

The Effects of Corporate Governance Mechanisms on Investment In Information Technology: Evidence from Tunisian Banks

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Abstract

The aim of this paper is to investigate the influence of internal corporate governance mechanisms, the ownership structure and the board of directors, on the intensity of information technology investments of Tunisian banks during the period 2005 to 2104. Empirical evidence shows that ownership concentration of the first three shareholders and institutional investor ownership are significantly positive on IT investments, foreigner investors' share in Tunisian banks has a negative and a significant impact. Board size has a negative and a significant impact on the intensity of IT investments. However, independence of the directors and the presence of an audit committee in the board have a positive and a significant effect.

Keywords: Corporate governance, Ownership structure, Board characteristics, IT investment, Asymmetric information, Banking institutions

1. Introduction

During the past three decades, world economies have experienced rapid and significant spread of Information Technology (IT). This growth has been further promoted by

globalization and has thus contributed to the emergence of a knowledge-based economy. The share of investment in information technology today exceeds that of other tangible investments. These investments have now come to complement tangible investments, as they enable companies to innovate and increase their capacity to acquire new knowledge that feeds a sustainable competitive advantage (Cohen and Levinthal, 1989). This investment is essential for companies to ensure their sustainability, in particular the banking industry. Indeed, information technologies that generate new products or processes create a competitive advantage and improve the bank's future performance and productivity (Griliches 1981; Alhaji A. A. et Rosmaini B. T., 2012; Mashal A., 2014 ; Bilkisu K., 2015) Pressured by new technologies and customer expectations, banks had to change their structures, strategies and leading to a new conception of banking governance. The importance of information technology in the banking industry relates to the intrinsic nature of their activities. There are several implications for its use: first, information technology facilitates the development of new, more sophisticated financial products. Second, information technology affects the methods used by banks as they reduce banking costs. Third, the development of technologies, coupled with deregulation, intensifies competition among banks. Finally, technological progress has been widely cited as one of the main sources of change in the financial services industry.

It is essential to highlight that investment level in information technology depends on managers' decisions. In fact, information technologies are considered to be specific, risky and long-term investments. However, sometimes managers tend to neglect their duties to protect firm value and, subsequently, investment in information technology may not be encouraged. These conflicts of interest between shareholders and managers relate to differences in risk aversion and planning horizons between the two parties (Byrd et al., 1998). Managers are seen to be risk averse, opportunistic and short-term, and rather seek to invest in projects that are not risky and short time.

To examine this conflict, good corporate governance practices are needed to help address these issues (Peng, 2004; Zahra and Pearce, 1989). Control mechanisms need to be introduced to reduce agency costs resulting from conflicts between shareholders and managers and to ensure that they make strategic decisions like investing in IT in order to improve shareholder wealth (Douma, George, and Kabir, 2006; Denis and McConnell, 2003; Joanna L. Y., Wu A. and Sean X. X. 2011; Dacosta R. F. et Rosini A. M. 2015).

Our study focus on how internal governance mechanisms (ownership structure and board of directors) may influence managers' decisions to invest in IT. We focus on banking institutions; the relevant literature shows that governance is more complex in the banking sector than in other sectors. It is very specific and needs to be improved to ensure the financial stability of all economies. Some authors like Marcey and O'Hara (2003), John and Qian (2003) and Levine (2003) assume that banks are different from non-financial firms because they are subject to strong regulation and operate with an intense opacity.

In Tunisia, the banking sector is the core of the financial system. In recent years, this sector has experienced a significant wave of investment in information technology. Indeed, the

banking sector is going through a phase of globalization and massive entry of foreign banks, intensifying thus interbank competition. The banking sector has also witnessed substantial changes in corporate governance imposed by the Central Bank of Tunisia in order to establish an optimal governance structure and guarantee the financial stability of the entire economy.

To answer our problematic, we conducted an empirical study in the context of Tunisian banks which is still little explored. In fact, the majority of research pertaining to our study is mainly conducted in other markets, the studies of (Chang et al 2006, Kroll et al 2006) on the American market, those of (Joanna LY, Anna Wu and Sean Xin Xu 2011) on the Taiwan market. To our knowledge no empirical study has addressed the role of internal corporate governance mechanisms on the intensity of IT investments of Tunisian banks.

