THE EFFECT OF THE BOARD OF DIRECTORS ON THE PERFORMANCE: CASE OF TUNISIAN BANKS

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Abstract

The board of directors plays a crucial role as an internal structure of corporate governance. Certainly, its efficiency is needy on the existence of numerous issues; the greatest significance is correlated to its characteristics that relay principally to the individuality of its memberships, board dimension, combining the purposes of pronouncement and regulator as well the grade of the individuality of the audit board and the diverse gender of the committee. To assess the authenticity of our assumptions, which stipulate the presence of deterministic characteristics of the committee on the profitability of Tunisian banks, we evaluated by three different ratios i.e., ROA (return on asset), ROE (return on equity), and MP (market performance); and we estimate three models with linear regressions. The empirical findings were performed on a data sample composed of 11 Tunisian banks listed on the Stock Exchange of Tunisia (SET) during the period from 1999 to 2018. From the estimated regressions, we find a satisfactory outcome indicating the significance of the influence of the characteristics of the committee on the banking performance in Tunisia. Then, the percentage of outside directors negatively affects the level of the financial performance of banks. The number of institutional administrators performs an essential role in improving financial performance. Finally, the duality of the Presidency of the Council General-Directorate has a negative effect on the level of stock market performance of Tunisian banks.

Keywords: Board, Economic Performance, Market Performance, Financial Performance

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1. INTRODUCTION

Beginning in the 1990s, corporate governance emerged as a system that could guarantee the efficiency of the firm, while preventing managers from "disobeying" shareholders. Indeed, if corporate governance has emerged, it is mainly because of conflicts of interest that arise between shareholders and managers and which hamper the growth of the company.

The agency theory describes these conflicts of interest and explains their consequences while proposing solutions to align the interests of managers with those of shareholders. This conflicting relationship between the shareholder and the manager is called an agency relationship. Jensen and Meckling (1976) define the latter as a contract by which one or more persons (the principal) engage another person (the agent) to perform on his behalf any task which involves the delegation of a certain power to decision to officer. According to these authors, asymmetric information is the main cause of agency conflicts since information is not accessible to all parties. The manager has an informational advantage compared to the shareholder since the latter delegates his decision-making power to the former. Consequently, shareholders are faced with two forms of opportunism on the part of managers, namely: adverse selection (asymmetry of information relates to the professional skills of the manager) and moral hazard (asymmetry information relates to the manager's desire to respect his commitments ex-post). These agency conflicts generate three types of agency costs: the monitoring costs borne by the shareholder, the bond costs borne by the manager, and the residual losses which represent the losses that persist despite control exercised by the shareholder and the manager's commitment.

Most studies in the field of finance on the governance phenomenon ignored the problems of governance in banks (Onyina & Gyanor, 2019; Grove, Clouse, & Xu, 2019; Braendle, Stiglbauer, Ababneh, & Dedousis, 2020). Thus, previous studies examining the effectiveness of the board as a bank governance mechanism in the banking systems of the emerging countries are not numerous. However, this issue is more important for several reasons.

First, banks play a critical role in the economies of countries. They play a crucial role in any economy because they are in close contact with several economic agents operating in a country. Then, the following change in the international context of globalization, liberalization, deregulation of financial systems, the adoption of new banking technologies, and the onset of crises affecting the operation of banks.

Tunisia is a country in which the banking sector is the core of the financial system. Indeed, despite the structural changes in the financial system that have strengthened the role of the Tunisian financial market since the liberalization of the eighties, bank intermediation is still the main method of financing of the Tunisian economy. The Tunisian banking group is the most important center of the Tunisian financial system. In view of all these considerations, it is then important to look closely at the impact of boards and their effects on the performance of Tunisian banks.

Subsequently, this paper is devoted to the analysis of the effect of the boards on the banking performance in Tunisia. The empirical findings were presented on a data sample of 11 Tunisian banks during the period of study from 1999 to 2018. The empirical findings show that the percentage of outside directors negatively affects the level of the financial performance of banks. The number of institutional administrators shows an essential part of improving financial performance. Finally, the duality of the Presidency of the Council General-Directorate has a negative effect on the level of stock market performance of Tunisian banks.

To do so, our paper is organized as follows. Section 2 presents a review of literature that examines the effect of boards on banking performance. In Section 3, we present data and hypotheses. The model is presented in Section 4. In Section 5, we present the empirical findings of our study. Finally, Section 6 concludes.

