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BANK PROFITABILITY AND ECONOMIC GROWTH: EVIDENCE FROM TUNISIA

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Abstract:
Bank profitability and economic growth are important for financial development of each country. It is interesting to understand the characteristics of these two variables and the relationship between them. In this article, we investigate the effect of economic growth on bank profitability using a sample of 18 banks in Tunisia over the period (2000 - 2017). We employ ROA (return on assets), ROE (return on equity) as indicators of bank profitability like dependent variable, the other bank specific variation, economic growth as independent variable. We use panel method for regression of 2moels. We found that economic growth has a positive and significant effect on bank profitability.

JEL: C33, G20, G21, E32

Keywords: bank profitability, economic growth, return on assets, return on equity, panel

1. Introduction

Bank profitability is an important indicator of bank performance, it represents the rate of return of bank that has been able to generate from using the resources and its command in order to produce and sell services. Bank profitability can be measured by return on assets, return on equity, net interest margin.

On the other part, economic growth is an increase in the production of economic goods and services, compared from one period of time to another. It can be measured in nominal or real adjusted for inflation terms.

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Many authors have investigated the relationship between bank profitability and economic growth. Their results are mixed positive, negative, or not significant.

So, the relationship between economic growth and bank profitability is important. As part of this article, we will study the impact of economic growth on bank profitability in Tunisia by used a sample of 18 banks over the period 2000…2017. As a result, we will use approach that consists of three sections. First we will show the literature review, and then we will analyze the empirical study. At the end, we will make the conclusion.

1. Literature review

A. Bank profitability

Bank profitability is the ability of a bank to generate revenue in excess of cost, in relation to the bank's capital base. Clearly, bank profitability matters for financial stability. Profits are the first line of defended against losses from credit impairment. Retained earnings are an important source of capital; they enable banking to build strong buffers to absorb additional losses. (www.ecb.europa.eu)

Banks with poor structural profitability can face higher funding costs and may be tempted to take on more risk. A sound and profitable banking sector is better able to withstand negative shocks and contribute to the stability of the financial system.

B. Economic growth

Economic growth is the increase in the inflation adjusted market value of the goods and services produce by an economy over time. It is conventionally measure is the percent rate of increase in real gross domestic product, or real GDP.

The rate of economic growth refers to the geometric annual rate of growth in GDP between the first and the last year over a period of time. This growth rate is the trend in the average level of GDP over the period, which ignores the fluctuations in the GDP around this trend. An increase in economic growth cause by more efficiency use of inputs increase productivity or labor, physical capital, energy or materials is referred to as intensive growth.

GDP growth cause only by increases in the amount of inputs available for use increase population, new territory is classed extensive growth. Economic growth typically refers to GDP growth. A country's gross domestic product or GDP is a measure of the size and health of its economy. (www.bankofenglan.co.uk)

It is the total value of goods and services produce over specific time period. An annual GDP growth rate of 3%, simply means that economy has grown by 3% over the past year.

There are some important factors that affect the economic growth of a country like human resource, natural resources, capital formation, technological development, social and political factors. (www.economiciscussion.net)

Jhingan (2006) viewed economic growth as an increase in output by expansion in labour force, consumption, capital and volume trade.

The main characteristics of economic growth are high rate of growth per capital income or output, higher rate of productivity, high rate of structural transformation.

C. The relationship between bank profitability an economic growth

Several authors have studied the relationship between bank profitability and economic growth. Klein, Weill (2018) investigate the impact of bank profitability on economic growth using a sample of 133 countries during the period (1999—2013) with several empirical researches.

They found that high current level of bank profitability contributes positively to economic growth. Besides, Adekola (2016) studied 5 banks during the period (2005…2014) in Nigeria. He finds that increasing proportion of bank profitability will significantly changes the gross domestic product in Nigeria.

Hamza, Khan (2014) explored the impact of banking sector profitability in economic growth in Pakistan. Using a sample of 10 commercial banks for the period (2008…2012). They found a positive and significant association between bank profitability and economic growth.

