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The Determinants of Bank Profitability : Case of Tunisia

Mohamed Aymen Ben Moussa[1] and Adel boubaker[2]

[1]Doctor in Finance; Department of Management; University Tunis el manar; Faculty of Economic Sciences and Managmenet of Tunis; Tunisia. E-mail: moussaymen495@gmail.com
[2]Professor in Finance; Department of Finance; University Tunis el manar; faculty of economic sciences and management of Tunis

Abstract: The purpose of this article is to examine the impact of selected internal and external factors on a bank's profitability. The research investigates the impact of size; liquidity; operating costs; deposits; credits; GDP growth and inflation change of the profitability of sample of 11 banks in Tunisia for the period (2000…2018). The determinants were used to construct 2 models with ROA and ROE as a proxies and regression analysis using panel approach. We found that size; bank deposit; operating costs; liquidity; economic growth have a significant impact on bank profitability measured by (ROA and ROE).

Keywords: Profitability; ROA; ROE; Panel, bank, profitability

JEL classification : G21, G23; D08

1. Introduction

Profitability is very important in bank's business affairs just as in other business as they need to generate sufficient profit so as to maximize shareholder's wealth in form of payment or capital appreciation of shares and for growth and expansion.

Profitability in the banking sector according to Olyo; Olarenjn (2015) is a measure of how efficient bank performs its intermediation role and the extent to which it is able to render quality services to customer.

In this article we attempt to study the determinants of the profitability of the banking in Tunisia.

We employ a methodology of three sections. The first section is devoted to literature review the second section is about the empirical study. We finish by making a conclusion.

2. Literature review

There are several studies about the determinants of bank profitability. Jawad and Lahan used a sample of 6 Moroccan banks during the period (2010-

2016). The findings show that only operating management efficiency measured by cost to income ratio is highly significant and negatively related to bank profitability. The bank size is positively related to ROA and statistically significant.

Lawa and al (2017) used a panel banks that account about 8% of the bank assets in south Africa. The study was conducting using random effect panel data. The resultants revealed that non performing loans; capital adequacy; GDP; market price are the main determinants of bank profitability. Also Horobert and al (2021) investigated the determinants of bank profitability in CEE countries between (2009….2018). They demonstrated that unemployement rate; inflation; budget balance; non government credit; non performing loans; concentration rate and capitalization rate are negatively important on bank profitability.

Lee (2018) used pooled ordinary least squares; random effect and 2 step GMM models over the period (2003…2016) for banks in Malaysia. The results indicate that capital strength; bank size; remuneration of the board of directors; the duality of the CEO chairman and economic growth have a positive effect on bank profitability. Whereas management efficiency; liquidity and loan growth have a negative impact on bank profitability.

Besides; Chouikh and Blagui (2017) used a sample of 7 private banks and 3 state owned banks in Tunisia over the period (1997…2015). They found a negative and significant relationship between bank profitability and board size.

Lemi and al (2020) used a sample of 7 banks in Ethiopia over the period (2000…2017). The results of the study showed statistically significant negative impact of broad money supply and credit risk. Inflation and GDP growth on the other hand was found with significant positive impact. Cash reserve ratio and bank size showed not significant impact on the profitability of commercial banks.

Akoi and Andrea (2020) used 8 public banks in Turky from the period (2001…2008). The results showed that an increase in bank deposits increase bank profitability. The findings also revealed that an increase in inflation and economic growth had inalstic positive effect on bank profitability.

Shamim and al (2018) used a sample of 12 local banks in Saudi Arabia for the period (2009…2015). The research concludes that bank internal factors specifically bank size; liquidity; credit risk and operational efficiency are significantly determining the profitability of bank. Achraf and al (2017) used a sample of banks in different asian countries over the period (2008…2015). They suggest that ban specific and macroeconomic determinants have strongly influence on bank's profitability.

Jadah and al (2020) used unbalanced panel date from 18 banks in Iraq for the period (2005…2017). The results showed that bank size; equity / assets; loan / total assets; GDP growth and government effectiveness have a significant and positive effect on the profitability of Iraqi banks.

Sanyalou and al (2019) investigated bank specific and macroeconomic determinants of profitability of 10 listed deposit money market banks in Nigeria stock exchange from (2008…2017). The results revealed that capital adequacy ratio; non performing loans; loan to total assets and size have significant effect on profitability while age was found to exert significant but negative effect on profitability.

The study could not however establish significant positive effect of macroeconomic indicators (economic growth and interest rate) on profitability of deposit money banks while inflation rate has negative but insignificant influence on profitability.