2. LITERATURE REVIEW

The financial literature research revealed several mechanisms to protect the interests of shareholders. Thus, the Board plays a most important role in guaranteeing the benefits of shareholders (Labelle & Raffournier, 2000). In addition, the committee performs an essential part in the commission funds, deciding tactical alternatives and particularly in the resolution of disputes of interest among administrators and investors within a firm.

In fact, the literature has emphasized the effectiveness of committee autonomy as a method that diminishes the latitude of the director and his resourcefulness. In this regard, many studies have demonstrated that a great percentage of autonomous executives on the committee increases the value of the journal of the financial indicators of a company and subsequently the existence of an improvement in performance (Chen & Jaggi, 2000). Indeed, outside directors may object to the decisions taken freely by the officer or by inside directors. These members of the biggest reasons for decisions favoring wealth maximization of stakeholders in a company.

Experimental investigations on the link among committee structure and profitability of a bank are much since undivided. Numerous preceding investigations have demonstrated that the existence of external or internal managers or sometimes public have a significative and positive impact on banking performance such as the findings Lee Rosenstein, Rangan, and Davidson (1992) who demonstrate that the existence of outside managers to safeguard the benefits of investors while they were in the case of organization disagreement.

According to Black, Jang, and Kim (2006) and Lefort and Urzúa (2008), the growth in the total of managers on the committee supports positively the profitability of the company. Additionally, Kor, Mahoney, and Watson (2008) find that the directors have excellent abilities and they affect positively the firm's profitability. Adeabah, Gyeke-Dako, and Andoh (2019) use data for 21 banking companies during the period from 2009 to 2017. From their empirical findings, they show that the number of board members could improve bank efficiency.

Hermalin and Weisbach (1991), Bhagat and Black (2002), and Klein (2002) advantage to a non-significant correlation amongst the portion of

managers and the firm's performance. Alqatamin Aribi, and Arun (2017) investigate the connection among directors' age for non-family versus family enterprises and earning management. From their empirical findings, they conclude that directors' age has no association together with earning management.

Coles, Daniel, and Naveen (2008) indicate that internal administrators can additionally increase the firm's importance because they have gain access to appropriate data and have the firm's information. Staikouras, Staikouras, and Agoraki (2007) conclude that there is a statistically significant relationship between the proportion of internal and external directors and bank performance, measured in terms of Tobin's Q, ROA, and ROE.

Elbahar (2019) examines the nexus among corporate governance's (GC) indicators exemplified by board characteristics and bank performance calculated by ROE and ROA in GCC banking sector. For the objectives of this analysis, the sample of 68 banks in gulf countries throughout the period from 2013 to 2017 has been chosen and distributed the data to Islamic banks and conventional banks. Their empirical findings indicate that the audit committee correlated positively and significantly with bank performance, it implies that the audit committee in the latest years shows a crucial role in improving the performance.

Karamoy and Tulung (2020) examine empirically the impact of financial performance and the application of corporate governance on the non-bank financial industry stock prices on the Indonesia Stock Exchange during the period from 2012 to 1016. The study population comprises the non-bank financial industry listed in IDX, as many as 37 firms. His paper shows that the possibility, managerial ownership, institutional ownership, and the structure of the independent commissioner partly and concurrently does not significantly affect the stock price of the non-bank financial firms.

Fiandrino, Rizzato, Busso, and Devalle (2019) examine the link among non-financial information (NFI) mandatory disclosure and ownership concentration in the Italian framework, which is categorized by pyramidal groups and high-level ownership concentration. Furthermore, it attracts intuitions on the controversial findings of the link among ownership structure and corporate social responsibility (CSR) when the revelation around sustainability problems develops compulsory.

Merendino and Melville (2019) examine the relationship between board structure and firm performance in the context of Italian listed companies over the period from 2003 to 2015. They find that directors elected by marginal investors are not capable to influence performance; independent executives do have a non-linear influence on firm performance. They find also that board size has a positive impact on company performance for smaller concentrations of board size. They conclude that ownership structure and shareholder contracts do not influence company performance.

3. DATA AND HYPOTHESIS

The purpose of this paper is to examine the impact of the board composition on the banking performance in Tunisia. The database utilized in our paper has been obtained from the data of the Central Bank of Tunisia (CBT), the Tunisian Professional Association of Banks and Financial Institutions (TPABFI), and the Stock Exchange of Tunisia (SET).