We consider that this research offers at least two main contributions. The first is to highlight the importance of the role played by the ownership structure and the board of directors taken together, in guaranteeing the efficiency of the deployment of investments in information technologies closely related to the improvement competitiveness and the performance of banks. This is particularly useful, especially for Tunisian banks which must intensify their investment in information technology to be able to follow the technological progress of banks at the international level, Tunisian banks are encouraged to invest more in information technologies to modernize their banking system and in order to power the digital revolution in the banking sector. The second contribution of our work is to include the role of the audit committee in the study of the effectiveness of decisions made by banks in IT investment. The increased interest in audit committees is legitimate since the circular of the Central Bank of Tunisia 2011-06 focuses on strengthening the rules of good governance through the recommendation of a permanent internal audit committee. The integration of the role of the audit committee is both useful and interesting in that, to the best of our knowledge, no empirical study has addressed this role in its impact on the IT investment decision.

Therefore, this paper is structured as follows. In the first section, we review the literature and identify the relevant internal banking governance mechanisms that will inform our research hypotheses. The second section presents our methodology. The third section discusses our findings.

2. Review of the Literature and Research Hypotheses

Because of the importance of banks to economic growth, public authorities ensure that the banking sector is regulated. In most countries, banks are protected by the state. Central banks shall be regarded to be the supreme authority exercising such a control. Banking supervision alone is insufficient. For this reason, a good governance system should be put in place a banks and financial institutions. That is why banks' supervisors should show a heavy interest in ensuring that each banking institution effectively applies principles of sound governance.

For the banking sector, as for other sectors, corporate governance is known by internal mechanisms aimed at influencing and monitoring managers' behavior. Among these mechanisms, we mention the disciplinary role assumed by the board of directors and ownership structure.

2.1 Hypotheses about Ownership Structure

Ownership structure is an important component of the banking governance system. Its effectiveness depends on the nature of shareholders, their objectives and the extent of their disciplinary actions. Thus, the different shareholders have a more effective control of the bank's management team than the markets have. They are generally represented on the board of directors; participate in developing the bank's strategies and in controlling the decisions taken by the managers.

2.1.1 Ownership Concentration in Banks

The study of ownership structure of banks in several countries shows that it is a common fact. Arun and Turner (2004) found that banks in emerging countries are known by significant family and government ownership levels. Similarly, Caprio, Laeven and Levine (2007) found that banks worldwide are generally characterized by a concentrated ownership structure and that most shareholders of banks are either a family or the state. Their results indicate that 75% of banks have a concentrated ownership structure and only 8 of the 44 studied countries have banks with a diffused ownership structure. Similarly, they found that in 52% of cases most shareholders of banks are a family and that in 17 countries these families control more than 50% of the banks' capital. The state, also, is the majority shareholder of banks in countries like Egypt, Greece, India, Indonesia and Thailand. In these countries, the State holds more than 50% of the bank's capital.

Holderness (2003) provided an interesting review of the literature on the role of major blockholders in controlling firms. He argued that, given their substantial interests in the company, these large shareholders play a more active role in supervising and disciplining executives than smaller shareholders, and are usually seen as active players in corporate governance (Shleifer and Vishny, 1997). Agrawal and Knoeber (1996), and Demsetz (2001) assume a positive relationship between ownership concentration and effective control. Ownership concentration is generally seen as a mechanism that controls managerial discretion (McConnell and Servaes 1995, Shleifer and Vishny 1997) and protects investors' interest when there is a poor legal protection (La Porta et al. 2002). Chen et al. (2006) found that the higher the percentage of shares held by large shareholders, the greater the influence of the shareholders on executives. Assuming that ownership concentration is an effective means of controlling managers, we formulate the following hypothesis:

H1: Ownership concentration has a positive effect on the intensity of IT investments.

2.1.2 Ownership of Institutional Investors

The attitude of institutional investors towards risk is the subject of two antagonistic perspectives. The first is known as the 'Long termism' of institutional investors. According to this dominant hypothesis of efficient control, institutional investors with a higher ownership level require managers to act in the shareholders' and partners' interests. Black (2006) argues that institutional investors represent professional investors who have privileges in acquiring and processing information. Bonaccorsi di Patti (2003), studying 695 US commercial banks during the 1990-1995 period, found that large institutional investors exercise control

functions that reduce agency costs. The second perspective of institutional investors is the short-termism. According to the institutional myopia theory, institutional investors are considered transitory shareholders concerned solely with short-term profits (Bushee, 1998). Cherian (2000) and Charreaux (2002) argue that when an institutional investor owns a portion of capital, this negatively affects IT investments. Therefore, we formulate the following hypothesis:

H2: Institutional ownership has a positive effect on the intensity of IT investments

2.1.3 Ownership of Foreign Investors

Foreign investors holding large shares are encouraged to propose restructuring initiatives and to maximize firm value, to identify with firm objectives, to be more prudent and more generous in controlling managers and guide them to invest in profitable projects. Delapierre et al (2002) believe that foreign investors are guided by strategic choices and firm orientations, by their mid- and long-term profitability, and by their immediate profitability. Indeed, foreign investors stand at the core of firm growth problem.