Al Homaidi and al (2020) examined the impact of internal and external determinants of 37 commercial banks profitability listed on Bombay stock exchange in India for the period (2008…2017). The results shows that bank size; assets; liquidity; asset management quality and net interest margin are important determinants which affect ROA.

Capital adequacy; deposits; operating efficiency; gross domestic product and inflation rate are found to have a negative significant impact on ROA.

3.   Empirical Study

The determinants of bank profitability has been the object of several researches.

Under this section; we will identify the sample at the beginning and then we specify the variables and the models. 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 11 banks (BIAT; STB; BNA; BH; ATB; AMEN Bank; BH; BTEI; BT; Attijari bank; UBCI) that belong to professional association of banks in Tunisia and quoted in Tunisian sotck exchange over the period (2000…2018)

Financial data are collected through the annual report of banks existed in the website of the professional association of banks in Tunisia over the period (2000…2018)

3.2. Estimation Method

We will utilize panel static because it controls:
  – The time and individual variation in the observable behavior across sectional times series aggregated.
  – The observed or unobserved individual heterogeneity

3.3. Specification of Variables

We will estimate the following models :

(1) **ROA i,t** = b0+ b1 **Sizei; t** +b2 **CAPi; t** +b3 **TLAi; t** + b4 **CEAi, t** + b5 **CFCi; t** + b6 **Tdeposit** i; t+b7 **CEAi,t** +b8 **CFCi,t** +b9 **ALA i,t** +b10 **CD i,t** +b11 **TPIBt** +b12 **TINFt** + Ei,t

(2) **ROEi,t** = b0+ b1 **Size** i,t + b2 **CAPi,t** +b3 **TLAi,t** + b4 **CEAi,t** + b5 CFCi,t +b6 Tdepositi,t + b7CEAi,t +b8 CFCi,t +b9 **ALAi,t** +b10 **CDi,t** +b11 **TPIBi, t** +b12 TINFi,t +Ei,t

Where : i = Bank

T = Time

b0 = constant

$b_1; b_2; b_3;........b_{12}$ = parameters to be estimated

We test the following hypothesis :

H1: Capital has a significant effect on bank profitability

H2: Deposits has a significant effect on bank profitability

H3: Size has a significant effect on bank profitability

H4: Operating costs has a significant effect on bank profitability

H5: Loans has a significant effect on bank profitability

H6: Inflation has a significant effect on bank profitability

H7: Economic growth has a significant effect on bank profitability

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 management uses the bank's investment resources has generate profit (Naceur (2003))

ROA is considered as the best proxy of profit (Flamini; al (2009); Samad (2005))

ROE = return on equity = Net income /total equity

ROE reflects the ability of bank to use its own funds to generate profits (Yilmaz (2013))

This ratio shows the profit earned per 1 dinar of investment. This is an indicator of how well banks uses investor's money or generate profit (Chowikh; Blagui (2017))

Size = size of the bank = Natural logarithm of total assets

Size can show the economies of scale. The large banks benefits 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 ratio indicates that the bank is better position to meet its stochastic with drawals **(Chagwiza (2014)).**

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 financial expenses in relation to total credits

Tdeposits = Total deposits / total assets

Deposits include demand deposit and term deposits. T deposits shows the share of deposits compared to total assets. The more the deposit a bank collect; the more the loan opportunities; it will be able to generate further profits **(Mencucci; Paolucci (2016))**

CD= total credits / total deposits

It is the ratio that describes how allocation of funds in term of deposits; comparing to a number of funds which is obtained from savings **(Widyastuti; al (2017))**

When the ratio is higher; it show more risky conditions because the funds from deposits have been collected in more of credits. Conversely the lower ratio indicate effective banks in lending decision.

TPIB = Growth rate of gross domestic product

It shows the growth in the economic activity in the country.

TINF = rate of inflation. It is known as a specific or sustained increase in

the actual price of the commodities in the economy over a certain period. Inflation has a lot to do with the banks as it fluctuate of the bank to balance the economy. (Al mansour and al (2021)).