Thus, our sample comprises the most important commercial banks in the banking system of Tunisia (11 banks) through the period of study from 1999 to 2018. The list of used banks is the following:

- Amen Bank (AB);
- Arab Tunisian Bank (ATB);
- Attijari Bank of Tunisia (ABT);
- The Housing Bank (BH);
- International Arab Bank of Tunsia (BIAT);
- Bank of Tunisia (BT);
- The National Agricultural Bank (BNA);
- The Tunisian Banking Company (STB);
- Union Banking of Trade and Industry (UBCI);
- The International Banking Union (UIB);
- Bank of Tunisia and Emirates (BTE).

In fact, we chose these banks because they account for more than 90% of the total assets of Tunisian banks in 2018, and 91.5% of loans granted to the economy.

Furthermore, the empirical test is concerned with the measurement of the impact of the board on the performance of Tunisian banks.

In addition, the present investigation is the examination of the effect of the board composition on the profitability of Tunisian banks. This impact can be observed in several variables, such as variables related to the specific characteristics of banks and variables that are related to the board of directors. In this context, the hypothesis to be tested is one that checks for the existence or not of influence of the board composition on the banking performance in Tunisia. Then, the research assumptions of our study are the following:

Hypothesis 1 (H1): The board of directors' composition can influence the economic performance (ROA) of banks in Tunisia.

Hypothesis 2 (H2): The board of directors' composition can influence the financial performance (ROE) of banks in Tunisia.

Hypothesis 3 (H3): The board of directors' composition can influence the market performance (MP) of banks in Tunisia.

4. MODEL

The problem of the study of banking performance is developed by several researchers. On one hand, there are studies on banking systems relative and specific to countries such as Colombia (Barajas, Steiner, & Salazar, 1999), Malaysia (Sufian, 2009), and Tunisia (Ben Naceur & Goaied, 2001). On the other hand, there are comparative studies on a range of countries such as European banks (Molyneux & Thornton, 1992), developed countries, and developing (Demirgüç-Kunt & Huizinga, 1999) and the countries of the MENA region (Ben Naceur & Omran, 2011). All of these studies are developed based on multiple methods and techniques of research and investigation data while focusing on the various measures of bank performance such as ROE (return on equity), ROA (return on assets), FP (financial performance), and NIM (net interest

margin) while exploiting several internal and external explanatory variables in the bank.

In our paper, we use three measures of bank performance:

- The $ROA_{i,t}$ (return on assets): the return on assets, which measures the ratio among the net income, and the total assets of the bank *i* at time *t*. It expresses the economic profitability (Demirgüç-Kunt & Huizinga, 1999).
- The $ROE_{i,t}$ (return on equity): the return on equity, which is the ratio of net income to the bank's equity *i* at time *t*. It expresses financial profitability.
- The $MP_{i,t}$ (market performance): This is the ratio of the market value of assets and the book value of the assets of the bank *i* at time *t*.

The explanatory variables are divided into two categories:

1. The variables that represent specific characteristics of banks or control:

- $END_{i,t}$: This is the ratio of total loans and the bank's total asset *i* at time *t*. If this ratio is high, it is associated with the highest net interest margins. Thus, this ratio allows the improvement of banking income as the loans are riskier.
- $ASSET_{i,t}$: This variable measures the natural logarithm of total assets of bank *i* at period *t*. The size of each bank could be a significant determining factor of banking performance in case size increases the profitability of a bank. However, the size could have a negative impact when banks become extremely large and due to bureaucratic reasons.

2. The variables related to the board:

- $TAILC_{i,t}$: This variable indicates the size of the board of executives. It equals the number of directors in the bank *i* at time *t*.
- $ADEXT_{i,t}$: The percentage of outside directors. It is the ratio between the number of outside directors and the total number of directors of the bank *i* at time *t*.
- $ADINST_{i,t}$: The percentage of institutional administrators. It is the ratio between the number of institutional administrators and the total number of directors of the bank *i* at time *t*.
- $ADETR_{i,t}$: The percentage of foreign directors. It is the ratio between the number of foreign directors and the total number of directors of the bank *i* at time *t*.
- $STATE_{i,t}$: The percentage of directors representing the state. It is the ratio between the number of directors representing the state and the total number of directors of the bank *i* at time *t*.
- $ADETP_{i,t}$: The percentage of directors representing public institutions. It is the ratio between the number of directors representing the public and the total number of directors of the bank *i* at time *t*.
- $DUAL_{i,t}$: This is the board chair duality general direction of bank *i* at moment *t*. This is a dummy variable that is equal to 1 if duality and 0 if not.