On the other hand, Tan, Floros (2013) examine the effect of GDP growth on bank profitability in China over the period (2003…2009). The one step system GMM estimation is use to test the persistency of profitability in Chinese banking industry. They found that there is a negative relationship between GP growth and bank profitability.

Moreover, Martinho et al (2017) investigate the effect of GDP growth on profitability in Europe. They find that there is a positive association between real GDP growth and bank profitability due to the procyclicality of impairments.

Alberatazzi, Gambaorta (2009) find that bank profitability is positively associated to GDP growth, identifying increases in the net interest income and reduction in provision as the main channels through which higher economic activity affects banks return on assets.

Also, Evans and Kiganda (2014) found that economic growth have insignificant effect on bank profitability in Kenya.

Ghurstskaia (2018) studied the relationship between economic growth and bank profitability in Georgia. She found that the GDP growth has weak relationship with bank profitability.

Tan, Trqng (2016) studied 9 banks listed in Vietnam during the period (2007…2011). They found a positive and statistically significant relationship between bank profitability and economic growth.

Moreover, Petria and al (2015) studied banks in 27 EU over (2004…2011). They found a positive association between GDP growth and bank profitability.

Boitan (2015) found a high and positive Granger Causality from GDP growth rate to the bank profitability in European Union countries. Al Jaafqri and al (2014) used a GMM approach, identified that economic growth has a positive relationship with bank profitability.

Besides Topak and Talu (2017) used data of banks in Turkey over the period (2005…2015). They found that GDP growth has a positive effect on bank profitability. Abobaker (2018) used annual data of 26 banks during the period (2006…2015).

Generalized methods of moments GMM estimators are applied to define the most factors. He found a positive relationship between bank profitability and economic growth.

3. Empirical study

The impact of economic growth on bank profitability has been the object of several studies prompting us to study this problem in the Tunisian context. Under this section, we will identify the sample at the beginning, and then we specify the variables and the model. After, we carry out the necessary econometric tests. Finally we show the estimation results of the model and their interpretations.

3.1 Sample

We will use 18 banks that belong to professional association of banks in Tunisia over the period (2000…2017). Financial data are collected through the web site of the professional association of banks in Tunis over the period (2000…2017).

3.2 Estimation method

We will utilize panel statistics because it controls:

- The time and individual variation in the observable behavior or cross sectional times series aggregated;
- The observed or unobserved individual heterogeneity;
- The hierarchical structure.

3.3 Specification of variables

We will estimate the two following variables:

ROA i,t = b0+ b1. Sizei,t +b2 .CAPi,t +b3.T LA i,t +b4. ALAi,t +b5. CEAi,t +b6. CFCi,t +b7. Tdeposit i,t +b8. TPIBi,t +b9. TINFi,t +Ei,t

ROEi,t = b0+b1 Sizei,t +b2 CAPi,t +b3 TLAi,t +b4 .ALAi,t +b5 CEAi,t +b6 CFCi,t +b7 Tdeposit i,t+b8 TPIBi,t +b9 TINFi,t + Ei,t

Where:

- I = bank;
- t = time;
- bo = constant;
- b1, b2, b3, b4, b5, b6, b7, b8, b9 - parameters to be estimated;
- ROA = return on assets = net income / total assets;

- ROA shows how to generate income from the assets of the bank Chin (2011). It measures the profit earned per dollar of assets and reflects how well bank management uses the bank's investment resources to generate profits Naceur (2003).
- ROE = return on equity = net profit / total equity;
- ROE reflects the ability of bank to use its own funds to generate profits Yilmaz (2013)
- Size = size of the bank = natural logarithm of Assets Size can show the economies of scale. The large banks benefit from economies of scale which reduces the cost of production and information gathering Boyd, Runkhle (1993).
- ALA = liquid assets / total assets;
- ALA depicts the bank's ability to absorb the liquidity shocks.

