The Determinants of Banking Performance: Empirical evidence from Tunisian Listed Banks

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Abstract
This paper aims to identify the determinants of performance of the Tunisian banking sector. The results found, following an empirical study using panel data of Tunisian banks listed on the stock market over the period 2000-2013, show that credit risk, liquidity, total assets and disclosure of information relating to credit are the main determinants of banking performance.

Key Words: Tunisian Banking Sector, Banking Performance, Panel Data

JEL Classification: G21, G24, G29, C33

Introduction
The revival of global economic activity since 2010 was quickly reversed in an economic recession and financial distress in 2011. This reversal was due to the crisis of sovereign debt in some countries of the Euro zone, soaring prices of raw materials on the international market and socio-political instability in some golf countries and North Africa.

In Tunisia, since the revolution of 2011, the deterioration of the main macroeconomic indicators and socio-political instability affected the banking system in terms of liquidity reduction and increased risks.

The Tunisian banking system described reduced and focused enough. Indeed, on a set of 21 banks, the first four, including three states, hold more than half of the overall total assets of the banking system. Non-performing loans are quite high. They represent 13.5% of total credit in 2012. These loans have increased as well the volume of bad loans as the risk of insolvency.

The stock market bank, which represents nearly 55% of the benchmark index, suffered a loss of over 15% in 2013. Tunisian banks prefer the logic of speculation and profit maximization rather than the logic funding and development of the economy.

Despite some privatization transactions mergers and acquisitions, foreign participation in the Tunisian

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1. The inflation rate has increased from 3 to 6%, the unemployment rate of 13.9 to 17%, the debt ratio of 40% of GDP to 45% of GDP

2. 17.8% for public banks and 10.6% for private banks

3. The acquisition by general society in 2002 the shares of the state in the UIB for an amount of approximately
banking system is low compared to countries in the region. This reflects the weaknesses of financial services, including FDI flows.

Monetary policy has been affected by practical direct administration of the credit. The capital market remains underdeveloped, which is the source of a significant rigidity rates. The monetary authorities take action to ensure the liquidity of the banking system, which was weakened by the weight of nonperforming loans, and act directly on the volume of loans.

All reforms since the early 90s for the restructuring and modernization of the Tunisian banking sector did not lead to the desired result in terms of financing the economy and diversifying risks. In addition, the Tunisian banking sector is not dynamic and renovating. It works according to conventional financing, less risky and more profitable.

However, despite these limitations, the Tunisian banking sector remains strong and resistant. This resistance is due to, on one hand, to the support and assistance of the central bank in controlling and refinancing and the state for the bailouts, especially for public banks, on the other hand.

The objective of this paper is to determine the factors of performance of the Tunisian banking system. The empirical analysis using panel data is carried out on a sample of listed Tunisian banks during the period 2000-2013. The results found shows that credit risk, liquidity, size, and credit information’s availability are the main factors of bank performance in Tunisia.

The structure of the paper is as follows: the first section reviews the main work on the determinants of bank profitability. The second section focuses on methodology, definitions of variables and sample. The third section presents the model and the interpretation of empirical results followed by conclusion in final section.

**Literature Review**

The financing of the economy thesis goes back to the writings of Schumpeter (1912), which had emphasized the key role of bankers. These later through, targeting and financing entrepreneurs encourage technological innovation, capital accumulation and thus stimulate growth. The Schumpeterian approach to finance and development is based on the role of banks in terms of productivity growth and technological change. The accumulation of capital is the key to economic growth. Banks must contribute through money creation as well as the mobilization and allocation of savings.

The role of banks in the financing and development of the economy, changes according to the specific conditions of each country. According to McKinnon and Shaw(1973) for developing economies, the state imposed the level of interest rates, used direct instruments of monetary control, imposed higher reserve requirement rate and allocated credit for sector. This situation led to a misallocation of bank resources, corned out the chances of developing the private sector and allowed governments to use seigniorage to finance their budget deficits. Therefore, the banking sector did not ensure its intermediation role. It did not collect savings efficiently and did not provide credit to productive sectors, thus limiting opportunities for investment and growth rates.