For the empirical analysis, we chose three measures of bank performance. Indeed, these three steps will be estimated by two models which are as follows:

Model 1:

$$ROA_{i,t} = \alpha_0 + \alpha_1 TAILC_{i,t} + \alpha_2 ADEXT_{i,t} + \alpha_3 ADINST_{i,t} + \alpha_4 ADETR_{i,t} + \alpha_5 STATE_{i,t} + \alpha_6 ADETP_{i,t} + \\ + \alpha_7 DUAL_{i,t} + \alpha_8 ASSET_{i,t} + \alpha_9 END_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where α_i measures the coefficients of the explanatory variables (where $i = 1, ..., 9$), α_0 indicates a constant, i indicates the index for each bank (where $i = 1, ..., 11$), t indicates the period (where $t = 1, ..., 20$) and $\varepsilon_{i,t}$ measures the error term for bank *i* at time *t*.

Model 2:

$$ROE_{i,t} = \beta_0 + \beta_1 TAILC_{i,t} + \beta_2 ADEXT_{i,t} + \beta_3 ADINST_{i,t} + \beta_4 ADETR_{i,t} + \beta_5 STATE_{i,t} + \beta_6 ADETP_{i,t} + \\ + \beta_7 DUAL_{i,t} + \beta_8 ASSET_{i,t} + \beta_9 END_{i,t} + \epsilon_{i,t} \quad (2)$$

Where β_i presents the coefficients of the explanatory variables (where $i = 1, ..., 9$), β_0 presents a constant, i indicates the index for every bank (where $i = 1, ..., 11$), t the time (where $t = 1, ..., 20$) and $\epsilon_{i,t}$ measures the error term for bank *i* at time *t*.

Model 3:

$$MP_{i,t} = \theta_0 + \theta_1 TAILC_{i,t} + \theta_2 ADEXT_{i,t} + \theta_3 ADINST_{i,t} + \theta_4 ADETR_{i,t} + \theta_5 STATE_{i,t} + \theta_6 ADETP_{i,t} + \\ + \theta_7 DUAL_{i,t} + \theta_8 ASSET_{i,t} + \theta_9 END_{i,t} + \omega_{i,t} \quad (3)$$

Where θ_i indicates the coefficients of the explanatory variables (where $i = 1, ..., 9$), θ_0 is a constant, i implies the index for every bank (where $i = 1, ..., 11$), t indicates the time (where $t = 1, ..., 20$) and $\omega_{i,t}$ reveals the error term for bank *i* at time *t*.

Therefore, the data employed in the computation for all used indicators are achieved from the yearly statements of the Central Bank of Tunisia (CBT), the Tunisian Professional Association of Banks and Financial Institutions (TPABFI) and Stock Exchange of Tunisia (SET).

5. EMPIRICAL RESULTS

In this part, we aim to analyze and explain the various results achieved from the estimates model on the three performance measures of Tunisian banks (ROA, ROE, and MP).

First, we indicate the type of estimations which is a regression on panel series. This preference is supported by the existence of two proportions in the used series; the first is the period (over 20 years) and the second is individual (the employed sample is

composed of 11 Tunisian banks registered in Tunisian Stock Exchange Market).

Table 1 (see Appendix) summarizes the descriptive statistics for every indicator utilized in our study. The ROA indicator, which indicates the economic profitability of Tunisian banks, can reach a maximum rate of 0.029. However, his minimum rate is equal to (-0.1035052) which implies deficit results in Tunisian banks. The risk level is assessed by the standard deviation which is equal to 0.16.

The ROE variable, which expresses the financial profitability of Tunisian banks, can attain a maximum rate of 1.6489452 and a minimum rate of (-0.77). The risk level of these indicators is assessed by the standard deviation which is equal to 0.004. Therefore, equity performance (ROE) is more volatile than economic performance (ROA).