Financial liberalization is an opportunity for foreign investors to acquire large shares in local firms (Gulamhussen and Guerreiro, 2009). Most developing countries have opted for privatization as a way of attracting foreign investors and more specifically strategic partners who will contribute to the management of the privatized firms by bringing their know-how and technologies of their country of origin and by facilitating access to new markets.

Chen et al (2009) showed that foreign institutions may mitigate agency problems and information asymmetry by improving corporate governance and financial transparency. Similarly, Al-Matari et al (2012) found that foreign ownership is a factor behind aligning shareholders' and managers' interests. Claessens and Laeven (2004) and Bonaccrosi di Patti and Hardy (2003) found that introducing foreign investors in banks and reducing legal restrictions on this type of ownership, mainly in developing countries, generate greater competitiveness for the local banking systems. Then, we formulate the following hypothesis:

H3: Foreign ownership has a positive effect on the intensity of IT investments

2.1.4 State Ownership in Banks

State ownership in banks is common in all countries. Nevertheless, La Porta et al. (2002), examining ownership structure of banks worldwide, found that state ownership is higher in countries with a poorly developed financial system, intensive government intervention in the economy, and poorly protected shareholder rights. Several studies examined the effect of state ownership on the effectiveness of the decisions made by bank executives. Berger et al. (2006) found that private banks are able to make effective strategic decisions faster than banks with a significant government ownership. Then, we formulate the following hypothesis:

H4: Government ownership in banks has a negative effect on the intensity of IT investments.

2.2 Role of Board of Directors in Banks

In banks and other institutions, the specific functions of the Board of Directors are four: protection of shareholder interests, control of strategies, supervision and development of management. However, analysis of banking crises indicates that their main reason is mismanagement in banks. This can be explained either by the fact that managers are not competent enough to assess the risk of their decisions, or that their risk preferences differ from those of shareholders or investors or the State. They freely operate within a control system inadequate to solve agency problems. Whatever the explanation may be, the Board of Directors is responsible. This latter assumption is justified in the report of the Basel Committee on Banking Supervision (1999), which assumes that the board of directors and bank managers are primarily responsible for good governance. Thus, in order to avoid the adverse effects of banking failures, the board of directors should rigorously perform its duties.

Several previous studies have confirmed the important role played by the board of directors (Klein, 2002, Xie, Davidson and Dadalt, 2003). These studies suggest that certain board characteristics influence strategic decisions. These characteristics are essentially: size, composition and structure.

2.2.1 Impact of Board Size

Size is one of the essential attributes of the board of directors that may affect its functioning and possibly its effectiveness. Lipton and Lorsch (1992) found that a large board of directors makes the communication and decision-making process more cumbersome and difficult. Some studies support the idea that larger boards are likely to carry a greater disagreement and lack of cohesion (Brown and Mahoney 1992; Bantel and Jackson 1989). According to Jensen (1993), the effectiveness of the board of directors depends on the choice of an ideal board size. The Basel Committee (1999) has not limited the number of directors on the Board, however, it has indicated that a board of directors should have sufficient directors who can exercise their judgment independently of managers, major shareholders and the State. Yermack (1996) and Eisenberg et al (1998) found that board size negatively correlates with performance. A small board size facilitates control and ensures taking the right decisions like the decision to invest in technology in order to improve firm performance. Boone et al (2007) found that a large board of directors negatively correlates with IT investment degree. Bearing on these assumptions, we formulate the following hypothesis:

H5: Board size has a negative effect on the intensity of IT investments.

2.2.2 Independence of Board Members

Independence of directors is considered to be the most fundamental dimension of the board and the most studied in literature. Governance researchers argue that independent external directors are the best mechanism to control executives.