At the micro-economic level, Rajan (1998a) shows that the bank holds significant informational advantages over other financial intermediaries. These benefits are related to monopolization the business management system of payments of the economy which is the only one to ensure. Indeed, the conduct and monitoring of deposit accounts enable it to collect private information. This information will then be used to maintain its relationship with its customers (Scialom, 1999), and to know the preference for money to its customers and to pool the risk of sudden withdrawal of deposits. The bank is also seen as a liquidity insurance. In the model of Diamond and Dybvig (1983), the presence of the bank as an alternative to the market is related to the better liquidity assurance that for depositors as well as borrowers.

At the macroeconomic level, the money creation power has two diametrically opposite effects on the real economy. On the one hand, it is beneficial to economic growth to the extent that the financing of productive capital is made from scratch and is no longer subject to ex-ante savings collected. On the other hand, it is harmful for growth because of inflationary pressure effect.

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4 Seigniorage income is defined as the amount of harvested resources by the authorities by issuing more currency "Central Bank" as necessary for private agents and financial intermediaries

5The private information includes: The regular income, consumption patterns, savings capacity, payment incidents, etc.
The bank holds due to its monetary and financial intermediary function, that distinguish from the other financial intermediaries. However, it's considered heart of the instability of the financial system through taking risks sometimes considered excessive.

The risks and dangers are amplified for an economy transiting from a state of autarky to a state of financial openness, resulting in inappropriate deregulation of the banking business. The crises of the 90s of the Southeast Asian countries begin from a banking crisis.

In the same context, Gutentag and Herring (1986) shows that banks behave as "blindness to disaster." Their activity follows a speculative logic which disconnects them from the evolution of income in the real economy. Banks are now drawn into a debt dynamic leading them to be more sensitive to the probability of failure (Scialom, 1999). This dynamic is characterized by an increase in loans granted, supported by the increase in the borrowing capacity of individuals.

Since then, international instances, such as the International Monetary Founds and the World Bank have imposed strict prudential banking regulations to avoid any risk of bank failure. The banks have developed an internal system of analysis and filtering of information required from the borrowers and management of credit risks on the other hand.

Empirically, studies have found mixed results of the relationship between bank performance and its various determinants. The relationship varies according to the particular case of each bank and to the economic, legal and institutional conditions of its environment.

The work of Kwan and Eisenbeis (1996), Altunbas et al. (2004) and Godlewski (2004) have found a negative relationship between the level of risk and bank performance. This indicates that an increase in the level of risk the bank systematically lead to a decline in performance and vice versa. The work of Demirgüç-Kunt and Huizinga (1998) show, using bank data for 80 countries over a period from 1988 to 1995, that bank profitability is linked to macroeconomic and fiscal conditions, prudential regulations, financial structure of banks and underlying legal and institutional conditions. They find that:

i. The most capitalized banks and net interest margins are more profitable

ii. Banks that relied heavily on deposits are unprofitable

iii. Inflation is positively associated with higher interest margins

iv. The effectiveness of the legal and institutional system and the absence of corruption decrease interest margins and affect bank profitability.

This overview of theoretical and empirical literature on the determinants of bank profitability enabled us to formulate the following hypothesis: bank performance is linked to macroeconomic factors specific to the bank and to independent macroeconomic factors as well.

**Research and Methodology**

**Choice of the sample**

An empirical study focusing on determinants bank performance has neglected Tunisian banks in their sample. Thus the choice of examination of the determinants bank performance is carried on all listed Tunisian banks in bourses. These banks are divided into three state banks (BNA, BH and STB), seven private banks (Amen Bank, ATB, Attijari Bank, BIAT, BT, UBCLUIB) and a Mixed Bank (BTE). They represent more than 80% of the Tunisian banking and finance more than ⅛ of the economy.