The MP variable, which expresses the market profitability of Tunisian banks, can attain a maximum rate of 0.033 and a minimum rate of 0.0007. The risk issued by this variable is calculated by the standard deviation which is equal to 0.006600. Then, the market profitability is less volatile than the other two performance measures for the case of Tunisian banks.

In the present research, we conduct a test of the correlation between the different variables used. Table 2 (see Appendix) summarizes the results for the correlation. Furthermore, the results indicate no correlation coefficient is great than the tolerance limit which is equal to 0.7. These findings imply the absence of autocorrelation problems in the estimation of the three models ROA, ROE, and MP.

Then, Table 4, Table 5, and Table 6 (see Appendix) summarize respectively, the empirical results of the estimation of the three selected models ROA, ROE, and MP).

So, the panel series structure is homogeneous because we use a sample composed of Tunisian banks. Then, we can employ the OLS methodology (ordinary least square) which permits a clearer fitting by reducing the totality of squared error terms. Thus, we estimate three models in which we use three measures of banking performance such as ROA, ROE, and MP as a dependent variable. The results of the OLS methodology of the three models employed to assess banking performance are presented in Tables 4, 5, and 6.

We operate the test of the unit root for a panel series. Thus, we apply the test of Levin-Lin-Chu. The null hypothesis (*H0*) of this test suggests that all series are non-stationary and the alternate *H1* of this test supposes that all series are stationary. The recognition or denial of *H0* is founded on the importance rate of the p-value relative to this test. This p-value is contrasted to a threshold of 10%. If this p-value is fewer than a threshold of 10%. So, we reject *H0*. Then, if this p-value is superior to a threshold of 10%, thus we accept *H0*. Table 4 summarizes the empirical findings of the test of the unit root of the used indicators in our study. From this table, we find that all utilized indicators have a p-value inferior to a threshold of 10%. In this situation, we reject *H0* and we admit that all the utilized variables are stationary. However, for the dummy variable, we assume that this variable is stationary without a unit root test.

For the problem at every estimate is the selection of the estimation techniques, the model with a fixed effects model, or model with a random effects model. Consequently, the resolution considered in this dilemma is the Hausman test that allocates selecting amongst assessing with a fixed effects model and assessing with a random effects model.

The selection of the model to be assessed is founded on the contrast of the p-value of the Hausman test related to a threshold of 10%. If the p-value of the test is inferior to a threshold of 10%, in this case, we select the model with fixed effects. Then, if the p-value of the Hausman test is superior to a threshold of 10%, therefore we choose the model with random effects.

In Model 1, we find that the p-value of the Hausman test is superior to a threshold of 10% (0.8805), then the random effects specification is better to the specification with fixed effects. In Model 2, we show that the p-value of the Hausman test is inferior to a threshold of 10% (0.0000), then the fixed effects specification is suitable than the specification with random effects In Model 3 we remark that the p-value of the Hausman test is superior to a threshold of 10% (0.4305), the random effects specification is suitable than the specification with fixed effects.

Furthermore, we use more tests to validate our estimate models and to explain the importance and the significance of utilized indicators. We examine the correlation among the independent variables and error terms. This test is founded on the p-value of (Prob > chi^2). If this p-value is inferior to a threshold of 5%, then we accept *H0* which confirms the non-existence of correlation amongst the error terms and the independent variables. Also, if this p-value is superior to a threshold of 5%, then we have a problem of connection among the error terms and the independent variables that must be resolved. In all used specifications, the p-value (Prob > chi^2) are all inferior to a threshold of 5%. Then, we have the absence of the problems of connection among the independent variables and the error terms.

The test of significance of the used models is founded on the p-value of the Fisher test. Based on the empirical findings, we find that all p-values are inferior to a threshold of 5% in all estimated models. Then, we can admit that all estimated models are significant.

Furthermore, we show that the coefficients of determination in the three estimated models are superior to the value of 0.60. So, we can confirm that all estimated specifications are characterized by a good linear fitting.

Table 4 (see Appendix) summarizes the estimation results of the first model (ROA), it was noted that there is only one significant variable. The first is the ASSET variable is statistically significant and positive at a threshold of 1%. In this context, the ASSET variable has a positive impact on the economic viability of Tunisian banks. Therefore, the impact of size on the profitability of banks is relevant, there is an optimal level of bank assets that achieve maximum profitability.