3.4. Descriptive Statistics

	Observations	*Mean*	*Standard deviation*	*Minimum*	*Maximum*
ROA	209	0.0117	0.0100	0	0.0975
ROE	209	0.1047	0.06077	0	0.2976
Size	209	15.013	1.017	11.93	18.29
CAP	209	0.1162	0.096	0	0.6739
TLA	209	0.7569	0.131	0.107	0.9817
CEA	209	0.02841	0.0063	0.000237	0.056
CFC	209	0.03677	0.0207	0.0184	0.03051
T deposit	209	0.7421	0.1599	0.0205	0.756
ALA	209	0.03494	0.037	0.0033	0.044
CD	209	1.5292	2.83	0.1852	35.76
TPIB	209	0.03310	0.0147	0.0012	0.0811
TINF	209	0.05529	0.05356	0.03	0.0781

209= 11*19

11= Number of banks

19= Number of years (2000….2018)

ROA (mean = 0.0117). In the average; net return represent 1.17% of total assets. Standard deviation is low (1%). There is no great difference between banks in ROA. Also **ROE (Mean = 0.1047)**. In the average; net profit represent 10.47% of total assets. Standard deviation is high (6%). There is no great difference between banks in ROE. Besides; On the other hand; **Size (mean = 15.013)**. In the average; size of bank equal to 15. Standard deviation is high. There is a big difference between banks in size.

CAP (mean = 0.1162). In the average; capital of bank equal to 11.62% of total assets. Standard deviation is high. There is a big difference between banks in Capital. Also TLA (mean = 75.69%). In the average total credit represents 75.69% of total assets. There is a big difference between banks in TLA. The banks is differently in TLA.

CEA (mean =0.02841). The operating expenses represent an average 2.841% of total assets. There is a low standard deviation. There isn't big differences between banks in term of CEA. On the other hand; CFC (mean =0.03677). In average financial expenses represent 3.677% of total credits.

T deposit (mean =0.7421). In average total deposits represent 74.21% of total assets. The standard deviation is high. There is a big difference between banks in term of deposits.

ALA (mean =0.034). In average asset liquid represent 3.4% of total assets. There is not high standard deviation. There isn't big difference between banks in term of ALA. Besides CD(mean= 1.52). In average total credit represent 1.52 of total deposits. There is a high standard deviation. There is a big difference between banks in term of CD.

TPIB (mean=0.033). In average economic growth equal to 3.33% in the period of study (2000…2018). There is a low standard deviation. There is no big difference between years in economic growth except the years after revolution of 2011 who the economic growth has dropped.

TINF (mean =5.52%). In average the rate of inflation equal to 5.52% in the period of study (2000…2018). There is a low standard deviation. There is a big difference between years in inflation except the years after revolution of 2011 who the inflation has increased.

3.5. Multicolinearity Test

Table 1: Correlation between Variables

	ROA	ROE	Size	CAP	TLA	CEA	CFC
ROA	1.000						
ROE	0.3930	1.000					
Size	0.0158	0.3964	1.000				
CAP	0.2435	-0.2316	-0.4941	1.000			
TLA	0.0933	0.0639	0.1256	0.09781	1.000		
CEA	0.0524	-0.0157	0.1215	-0.0841	-0.0628	1.000	
CFC	-0.0056	0.0089	0.1200	-0.0915	-0.2040	0.2885	1.000

Table 2: Suit of Correlation between Variables

	ROA	ROE	Size	CAP	TLA	CEA	CFC	Tdeposit
Tdeposit	-0.0463	0.3751	0.534	-0.7636	0.0528	-0.0738	0.0303	1.000
ALA	-0.0920	-0.1441	-0.0794	-0.0619	-0.0700	-0.374	-0.036	-0.0849
CD	0.2313	-0.1557	-0.3739	0.7434	0.0517	-0.1049	-0.063	-0.59
TPIB	0.0685	-0.1856	-0.3656	0.0522	-0.1881	-0.0532	0.021	-0.1314
TINF	0.0427	0.0486	0.1247	-0.0160	0.1440	0.0418	-0.0038	0.0753

Table 3: Suit of Correlation between Variables

	ALA	CD	TPIB	TINF
ALA	1.000			
CD	-0.0598	1.000		
TPIB	0.1226	0.0628	1.000	
TINF	-0.0834	-0.0186	-0.2389	1.000

Multicolinearity occurs when there is a high correlation between the independent variables in the regression analysis which impacts the overall interpretation of the results it reduces the power of coefficients and weakens the statistical measure to test the p value is identify the significant independent variables.