In theory, the higher liquidity ratios indicate that the bank is in better position to meet is stochastic withdrawals Chagwiza (2014).

TLA = Total Loans / Total Assets

It considers as one of the asset qualities indicators are loans are one of the main risky assets, the more the loans, the bank exposes to risks. (Abobaker, 2018).

CEA = Operating Expenses / Total Assets

Operating expenses including personal expenses and other expenses. CEA shows the weight of operating expenses compared to total assets.

CFC = Financial Expenses / Total Credits

Financial expenses include interest expenses due to loan made in the money market and the capital market by banks. CFC shows the share of financial expenses in relation to total credits.

T deposit = Total Deposits / Total Assets

Deposits include demand deposits and term deposits.
T deposit show the share of deposits compared to total assets.

TPIB = Growth Rate of Gross Domestic Product

TPIB show the growth in the economic activity in the country Ayadi, Boujelbene (2012) Asarkaya, Ozcan (2007) pointed out that when economic growth, the banks make more profit.

CAP = Total Equity / Total Assets

The capital strength of banks indicates its capacity to meet deposit demand and sends signals to bank customers about its stability and ability to protect their savings especially during periods of uncertainty such as the financial crisis Ghosh (2016), Berger (1995).

TINF = Rate of Inflation

TINF shows the rate of increase in the price index.

Inflation is generally the persistent increase of price level of goods and services in economic over a period of time. Therefore, we estimate the following hypotheses:

- **H1:** Economic growth has a positive effect on bank profitability.
- **H2:** Economic growth has a negative effect on bank profitability.

3.4 Analysis of descriptive statistics

Table 1: Descriptive statistics of variables

Variable	Observations	Mean	Standard deviation	Minimum	Maximum
ROA	324	0.011424	0.01439	0	0.1291
ROE	324	0.08764	0.088	0	0.9572
CAP	324	0.1626	0.1705	0	0.9724
Size	324	14.058	1.329	10.19	16.46
TLA	324	0.7165	0.1910	0.024	0.97
ALA	324	0.037	0.04055	0.0033	0.44
CEA	324	0.026	0.02132	0.00023	0.3614
CFC	324	0.0324	0.0206	0.001788	0.3179
Tdeposit	324	0.6545	0.2626	0.0066	0.9813
TPIB	324	0.03295	0.0405	-0.015	0.0611
TINF	324	0.041	0.0089	0.03	0.0715

Where:

- 324 = 18*18= total number of observations
- 18 = Number of years (2000…2017)
- 18 = Number of banks
- ROA (mean = 0.0114). The net profit represent on average 1.14% of total assets.
- ROE (mean = 0.087). The net profit represent on average 8.7% of total equity.
- Size mean = (14.058). Most banks have a small and medium size. There is no large variation in size between banks.
- CAP (mean = 0.1626). The equity represent on average 16.26% of total assets. But there is a large variation in capital between banks standard deviation = 17.05%
- TLA (mean = 71.65). Total credit represent on average 71.65 of total assets.
- The standard deviation is high 19.10
- ALA (mean = 0.037). Liquid assets represent on average 3.7% of total assets. The standard deviation is low 0.04
- CEA (mean = 0.026). Operating expenses represent on average 2.6% of total assets. The standard deviation is low 2.13%
- CFC (mean = 0.0324). Financial expenses represent on average 3.24% of total credit. Standard deviation is low 2.6%. There isn't a big difference between banks in term of financial expenses.

- Tdeposit (mean = 0.6545). Total deposits represent on average 65.45% of total assets. The standard deviation is high 26%. There is a big difference between banks in term of deposits.
- TPIB (mean = 3.29%). The economic growth is not good. There is negative in 2011 because of revolution.
- TINF (mean = 4.1%).The rate of inflation is acceptable. Standard deviation is not high. There is not big difference between the years. But after revolution 2011 this rate will be high.