The role of external directors in protecting shareholders has been the subject of much debate and research. Fama and Jensen (1983) observed that outside directors who compete in the job

market are motivated to promote their reputation as an expert in controlling executives, since their market value depends mainly on their management control function. However, evidence on the effectiveness of external directors in controlling managers is mixed. Although several authors found that external directors protect shareholders in specific cases of agency problems (Byrd and Hickman, 1992), others found a negative relationship between external directors and shareholder interests (Agrawal and Knoeber, 1996, Klein, 2002). In the context of banks, Macey and O'Hara (2003) argue that there is a huge responsibility for external directors serving on a bank's board of directors. These directors should ensure that their decisions do not affect the bank's ability to honor its debts, do not increase the bank's risk and do not reduce its capitalization. Similarly, Crespi (2004) notes that bank administrators have a public responsibility, i.e. they have a fiduciary duty not only vis-à-vis the shareholders but also the bank's various contracting parties. It is the public interest that must be protected at all costs. The Basel Committee (1999) places a great importance to the independence of directors. It stipulates that when the board of directors includes directors who are not managers, it improves independence and objectivity. Adam and Mehran (2003) found that banks have more independent directors on their boards than manufacturing firms. They explained this result by the effect of regulation on the structure of the boards of directors of banks. The Basel Committee (1999) also highlights the competence of directors in banks. It assumes that qualified outside directors bring with them new perspectives and experience, this improves the strategic focus of management. Some studies of the effectiveness of external board members in making strategic decisions yielded mixed results. Indeed, Hill and Snell (1988) found that a high percentage of internal directors on the board of directors positively relates to IT investments. Similarly, Godard (2005) found that boards of directors of firms with more internal directors invest more in technology. Zahra (1996) also noted that internal directors are more interested in projects that have significant and positive long-term growth potential than external directors. Then, we formulate the following hypothesis:

H6: The percentage of external directors on the board of directors has a positive effect on the intensity of IT investments.

2.2.3 Separation of the Chief Executive Officer and Chairman of the Board Functions

Holding the position of the managing director and the chairman of the board of directors by one person may affect independence of the board of directors. Agency theory considers this accumulation of functions as a source of conflicts of interests, since one of the functions of the board of directors is to appoint, remunerate and relieve the officer from these functions. Indeed, combining the managing director and the chairman of the board cannot ensure the proper functioning of the board (Jensen, 1993). A review of the effect of combining these two functions on the efficiency of US Holding banks during the 1989-1990 period conducted by Pi and Timme (1993) showed that financial performance tends to decrease when the functions are combined. It is therefore preferable to separate the two decision-making and control functions so that the board can make the right decisions and limit managers' opportunism. However, other studies like that of Dutta et al (2004) found that the presence of a non-executive board chairman does not encourage managers to make the right decisions like investing in IT. We thus formulate the following hypothesis:

H7: Combining the CEO and chairman of the board functions has a negative effect on the intensity of IT investments.

2.2.4 Structure of the Board of Directors: Presence of an Audit Committee

The effectiveness of the board of directors in controlling management also depends on how well it is structured and organized. Generally, the board of directors delegates responsibility for specific functions to committees consisting of board members (Klein, 1998). The responsibility of overseeing financial statements, the audit process and internal control is delegated to the Audit Committee. Klein (2002) suggests that the audit committee arrange regular meetings between the company's external auditors and management to review financial statements and the internal control process. However, the presence of an audit committee does not relieve the board of directors from its responsibility for financial statements since it uses them to make important decisions: investment, functioning and managers' remuneration decisions. In the case of banks, the Basel Committee (1999) assigns to the Audit Committee the responsibility of hiring and dismissing the internal and external auditors of the bank and overseeing their work, ensuring that management takes corrective actions, in due course, to deficiencies and problems identified by the committee. The audit committee helps mitigate agency conflicts between managers and shareholders by improving the quality of financial statements and reducing information asymmetry. The Audit Committee plays an important role in controlling finances and making decisions, and more specifically in banks. This assumption is supported by Gramling and Myers (2006) who believe that internal auditing helps to check whether the risks have been well assessed. Then, we formulate the following hypothesis:

H8: The presence of an audit committee on the board has a positive effect on the intensity of IT investment.

2.3 Control Variables

Corporate governance mechanisms are not the only factors that may influence IT investment level. Other mechanisms may be involved in determining this investment level. These are mechanisms that are specific to the bank. In what follows, we will justify the inclusion of bank size as a control variable to study the determinants of IT investment.

