economic growth. With good economic conditions; banks tend to provide loans to the community as working capital. Conversely if the economic conditions are deteriorating. Banks are reluctant to provide loans to the public because of the unstable financial conditions on the community.(Dian and al (2020). Logically a strong economic conditions creates more demand for goods and services which leads to more investments in different sectors; hence increase the per capita income as well as the savings; collectively these factors convince banks to issue more credit private. (Yitaw (2021). Amidu (2014) also documented that when the gross domestic product increases it will lead to the increment of bank lending. Rababbah (2015) pointed out that the higher rate of economic growth leads to increase proportion of credit facilities.

**There is a positive relationship between TINF and TLA** (if TINF increase by 1% TLA increase by 2.55%). The increase of inflation has a positive effect on bank lending. This result is similar to the result found by Alkhazaleh (2017) but contrary to the result found by Bhattarai(2020); Rizky (2020). The inflation rate is a reduction in the purchasing power of a currency resulted from a general and sustained increase in the general price level of all goods and services in an economy usually expressed as an annual percentage change of consumer price index. When inflation increases; banks also increase the cost of credit to keep the space in the inflation while will result in increased lending rate in the country (Banda (2010). Banks are likely to support the government approach by limiting their lending activities in high inflation environment.

## CONCLUSION

The banks provide loans and advances to its customers like individuals business entities; and government as per demand by formal procedures. As bank lending is the major source of granting revenues and it involves remarkable amount of risks, banks should be careful in analyzing the various determinants of bank lending behavior. It is interesting to understand the determinants of bank lending. For this purpose we analyze in this article the factors affecting bank lending in Tunisia over the period (2005...2020). We employ a method of generalized least square in the sample of 11 banks. We found that only (bank net interest margin; net interest margin; inflation) have a significant bank lending.

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