All coefficients between variables are inferior to 80%. There is no problem of multicolinearity

Test of VIF

Variables	VIF	1/VIF
CAP	3.87	0.25
Tdeposit	2.97	0.33
CD	2.27	0.44
Size	1.74	0.57
TPIB	1.26	0.79
CEA	1.18	0.84
CFC	1.15	0.86
TLA	1.15	0.86
TINF	1.08	0.91
ALA	1.07	0.93

VIF quantifies the extent of correlation between one predictor and other predictors in a model. High value signifies that is difficult to assess accurately the contribution of predictors to a model.

3.6. Hausman Test

The Hausman test is developed to give existence in deciding on electing between the field effects and random effect approach.

The hypotheses of the hausman test are **: H0: Random effect are consistent and efficient**

H1: Random effect are inconsistent

When the pvalue is greater to 0.05 the random effect is chosen

In Model 1: Pv= 0.0534
Model 2: Pv = 0.068

3.7. Estimation of result of models and interpretations

A – Estimation of result of model 1 and their interpretations

ROA	Coeff	Std.error	Z	Z < P	95% CI	
Size	0.0015	0.00085	2.072	0.015	-0.00013	0.0032
CAP	0.049	0.013	1.073	0.000	0.022	0.075
TLA	0.0023	0.0053	0.663	0.663	-0.0081	0.0128

ROA	Coeff	Std.error	Z	Z < P	95% CI
CEA	-0.1998	0.112	2.077	0.014	-0.021 0.42
CFC	-0.0079	0.033	0.814	0.8140	-0.074 0.058
Tdeposit	0.0213	0.0070	0.003	0.003	0.0074 0.035
ALA	-0.0063	0.0181	2.726	0.013	-0.042 0.029
CD	0.00050	0.00034	0.149	0.149	-0.00018 0.0011
TPIB	0.1090	0.049	2.029	0.019	0.011 0.206
TINF	0.0064	0.01270	0.611	0.611	-0.0184 0.031
Cons	-0.040	0.0142	0.002	0.002	-0.072 -0.0165

There is a positive relationship between ROA and size (if size increase by 1%: ROA will be increase by 0.0015%). The increase of size has a positive effect on return on assets. This result is similar to result found by (Menicucci; Paolucci (2016) : Serwaddad (2018)) but contrary to result found by (Pasiouras; Kosmidou (2007); Athansoglou; al (2008))

Large banks might benefit from economies of scope economies (Menicucci; Paolucci (2016)). Also there is a positive relationship between ROA and CAP (if CAP increase by 1%; ROA will be increase by 0.049%) The increase of capital has a positive effect on return on assets of bank This result is similar to result found by (Trujillo; Ponce (2013); Dhouibi (2017)).

A high volume of equity will reduce the cost of capital; causing a positive effect on profitability. Therefore well capitalized banks achieve greater profitability (Menicucci; Paolucci (2016)).

There is a positive relationship between ROA and TLA (if TLA increase by 1%; ROA will increase by 0.0023%). The increase of total credits by total assets has a positive effect on return on assets of bank. This result is similar to result found by (Meniccuci; Paolucci (2016)).

There is a positive relationship between CEA and ROA (if CEA increase by 1% : ROA will decrease by 0.1998%). The increase of operating expenses has a negative effect on bank return on assets. This result is similar to result found by (Athansoglou; al (2008); Kosmidou; al (2005)).

The negative effect of cost means that there is a lack of competence in expense management since banks pass part of increased costs to customers and the remaining parts to profits; possibly due to the fact that competition does not allow them to over charges (Athansoglou; al (2008)). Besides there is a negative relationship between CFC and ROA (if CFC increase by 1%; ROA will be decrease by 0.0079%). The increase of financial expenses by credits has a negative effect on return on assets.

There is a positive relationship between T deposit and ROA (if T deposit increase by 1%; ROA will increase by 0.0213%). The increase of deposit has a positive effect on return on assets of banks. This result is similar to result found by

There is a negative relationship between ALA and ROA (if ALA increase by 1%; ROA will increase by.0063%). The increase of asset liquid has a negative effect on return of assets.

Also there is a positive relationship between CD and ROA (if CD increase by 1%; ROA will increase by 0.0050%). The increase of credits by deposits has a positive effect on return on assets. This result is similar to result found by (Hassan; Bashir (2003); Bawacha(2018))but contrary to result found by (Pruwoko; Sudyatno(2013)).

There is a positive relationship between TPIB and ROA (if TPIB increase by 1%; ROA will increase by 0.1090%). The increase of economic growth has a positive effect on return on assets of bank.This result is similar to result found by (Dietrich; Wanzenried (2011);Jawad,Lahsen (2018))but contrary to result found by (Blagui; Chouikh (2017)).