Table 1 shows that during the period (2000-2013), the bank performance and its determinants vary with the nature of each bank (state banking, private banking or mixed bank). The average growth rate in revenues is 13%. This rate implicitly reflects a slightly reassuring performance. Credit risk is sustainable, it reach 7.45% signaling that the recovery of assets within the time is still achieved. The liquidity ratio is 95.12%. This rate, which is less than unity, is deemed insufficient to meet the bank's obligations at maturity. We note that the state-owned banks (BH, BNA, STB) are less efficient and less liquid than private banks. Similarly, the weight of equity in the capital structure of banks does not exceed 12.5% of total assets. This rate indicates the weakness of the financial autonomy of these banks. On average these banks are called quasi-efficient, less liquid and less risky.

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6 The hypothesis of "disaster myopia" includes the idea of a bias in the estimation of subjective probabilities that bankers give to events that may disrupt their business.

7 According to Article 13 of the Circular 91-24 BCT Banks must always respect a liquidity ratio that cannot be less than 100%
Table 1: Description of variables by banks (average for the period 2000-2013)

| Banks                                | Variables | Growth rate of total assets | Growth rate of net banking income | Credit risk | Liquidity ratio | Equity to total assets “EQTA” |
|--------------------------------------|-----------|-----------------------------|----------------------------------|-------------|-----------------|------------------------------|
| Amen Bank (AB)                       |           | 0,148                       | 0,102                            | 0,087       | 1,013           | 0,088                        |
| Arab Tunisian Bank (ATB)             |           | 0,16                        | 0,127                            | 0,089       | 1,416           | 0,089                        |
| Attijari Bank                        |           | 0,111                       | 0,08                             | 0,06        | 1,076           | 0,077                        |
| Housing Bank (BH)                    |           | 0,094                       | 0,058                            | 0,061       | 0,818           | 0,075                        |
| Arab International Bank of Tunisia (BIAT) |   | 0,105                       | 0,078                            | 0,065       | 1,307           | 0,131                        |
| National Agricultural Bank (BNA)     |           | 0,08                        | 0,059                            | 0,068       | 0,881           | 0,089                        |
| Bank of Tunisia (BT)                 |           | 0,097                       | 0,063                            | 0,068       | 0,868           | 0,154                        |
| Tunisia and Emirates Bank (BTE)      |           | 0,308                       | 0,388                            | 0,036       | 0,342           | 0,378                        |
| Tunisian Society Banks (STB)         |           | 0,087                       | 0,051                            | 0,077       | 0,850           | 0,088                        |
| Union Bank for Trade and Industry (UBCI) | | 0,094                       | 0,047                            | 0,091       | 0,945           | 0,114                        |
| International Union of Banks (UIB)   |           | 0,435                       | 0,376                            | 0,117       | 0,948           | 0,085                        |
| Mean                                 |           | 0,156                       | 0,13                             | 0,075       | 0,951           | 0,124                        |

Source: author’s work

Variables: definitions and measurements

*Endogenous variable:* the banking performance is measured by the rate of growth in Net Banking Income (NBI) which is equal to the banking operations months banking expenses

*Explanatory variables:* six variables are used to identify the determinants of bank performance. These variables are related to the specific characteristics of the bank and to its macroeconomic and institutional environment.

Variables specific to the bank

*Credit Risk:* is the most alarming risk to the bank. It reflects the importance of its non-performing debts. Effective management of credit risk is very important for the survival and stability of banking institutions. For the assessment of this risk, banks must distinguish their balance sheet assets and off-balance sheet in to:

- Assets "Current" means assets having a full recovery in time.
- Assets "classified" according to the risk of loss and the probability of recovery.

*Class 1:* Assets requiring special monitoring:

*Class 2:* uncertain Assets

*Class 3:* Assets of concern or threatened

*Class 4:* Active or bad compromise

*Size:* large banks are more accommodated in the consolidation and financing of the economy and less vulnerable to imperfect competition. Indeed, we consider that the total assets of Tunisian banks, which consist largely of customer deposits, have a positive effect on the bank performance. However, this effect can be reversed if the deposits are used for speculative purposes.