The other variables have no significant impact on the economic performance of Tunisian banks. Primarily, the variables related to the board have a relative or sometimes nonexistent impact on the economic performance of Tunisian banks. In this case, we can reject *H1* which supposes that the

board of directors' composition can influence the economic performance (ROA) of banks in Tunisia.

Table 5 (see Appendix) recaps the estimate for the second measure bank performance (ROE), we choose the estimation with fixed effects specification. According to the estimation results, we find that there are three significant variables.

First, the ADEXT variable has a negative impact on the financial performance of Tunisian banks. This variable is significant at a threshold of 10%. In this case, we show that in the Tunisian banks the percentage of outside directors negatively affects the level of the financial performance of banks.

Then, the ADINST variable which measures the percentage of institutional directors has a positive influence on the financial performance of Tunisian banks. This variable is statistically significant at a threshold of 5%. In this context, the number of institutional administrators plays an important role in increasing the financial performance of Tunisian banks.

Finally, the variable END which measures the level of indebtedness of the bank has a positive effect on the financial performance of Tunisian banks. The variable END is significant at a threshold of 5%. This positive impact is justified by good management and proper monitoring of debt operations since loans are assets with the greatest share of operating costs banking portfolio.

Also, in the second model, we notice that there are two variables related to the board that impacts the financial performance of Tunisian banks. In this case, we can accept *H2* which supposes that the board of directors' composition can influence the financial performance (ROE) of banks in Tunisia.

In Model 3, we adopt the estimation with random effects specification. In this model, there are two significant variables. The first variable DUAL has a negative and significant effect on the stock market performance of Tunisian banks. This variable is significant at a threshold of 5%. In this case, the duality of the Presidency of the Council General-Directorate has a negative effect on the level of stock market performance of Tunisian banks.

The second variable is the ASSET variable which is statistically significant and positive at a threshold of 1%. In this context, the ASSET variable has a positive impact on the economic viability of Tunisian banks. Therefore, the impact of size on the profitability of banks is relevant is to say, there is an optimal level of bank assets that achieve maximum profitability.

In Model 3, we notice that the board has an impact on the performance of Tunisian banks. In this case, we can accept *H2* which supposes that the board of directors' composition can influence the market performance (MP) of banks in Tunisia.

Finally, our study aims to examine the impact of the board of directors' composition on the performance of Tunisian banks. According to the empirical results obtained in our paper, we can conclude that the structure of the board of directors' affects the performance of Tunisian banks.

6. CONCLUSION

In this paper, the analysis of the influence of the directors' composition on the performance of a firm was based on an investigation for 11 Tunisian banks listed on the stock exchange of Tunisia (SET) during the period of study from 1999 to 2018.

In this study, we utilize three measures of banking performance such as ROE (return on equity), ROA (return on assets), and MP (market performance) to evaluate the profitability of Tunisian banks. From the empirical findings, we show that the percentage of outside directors and the duality of the Presidency of the council general directorate has a negative impact on the performance of Tunisian banks. However, the percentage of institutional directors and the level of indebtedness of the bank have a positive in the performance of Tunisian banks.

We also found that the size of the board of directors and that of the audit committee, as well as their respective degrees of independence, influence the financial performance of Tunisian banks. In addition, according to our results, duality has an impact on the performance of Tunisian banks. The latter can, therefore, combine or dissociate the functions of chief executive officer and chairman of the board of directors, and consequently, this has an impact on their performance.

A possible extension of this work is to study the impact of the board of directors on the performance of Tunisian firms listed in the stock exchange of Tunisia since our study is limited to the performance of Tunisian banks only. It would, therefore, be interesting to analyze the signal effect exerted by the characteristics of the board of directors on Tunisian companies.