3.5 Econometric tests

A. Test of multi-collinearity

Table 2: Correlation between variables

	ROA	ROE	Size	CAP	TLA	CEA
ROA	1.000					
ROE	0.2220					
Size	-0.0874	0.3293	1.000			
CAP	0.4551	-0.1262	-0.4699	1.000		
TLA	-0.1706	-0.0100	0.2604	-0.0917	1.000	
CEA	-0.0289	0.0674	0.1122	-0.0612	-0.07	1.000
CFC	-0.0911	0.0589	0.0369	-0.0848	-0.1739	0.2536
Tdeposit	-0.2323	0.2107	0.4532	-0.56	-0.0841	0.1771
ALA	0.0256	-0.1147	-0.1656	0.1179	-0.057	-0.0716
TPIB	0.1370	-0.1069	-0.2207	0.1836	-0.23	-0.068
TINF	-0.1149	0.0963	0.24	-0.242	0.1986	-0.0792

Table 3: Suite of correlation between variables

	CFC	Tdeposit	ALA	TPIB	TINF
CFC	1.000				
Tdeposit	0.2661	1.000			
ALA	-0.0031	-0.24	1.000		
TPIB	0.0161	-0.12	0.1556	1.000	
TINF	-0.06	0.1958	-0.1743	0.0090	1.000

There is no problem of multi-collinearity because all coefficients are inferior to 80% (0.8)

Table 4: Test of VIF

	VIF
Size	1.58
T deposit	2.97
TINF	1.17
ROA	1.56
ROE	1.72
CFC	1.19
ALA	1.24
CEA	1.39

TLA	1.22
TPIB	2.27
CAP	1.94

There is no problem of multi-colinearity because VIF inferior to 5.

3.5.1 Hausman test

Hausman test determines if the individual effects are fixed or random. It determines if the coefficient Beta and fixed or random estimated are not statistically different. Under the null hypothesis of independence between errors and explanatory variables, both estimators are unbiased, so the estimated coefficients become somewhat different. The fixed effect model assumes that the influence of explanatory variables on the dependent variable is the same for the all individuals, and that whatever the period Sevestre (2002).

The random effect model assumes that the relationship between the dependent variable and the explanatory variable is not fixed but random; the individual effect is not fixed parameter but a random variable (Bourbonnais, 2009).

The null hypothesis of the test is following:

Ho: The presence of random effect if Pv inferior to 5% we accept H0 presence of random effect, if not we accept fixed effect.

In model 1, pv= 0.9961, In model 2 pv = 0.2893, Pv are superior to 10%. We choose random effect in regression of two models because it is more pertinent.

3.5.2 Breush Pagan test

The Breush Pagan test developed in 1979 by Trevor Breush and Adrian Pagan. It is used to test for heteroscedasticity in a linear regression model. It is a Chi squared test.

The test statistic in X 2 with the degree of freedom. It tests the null hypothesis of homoscedasticity.

If the Chi squared value is significant with p value below an appropriate threshold p <0.05 then the null hypothesis of homosedasticity is rejected and heteroscedasticity is assumed.

3.6 Results of estimation and interpretations

Table 5: Results of estimation of model 1

ROA	Coefficient	Z	P	Standard error
Size	0.0019	1.83	0.067	0.0019
CAP	0.0375	5.31***	0.000	0.0307
TLA	-0.0081	-2.03	0.043	-0.0081
CEA	-0.032	-1.03	0.304	-0.032
CFC	-0.062	-1.82	0.069	-0.062
T deposit	-0.0053	-1.05	0.294	-0.0053
ALA	0.004754	2.26*	0.891	0.0057
TPIB	0.0631	2.54*	0.323	0.084
TINF	-0.074	-2.91***	0.562	0.0925
Cons	-0.0071	-0.48	0.629	0.0149

There is a positive relationship between ROA and size if size increase by 1%, ROA will be increase by 0.19% the increase of size has a positive effect on return of assets of bank. This result is similar to result found by Ben Khediri and al (2010), Anbar, Alper (2011), Masood, Ashraf (2012), Flamini et al (2009), Athansoglou et al (2008), Molyneux and Thornton (1992), Bourke (1989), Short (1979), Jamel and Mansour (2018).