*Liquidity Ratio:* structure is an important indicator for the bank. Liquidity allows the bank to meet its obligations and to fulfill its economy finance function. Indeed, a high liquidity ratio increases the banking performance.

*Financial Structure:* it is measured by the ratio of "equity relative to total assets". This ratio reflects the financial autonomy of the bank. It determines the distribution of its sources of financing between debt and equity. Thus, the more this ratio is, the less the bank is risky and the bank's profitability is low.
Variable of monetary stability (Inflation): Price stability is essential for several reasons. First, if inflation is low, the target of positive real interest rates is reached. Then, in a moderate and low volatile inflation environment, nominal interest rates are not excessively high and permit for avoid the problem of bankruptcy of indebted financial institutions. Banks are no longer forced to engage in a price war to attract the maximum deposits. Thus, a high inflation rate may affect the bank interest margin.

Institutional Variable: Index of Credit Information: The extent of the availability and reliability of the information provided by private and public organizations facilitates the bank crediting decision. An increase in this range, reduces the information asymmetry between informed investors and uninformed. In this context, uninformed investors abandon the search for private information that becomes costly. These results have practical relevance as well as for the stock agencies of companies, especially banks. According to the World Bank, the index of credit information varies from 0 to 8. The higher the value, the greater the credit information is available.

In summary, Table 2 shows the measurement and the expected impact of all variables in the model.

Table 2: definition and measurement of variables

| Variables                          | Proxy                                                                 | Predicted coefficient sign |
|-----------------------------------|-----------------------------------------------------------------------|-----------------------------|
| **Dependant variable**            |                                                                       |                             |
| bank performance, noted “NBI”     | measured by the rate of growth in net banking income (NBI) which is equal to the banking operations months banking expenses | -                           |
| **Independent variables**         |                                                                       |                             |
| Credit risk, noted "credit risk"  | Estimated by the ratio between provisions and outstanding credit to the customer | Negative                    |
| Liquidity, noted "liquidity"      | Estimated by the ratio between loans and customer loans               | Positive                    |
| Size, noted "size"                | Estimated by total assets growth rate                                | Positive                    |
| Financial structure, noted "EQTA" | Estimated by the ratio 'equity relative to total assets               | Positive                    |
| Index of credit information, denoted "information" | The index ranges from 0 to 8. The higher the value, the greater the credit information is available and reliable. | Positive                    |
| Inflation, noted "inflation"      | Estimated by the general price index to the consumer                 | Uncertain                   |

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*All variables are from World Development Indicators (WDI), the Central Bank of Tunisia (BCT), the professional association of Tunisian banks (APBT) and annual reports of listed Tunisian banks in stock market from 2000 to 2013.*
Estimate model

The consideration of individual data prior leads us to estimate panel data to better understand the factors that explain the bank performance. Our empirical analysis is based on annual data for a sample of eleven listed banks over the period 1990-2013.

The general model specification takes the following form:

\[ y_{it} = \alpha_i + \beta \text{VE}_{it} + \varepsilon_{it}, \]

where, Y\text{it} is the growth rate of net banking income (NBI), VE is he explanatory variables and \( \varepsilon_{it} \) is the error term, with \( E(\varepsilon_{it}) = 0 \) and \( E(\varepsilon_{it}^2) = \sigma^2_{\varepsilon} \).

First, we test the existence of a common assumption of constant for all banks

\[ (H_0 : \alpha_i = \alpha \ \forall \ i \in [1, 11]). \]

If this hypothesis is rejected, we obtain the following model with individual effects:

\[ y_{it} = \alpha_i + \beta \text{VE}_{it} + \varepsilon_{it}, \]  

(1);

\[ \varepsilon_{it} = u_i + \epsilon_{it}, \]  

\( u_i \rightarrow iid \)