2.3.1 Bank Size

Large firms typically have enormous resources and incentives to develop new products and to support expensive technological projects (Shleifer and Vishly; 1997). Like Hill and Snell, (1988) Baysinger and Hoskisson, (1989), Baysinger et al, (1991), and Chen and Hsu, (2009), we consider that bank size has a positive impact on the intensity of IT investment. Then, we expect that:

H9: Bank size has a positive impact on the intensity of IT investments.

3. Methodology

3.1 The Sample

In order to study the role of corporate governance on the intensity of IT investment in banks, we examined a sample of 10 Tunisian banks listed on the Tunis stock exchange. All these banks are under the supervision of the Tunisian Central Bank, one of whose main roles is to issue regulations and laws.

3.2 Data Collection

Data on internal corporate governance mechanisms (ownership structure and board of directors) are taken from the annual reports published by Tunisian banks, guides of the Tunis Stock Exchange (BVMT), reports published by the Tunisian Professional Association of Banks and Financial Institutions, and available public documents and websites. Accounting data used in our models are taken from the Thomson One Banker database. The data covers a 10-year period stretching from 2005 to 2014, totaling a panel of 100 observations.

3.3 Definition and Measurement of Variables

We use in our research the following variables:

- The variable IT is measured by the following ratio, Total IT expenses (expenses plus capitalized IT) / Total assets.
- The variable BLOC is measured by the Percentage of capital held by the top three shareholders.
- Similarly, ACT_INST is measured by Percentage of capital held by institutional investors.
- ACT_ETR is measured Percentage of capital held by foreign investors.
- ACT_PUB is a dummy variable that takes 1 if the bank is private and 0 otherwise.
- T_CA is determined by the number of directors in the board.
- IND_CA is the number of Number of independent directors in the board by the total number of directors.
- CUMUL is dummy variable that takes 1 if the CEO and the chairman of the board is the same person and 0 otherwise.
- COM_AUD is dummy variable that takes when there is an audit committee in the board and 0 otherwise.
- SIZE is a control variable, measured by the logarithm of total assets.

3.4 The Model

To measure the effect of internal governance mechanisms (ownership structure and board of directors) on the intensity of IT investment, we propose to estimate the following regression model:

$$IT_{i,t} = \beta_0 + \beta_1 BLOC_{i,t} + \beta_2 ACT_INST_{i,t} + \beta_3 ACT_ETR_{i,t} + \beta_4 ACT_PUB_{i,t} + \beta_5 T_CA_{i,t} + \beta_6 IND_CA_{i,t} + \beta_7 CUML_{i,t} + \beta_8 COM_AUD_{i,t} + \beta_9 SIZE_{i,t} + \epsilon_{i,t}$$

The model will be analyzed by using the panel data. The estimation of the model will be processed by “STATA” software.

4. Statistical Analysis and Results

4.1 Descriptive Analysis

We started our analysis with a descriptive statistics (Table 1) of our variables for all banks in our sample: number of valid observations, the minimum, the maximum, the median, the mean, and standard deviation.

IT investment intensity measured by the ratio of IT investments to turnover is on average 0.01564. There is a significant difference in IT investments intensity, with a maximum of 0.15486 and a minimum of 0.0001 for all banks in our sample. This may relate to several factors. Indeed, intensity of IT investments in banks depends on several variables, namely bank size, growth opportunities, and internal governance mechanisms. For all the sample, average ownership concentration (BLOC) of the three largest shareholders is 53.9% with a maximum of 81.31%. The distribution of this variable shows that ownership structure of the banks in our sample is concentrated. In the same context, we notice the strong presence of institutional investors (ACT_INST). Moreover, this presence has increased in recent years, particularly following the privatization and the restructuring of the sector. Their average share is 44.88% with a maximum of 77%. Foreign investors measured by the variable ACT_ETR have a mean of 28.84% with a maximum value of 64.24%. The dispersion of observations of this variable is 23.40% confirms the existence of two categories of financial institutions in our sample. There are financial institutions with high foreign ownership and other institutions with minority foreign ownership. Board size varies between 7 and 17 members. It seems that Tunisian banks choose large boards. The median size is 12 members, very close to the maximum requirement of 17 members. Boards of directors are also marked by the presence of independent directors, with an average of 34.42%. This relatively low presence affects the independence of boards and therefore affects their effectiveness, particularly their monitoring and supervision functions. Nevertheless, 65% of the banks combine the functions of CEO and chairman of the board. There is an audit committee in the board in 40% of the banks.