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APPENDIX

Table 1. The descriptive statistics of used indicators

Indicators	*Obs.*	*Mean*	*Maximum*	*Minimum*	*Std. Div*	*Skewness*	*Kurtosis*
ROA	220	0.0091993	0.0291264	-0.103505	0.0127997	-6.221889	52.41313
ROE	220	0.0874525	1.6489452	-0.777776	0.16879521	3.52515	52.73615
MP	220	0.0116145	0.0330853	0.0007537	0.0066267	1.285867	4.463816
TAILC	220	14.72121	19	11	2.117257	-0.017753	2.202136
ADEXT	220	0.3392655	0.6363636	0.1578947	0.1253785	0.8122107	2.874667
ADINST	220	0.2093011	0.4615385	0.0526316	0.0963024	0.6055367	2.545523
ADETR	220	0.1833321	0.5	0	0.1452021	0.443283	2.081762
STATE	220	0.1358422	0.5	0	0.1360707	1.003339	3.106278
ADETP	220	0.1177393	0.5	0	0.1368849	1.285869	3.67747
DUAL	220	0.5030303	1	0	0.5015129	-0.012121	1.000147
ASSET	220	14.66784	17.20832	12.38582	0.9022772	-0.239913	4.134485
END	220	0.7721087	1.836772	0.4428743	0.1302021	2.985973	29.01075

Source: Own elaboration.

Table 2. The correlation matrix

	ROA	***ROE***	***MP***	***TAILC***	***ADEXT***	***ADINST***	***ADETR***	***STATE***	***ADETP***	***DUAL***	***ASSET***	***END***
ROA	1.0000											
ROE	0.2773 (0.0003)*	1.0000										
MP	0.2978 (0.0001)*	0.1443 (0.064)***	1.0000									
TAILC	-0.0428 (0.5850)	0.1231 (0.1151)	0.1313 (0.0927)***	1.0000								
ADEXT	-0.0687 (0.3806)	-0.0423 (0.5896)	-0.1335 (0.0873)***	-0.6679 (0.0000)*	1.0000							
ADINST	0.0916 (0.2422)	-0.1703 (0.0288)**	-0.2745 (0.0004)*	-0.4005 (0.0000)*	0.4233 (0.0000)*	1.0000						
ADETR	0.1169 (0.1347)	0.0532 (0.4971)	-0.0061 (0.9380)	0.0929 (0.2351)	-0.5250 (0.0000) *	-0.5659 (0.0000)*	1.0000					
STATE	0.0525 (0.5030)	0.1661 (0.0330)**	0.0941 (0.2295)	0.0008 (0.9915)	-0.2846 (0.0002) *	-0.6892 (0.0000)*	0.8206 (0.000)*	1.0000				
ADETP	0.1380 (0.0771)***	0.1454 (0.062)***	0.1605 (0.0395)**	-0.0208 (0.7908)	-0.3538 (0.0000)*	-0.6892 (0.0000)*	0.8477 (0.000)*	0.9314 (0.000)*	1.0000			
DUAL	0.0030 (0.9694)	-0.0046 (0.9536)	-0.1070 (0.1712)	0.0065 (0.9335)	0.0434 (0.5800)	0.0281 (0.7201)	-0.0754 (0.3356)	-0.0627 (0.4238)	-0.0651 (0.4058)	1.0000		
ASSET	-0.1067 (0.1725)	-0.2480 (0.0013)*	0.3583 (0.0000)*	-0.0129 (0.8689)	-0.0259 (0.7414)	-0.4580 (0.0000)*	0.1947 (0012)**	0.2166 (0.005)*	0.2385 (0.0020)*	-0.0192 (0.8067)	1.0000	
END	0.0497 (0.5257)	0.3530 (0.0000)*	-0.0538 (0.4929)	0.0669 (0.3932)	-0.0692 (0.3774)	-0.1154 (0.1399)	0.1005 (0.1988)	0.1758 (0023)**	0.1143 (0.1438)	0.0198 (0.8009)	0.0841 (0.2826)	1.0000

Note: (*), (**) and (***) are a significant value at a threshold of 1%, 5% and 10%, respectively.
Source: Own elaboration.

Table 3. The test of unit root

Indicators	***t-statistic***	***p-value***
ROA	-6.6534	0. 0000
ROE	-7.8694	0. 0000
MP	-5.9001	0. 0000
TAILC	-5.0248	0.0000
ADEXT	-6.0014	0.0000
ADINST	-5.9865	0.0000
ADETR	-5.2546	0.0000
STATE	-4.4996	0.0000
ADETP	-2.2476	0.0123
ASSET	-6.4576	0.0000
END	-4.9621	0.0000

Note: In the test of unit root the p-value is contrasted to a threshold of 10%. If the p-value is inferior to a threshold of 10% consequently we reject H0 and if the p-value is superior to a threshold of 10% then we accept H0. From H0, all variables are non-stationary.
Source: Own elaboration.