The test result of the individual effects follows a Fisher statistic F (10, 122) which is equal to 0.71. At a degree of risk of 5% we accept the null hypothesis of equality of constants \( \alpha \) (p-value= 5%). Therefore it is necessary to introduce the individual effects of each bank. The structure of the panel is completely homogeneous (pooled model). The final specification of the model is as follows:

\[ y_{it} = \alpha + \beta \text{VE}_{it} + \varepsilon_{it}, \]  

(2)  

\( \forall \ i \in [1, 11], \forall \ t \in [1990, 2013] \)

Results and Discussion

The estimation results\(^9\) of Models 1 and 2 are summarized in Table 3:

- **Model 1** expresses the banking performance based on specific variables to the bank:
  \[ Y_{it} = \beta_1 \text{credit risk}_i + \beta_2 \text{Liquidity}_i + \beta_3 \text{size}_i + \beta_4 \text{inflation}_i + \beta_5 \text{information}_i + \epsilon_{it}, \]  
  \( \forall \ i \in [1, 11], \forall \ t \in [1990, 2013] \)

- **Model 2** expresses the banking performance based on all variables:

\[ Y_{2it} = \beta_1 \text{credit risk}_i + \beta_2 \text{Liquidity}_i + \beta_3 \text{size}_i + \beta_4 \text{inflation}_i + \beta_5 \text{information}_i + \epsilon_{it}, \]  

\( \forall \ i \in [1, 11], \forall \ t \in [1990, 2013] \)

\(^9\) The results of Models 1 and 2 are derived with poled ordinary least squares (OLS) using STATA 2013

\[ Y_{it} \]

\[ Y_{2it} \]

Table 3: Estimate Results

| VARIABLES                | Model 1                  | Model 2                  |
|-------------------------|--------------------------|--------------------------|
| Credit risk             | -0.478***                | -0.532***                |
|                         | (0.127)                  | (0.127)                  |
| Liquidity               | 0.249***                 | 0.311***                 |
|                         | (0.0924)                 | (0.0941)                 |
| Size                    | 0.367***                 | 0.350***                 |
|                         | (0.0523)                 | (0.0520)                 |
| EQTA                    | 0.0990                   | 0.0714                   |
|                         | (0.113)                  | (0.112)                  |
| Information             | 0.181**                  | 0.0702                   |
|                         | (0.138)                  |                          |
| Inflation               | -0.0525                  | -0.347                   |
|                         | (0.462)                  | (0.502)                  |
| Constant                | -0.0525                  | -0.347                   |
|                         | (0.462)                  | (0.502)                  |
| Observations            | 139\(^{10}\)             | 139                      |
| R-squared               | 0.399                    | 0.428                    |

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

The results in Table 3 show that except for the inflation rate, credit risk, liquidity, size and quality of information are significant and have the expected sign:

i. **Credit risk is negative and significant (-4.18).** This result shows that poor management of assets classified led to increased credit risk and therefore a loss on the interest margin. This credit risk is sustainable\(^{11}\) for the recovery of debts of the bank at maturity; it requires special monitoring because of the importance of its harmful impact on bank profitability.

ii. **The liquidity ratio is positive and significant (3.3).** It means that monetary availability improves bank performance. While a lack of liquidity may result in an inability of the bank to meet its obligations and its cash commitments to creditors at maturity.

\(^{10}\)Taking the logarithm of the variable has eliminated negative ones of the sample. Thus the number of observations has dropped from 154 to 139.

\(^{11}\) On average the risk is equal to 7.43% for all banks. It is part of class 1 (active requiring special monitoring).
Empirical analysis show that the credit risk management, liquidity, size, and disclosure of credit information are the main determinants of bank performance in Tunisia. Thus in 2011, the monetary authorities in the central bank case, responded to implement a process of reforms aimed at monitoring and supervision of these indicators to ensure the durability and performance of banks. These reforms need to be continued and strengthened through the establishment of good governance and effective legal and institutional environment. However, the introduction of these reforms should be progressive, gradual and timed manner according to the characteristics and specificities of each bank. Their positive impact on value creation, optimal resource allocation and risk diversification requires that the choice of these reforms come from the needs of the economy.

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