Size is associated with economies of scale leading banks becoming more profitable as they become large. Besides there is a positive relationship between CAP and ROA if CAP increases by 1%, ROA will be increase by 3.075%. The increase of capital has a positive effect on bank profitability. This relationship is statistically significant at 1%.

This result is similar to result found by Maqbool et al. (2015), El Kassem (2017), Ebenzer et al (2017), Bourke (1989), Demirguc Kunt and Huizinga (1999), Goddard and al (2004), Abobaker (2018).

Moreover, there is a negative relationship between TLA and ROA if TLA increases by 1%, ROA will be decrease by 0.81%. The increase of total credits in term of assets has negative effect on bank profitability. This relationship is statistically significant at 5%. This result is similar to result found by El Kaseem (2017), Yukul and al (2018). High level of loans means a possible deterioration of bank asset quality with a negative effect on profitability Alper, Anbar (2011), Alshatti (2016).

On the other hand, there is a negative relationship between CEA and ROA if CEA increase by 1%, ROA will be decrease by 3.2%. The increase of costs has a negative effect on bank profitability. This result is similar to result found by Athansoglou and al (2008), Molyneux and Thornton (1992), Bourke (1989).

Also there is negative relationship between CFC and ROA if CFC increase by 1%, ROA will be decrease by 6.2%. The increase of financial expenses has a negative effect on bank profitability.

There is a negative relationship between T deposit and ROA if ROA will be increase by 1%, T deposits will be decrease by 0.53%. The increase of deposits has a negative effect on bank profitability. This relationship is not statistical significant.

There is a positive relationship between ROA and ALA if ALA increase by 1%, ROA will be increase by 0.00475%. The increase of liquid assets has a positive effect on return on assets. This relationship is statistically significant at 1%.

This result is similar to result found by Lucy and al (2018), Kosmidou et al. (2018), Kosmidou (2008), Khan and Ali (2016), Warrad et al. (2016). But, opposite results have been found by Rahm, Nasr (2017).

Bank liquidity means the ability of the bank to maintain sufficient funds to pay for its maturing obligations. The fundamental role of banks is to transform short term deposits in to long term loans. Therefore, it is evident that all banks should be managed such as way that achieves certain profitability while maintaining certain liquidity. (Vodova et al., 2016)

There is a positive relationship between TPIB and economic growth if TPIB increase by 1%, ROA will be increase by 0.0631%. The increase of economic growth has

a positive effect on bank return on assets. Economic growth is regarded as an increase in the net national production in a given period of time Dewett (2005).

This result is statistically significant at 1%. This result is similar to result found by Klein and Weill (2018), Adekola (2016), Hamza and Khan (2014), Martinho et al (2017). But contrary to result found by Tain, Floros (2012), Ghurstkaria (2018).

There is a negative relationship between ROA and TINF if TINF increase by 1%, ROA will be decrease by 0.074%. The increase of inflation rate has a negative effect on return on assets. This result is similar to result found by Jumono and al (2019), Achraf and Haider (2017), Rani, Zergaw (2017). But contrary to result found by Jamel and Mansour (2018).

The inflation rate is the rate which the general price level of goods and service rises around as result the purchasing power of currency levels (Singh, Sharma (2016)).

Table 6: Results of estimation of model 2

ROE	Coefficient	Z	p<z	Standard error
Size	0.02326	3.26	0.001	0.0071
CAP	0.03343	0.83	0.406	0.040
TLA	-0.0199	-0.71	0.477	0.027
CEA	-0.0206	-0.09	0.925	0.22
CFC	0.098	0.41	0.682	0.24
Tdeposit	-0.042	-1.21	0.228	0.035
ALA	-0.022	-2.17	0.873	0.13
TPIB	0.3181	-2.12	0.425	0.29
TINF	0.5796	1.03	0.303	0.56
Cons	-0.21	-2.14	0.032	0.10

There is a positive relationship between ROE and Size if Size increase by 1%, ROE will be increase by 0.02326%. The increase of Size has a positive effect on bank return on equity. This result is similar to result found by Topak, Talu (2011), Abobaker (2018), Junono (2019), Ashraf and al (2017), Bogale (2019).