Table 4. Estimation of the ROA variable

Dependent variable: ROA. Estimation period: 1999-2018	
Independent variables	***Coefficients (T-student)***
TAILC	0.0003152 (0.21)
ADEXT	0.0049648 (0.13)
ADINST	0.0551304 (1.04)
ADETR	-0.0064548 (-0.14)
STATE	-0.0064801 (-0.10)
ADETP	0.0408572 (0.60)
DUAL	0.0004416 (0.25)
ASSET	**0.0007496** **(3.46)***
END	0.0101404 (1.18)
CONS	-0.0304571 (-0.62)
Number of obs	220
Probability Fisher	Prob > F = 0.0000
The value of Fisher	F (9.145) = 8.91
The likelihood of chi² ()[a]	Prob > chi² = 0.0000
The value of Wald chi²	Wald chi² (9) = 52.75
R²	0.7865
Probability of the Hausman test	Prob > chi² = 0.8805
The selected model	The random effects specification

Note: (*), (**) and (***) are a significant value at a threshold of 1%, 5% and 10%, respectively. [a] The Wall test is employed to assess the association among the independent variables and error terms. In this test, we compare the probability of (Prob > chi²) to a threshold of 5% to decide the acceptation of H0 is based on this probability. If (Prob > chi²) is inferior to a threshold of 5%, then we accept H0 which implies that we have the absence of the correlation among the independent variables and error terms.

Source: Own elaboration.

Table 5. Estimation of the ROE variable

Dependent variable: ROE. Estimation period: 1999-2018	
Independent variables	***Coefficients (T-student)***
TAILC	0.0002977 (0.24)
ADEXT	**-0.0741332** **(-1.80)***
ADINST	**0.1439063** **(2.25)****
ADETR	-0.0254259 (-0.42)
STATE	0.0715681 (0.82)
ADETP	-0.0136125 (-0.16)
DUAL	-0.0002915 (-0.31)
ASSETS	-0.0001604 (-0.17)
END	**0.0115534** **(2.45)****
CONSTANT	0.0096415 (0.26)
Number of obs	220
Probability Fisher	Prob > F = 0.0000
The value of Fisher	F (9.145) = 6.51
The likelihood of chi² ()[a]	Prob > chi² = 0.0000
The value of Wald chi²	Wald chi² (9) = 70.46
R²	0.6858
Probability of the Hausman test	Prob > chi² = 0.0000
The selected model	The fixed effects specification

Note: (*), (**) and (***) are a significant value at a threshold of 1%, 5% and 10%, respectively. [a] The Wall test is employed to assess the association among the independent variables and error terms. In this test, we compare the probability of (Prob > chi²) to a threshold of 5% to decide the acceptation of H0 is based on this probability. If (Prob > chi²) is inferior to a threshold of 5%, then we accept H0 which implies that we have the absence of the correlation among the independent variables and error terms.

Source: Own elaboration.

Table 6. Estimation of the variable MP

Dependent variable: MP. Estimation period: 1999-2018	
Independent variables	***Coefficients (T-student)***
TAILC	0.0002529 (0.41)
ADEXT	-0.0038352 (-0.22)
ADINST	0.0143777 (0.60)
ADETR	-0.0060721 (-0.28)
STATE	-0.0026449 (-0.08)
ADETP	0.0129408 (0.42)
DUAL	**-0.0013136** **(-2.16)****
ASSETS	**0.0038891** **(6.71)***
END	-0.0032279 (-1.08)
CONSTANT	-0.0477591 (-2.44)**
Number of obs	220
Probability Fisher	Prob > F = 0.0000
The value of Fisher	F (9.145) = 6.28
The likelihood of chi^2 ()[a]	Prob > chi^2 = 0.0000
The value of Wald chi^2	Wald chi^2 (9) = 54.68
R^2	0.7163
Probability of the Hausman test	Prob> chi^2 = 0.4305
The selected model	The random effects specification

Note: (*), (**) and (***) are a significant value at a threshold of 1%, 5% and 10%, respectively. [a] The Wall test is employed to assess the association among the independent variables and error terms. In this test, we compare the probability of (Prob > chi^2) to a threshold of 5% to decide the acceptation of H0 is based on this probability. If (Prob > chi^2) is inferior to a threshold of 5%, then we accept H0 which implies that we have the absence of the correlation among the independent variables and error terms.

Source: Own elaboration.