There is a positive relationship between TINF and ROA (if TINF increase by 1%; ROA will increase by 0.0064%). The increase of rate of inflation has a positive effect on bank return of assets. This result is similar to result found by (Pasiouras; Kosmidou (2007)), Lemin and al (2020); Karadazic and Dalovic (2021)) but contrary to result found by (Chitha (2018); Almansour and al (2021) Nyabakora and al (2020); Ebrahimi and al (2021)).

Estimation of Results and Interpretations of Model 2

Table : Estimation of results of model 2

ROE	Coeff	Std.error	Z	Z<P	95% CI
Size	0.01668	0.0049	3.37***	0.001	0.0069 0.026
Cap	0.07381	0.077	0.95	0.341	-0.078 0.22
TLA	-0.0068	0.031	-0.22	0.827	-0.067 0.054
CEA	-0.062	0.65	-2.536	0.015	-1.34 0.21
CFC	-0.068	0.19	-0.35	0.728	-0.45 0.30
T deposit	0.1295	0.0409	3.16***	0.018	0.049 0.20
ALA	-0.1297	0.1054	-2.253	0.017	-0.33 0.076
CD	0.0013	0.002	0.66	0.511	-0.0026 0.0032
TPIB	-0.19	0.2891	-2.67	0.011	-0.75 0.37
TINF	-0.027	0.0736	-0.38	0.7060	-0.17 0.11
Const	-0.23	0.082	-2.79	0.005	-0.39 0.066

(***) significant at 1%

There is a positive relationship between size and ROE (if size increase by 1% ROE will increase by 1.66%). The increase of size has a positive effect on return on equity of bank. This relationship is statistically significant at 1%. This result is similar to result found by (Topak; Talu (2017); Abobaker (2018); Bogale (2019).This result is contrary to found by Gadagbi (2017).

Finance literature suggests that large banks are said to exhibit lower returns because of the enhanced economies of scale which they may pass on their customers in the form of lower lending rates.

There is a positive relationship between CAP and ROE (if CAP increase by 1%; ROE will increase by 7.38%). The increase of capital has a positive effect on bank return on equity.This result is similar to result found by (Ahansolgou; al (2008); Abobaker (2018)).There is contrary to result found by Gadegbi (2017).

Banks with a high capital ratio are consistent to be insured against bankruptcy to have access to cheap funds to be more flexible in pursing business opportunities and have to ability to absorb any unexpected losses.

There is a negative relationship between ROE and TLA (if TLA increase by 1%; ROE decrease by 0.0068%). The increase of TLA has a negative effect on return on equity of bank. This result is similar to result found by Yuksul; al (2018)).Therefore high level of loans means a possible deterioration of the bank asset quality with a negative effect on bank profitability (Alper; Anbar (2011)

There is a negative relationship between ROE and CEA (if CEA increase by 1% ROE decrease by 0.062%). The increase of operating costs has a negative impact on bank return on equity.

There is a negative relationship between ROE and CFC (if CFC increase by 1%; Roe decrease by 0.068%). The increase of financial expenses has a negative impact on bank return on equity.

There is a positive relationship between ROE and T deposit (if T deposit increase by 1%; ROE will increase by 0.1295%). The increase of deposits have a positive impact on bank return on equity.

There is a negative relationship between ROE and ALA (if ALA increase by 1%; ROE will decrease by 0.1297%). The increase of asset liquid has a negative impact on bank return on equity.

There is a positive relationship between ROE and CD (if CD increase by 1%; ROE will increase by 0.0013%). The increase of credits by deposits have a positive impact on bank return on equity.

There is a negative relationship between TPIB and ROE (if TPIB increase by 1%; ROE will decrease by 0.19%). The increase of TPIB have a negative impact on bank return on equity.

There is a negative relationship between TINF and ROE (if TPIB increase by 1%; ROE will decrease by 0.027%). The increase of TINF have a negative impact on bank return on equity

This result is similar to found by (Ebrahimi and al (2021), Saeed (2014); Sufian; Chong (2008); Ayadin and Karakaya (2014))

Conclusion

Banks are specialized companies with their own specification; banks are more opaque than other companies play a crucial role in financing their economy and take on risky financial activities based on information and trust.

The profitability is important in banking industry for effective management and paying the costs of banks. In this article we study a panel model for the sample of 11 banks in Tunisia for the period (2000…2018). We found that size; deposits; operating costs; liquidity and economic growth has a significant impact on bank profitability measured by return on assets and return on equity.

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