Increase in size can increase bank profitability due to economies of scale. Moreover, there is a positive relationship between CAP and ROE if CAP increase by 1%, ROE will be increase by 0.03343% the increase of capital has a positive effect on bank return on equity. This result is similar to result found by Abobaker (2018), Athansoglou and al (2008), Ben Naceur (2003).

Banks with a high capital ratio are considered to be insured against bankruptcy, to have access to cheap funds, to be more flexible in pursuing business opportunities and to have the ability to absorb any unexpected losses. (El Harbi, 2019).

Besides there is a negative relationship between ROE and TLA if TLA increase by 1%, ROE will be decrease by 0.0199%. The increase of total credit in term of total assets has a negative effect on bank return on equity. This result is similar to result found by Anarfi and al (2016), Yukel and al (2018).

Therefore higher level of loans means a possible deterioration of the bank asset quality with a negative effect on bank profitability. (Alper, Anbar, 2011).

On the other hand there is a negative relationship between CEA and ROE if CEA increase by 1%, ROE will be decrease by 0.0206%. The increase of operating costs has a negative impact on bank return on equity.

Also there is a positive relationship between CFC and ROE if CFC increase by 1%, ROE will be increase by 0.098%. The increase of financial expenses has a positive effect on bank return on equity.

Moreover there is a positive relationship between TPIB and ROE if TPIB increase by 1%, ROE will be increase by 0.3181% the increase of economic growth has a positive effect on bank profitability. This relationship is statistically significant at 10%. This result is similar to the one found by Zampara et al (2018).

According to Staikouras and Wood (2003), Alexiou, Voyazas (2009), Grow and al (2014) Dietrich and Wanzenreied (2011), a higher GDP growth rate result in higher demand for bank services , on the one hand and lower loan default probability on the other hand.

Whereas banks can also impose higher fees and interest for their services, resulting in higher profitability (Zampara et al., 2018). Besides, Karinzadek et al (2013), Said, Tamim (2011) argue that GDP growth has a positive effect on the expectation of both the bank and the customers, implying hence that during economic booms not only customers demand for new loans and financial services rises, but simultaneously banks are also more eager to increase loan supply .

There is a positive relationship between TINF and ROE if TINF increase by 1% , ROE will be increase by 0.5796%. The increase of inflation has a positive effect on bank return on equity.

This result is similar to result found by (Rani and Zergaw (2017), Naceur, Abdollah (2015), Tan, Floros (2012), Flamini and al (2009), Gul and al (2011), Sufian and Habibullah (2009), Hasanov and (2018)).

But, contrary opinions to result were found by Syfari (2012), Boyd, Champ (2003). Inflation affects bank performance as it transfers money from services and investors to debtors. Therefore the opportunity cost of holding currency in the future may discourage savings that will in turn affect the performance of banks.

The amount of savings that would be available at the disposal of the banks will decrease as savers will prefer to invest in non-monetary capital projects to avoid losses expected from the declining purchasing power of money.

4. Conclusion

The banking industry is a crucial pillar for the stability and development of any economy‘s financial system, through the efficient allocation of the national savings to prompt various investment and growth rates (Jreisat, Hassan and Shankar, 2018).

In addition, the stability of the financial system is fundamental for both the overall economic development and the effectiveness of the central bank monetary policy. (Kassem, Sakr, 2018). On the other hand bank profitability indicates the

efficiency of bank and increase of earnings. The relationship between economic growth and bank profitability has been studied in many countries like China, Pakistan, Turkey.

In this article, we studied the impact of economic growth on bank profitability in the Tunisian context. We used a sample of 18 banks over the period 2000…2017. We found that economic growth has a positive impact on bank profitability.

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