Table 1. Descriptive statistics

Variables	N	Minimum	Maximum	Mean	Standard Deviation
TI	100	0.0001	0.154822	0.01564	0.029446
BLOC	100	0.22	0.8131	0.53905	0.14165
ACT_INS	100	0.074	0.77	0.44889	0.18548
ACT_ETR	100	0.0011	0.6424	0.28845	0.23407
ACT_PUB	100	0	1	0.7	0.46056
T_CA	100	7	17	11.19	1.76208
IND_CA	100	0.09	0.64	0.34426	0.13811
CMUL	100	0	1	0.65	0.47937
COM_AUD	100	0	1	0.4	0.49236
SIZE	100	18.51046	22.97437	19.85134	1.00434

4.2 The Univariate Analysis: Correlation Matrix

The correlation matrix (Table2) shows that there is no problem of correlation between the independent variables. The Pearson correlation coefficients are sufficiently low, less than 0.8, which fits the limit set by Kennedy (1985) at which problems may arise.

Table 2. Correlation Matrix

	Bloc	act_inst	act_etr	Act_pub	t_ca	ind_ca	Cumul	com_Aud	Size
Bloc	1								
act_inst	0.075	1							
act_etr	0.083	0.111	1						
Act_pub	0.067	0.215	0.176	1					
t_ca	0.148	0.176	-0.098	-0.140	1				
ind_ca	0.216	0.127	-0.103	0.150	-0.009	1			
Cumul	-0.371	-0.165	-0.35	-0.480	-0.255	-0.199	1		
com_Aud	-0.078	0.195	0.136	0.000	0.086	-0.336	0.08	1	
Size	-0.481	0.030	-0.263	0.016	-0.039	-0.394	0.160	0.139	1

4.3 The Multivariate Analysis

Given the particular nature of the panel data, we will run various tests to determine the appropriate estimation method. We will use the individual effects test, the Hausman test, the heteroskedasticity test and the errors auto-correlation test.

The estimation method that overcomes the error auto-correction problem is the generalized least square method (GLS). The regression of this estimation method yielded the results summarized in the following table.

4.4 Interpretation of the Results

4.4.1 The Impact of Ownership Structure on the Intensity of IT Investments

The results presented in Table 3 support our H1. Indeed, ownership concentration of the first three shareholders has a positive and a significant effect (1%) on the intensity of IT investments. Indeed, a highly concentrated ownership structure favors investment in information technologies. This result is consistent with that of McConnell and Wahal (2000) who found that the share of capital held by large shareholders has a positive impact on the intensity of IT investments. These results indicate that given their large capital share, dominant shareholders are encouraged to scrutinize managers' decisions with a view to promoting long-term performance (Demsetz 2001).

As for institutional investors' ownership, the results show that the effect of this variable on the intensity of IT investments is significantly positive. This result confirms the thesis of the dominant hypothesis of efficient control. Indeed, according to Gompers and Metrick, (2003), institutional investors intervene to counteract the influence of managers on strategic decisions. Institutional investors are more risk averse and have a 'Long termism' vision, according to which institutional investors with a large share in the capital, force executives to act in the interest of shareholders and partners.

Foreign shareholders, on the other hand, do not play an effective role in promoting IT investments. (ACT_ETR) coefficient is significantly negative. Non-Tunisian members do not contribute to promoting IT investments in Tunisian banks. This result rejects our hypothesis and the result found by Delapierre et al (2002) who found that foreign investors are guided by the choices and strategic orientations of the company, so they have mid- and long-term profitability objectives and not immediate profitability objectives. For Tunisian banks, this result can be explained by the fact that most foreign investors seek short-term profitability and added value, and subsequently do not seek to invest in risky projects whose profitability is uncertain.

As for the effect of state ownership on the intensity of IT investments, the results show a coefficient for the variable ACT_PUB is positive and significant. As a result, private banks invest more in IT than do state-owned banks.

4.4.2 The Impact of Board Characteristics on the Intensity of IT Investments

The results indicate that board size has a significant and a negative impact on the intensity of IT investments. Our hypothesis is thus retained. It thus seems that a smaller board is more successful in coordinating the opinions of its members, which reduces agency conflicts and accelerates decision-making. This result is consistent with those of Lipton and Lorsh (1992) and Yarmek (1996) who found that a reduced number of directors favors better control over executive decisions. This conclusion should be put into perspective given that the minimum board size is 7 members, whereas the minimum requirement is 3. The optimum size seems to be rather around 8 or 9 members, a relatively high number, but rather close to the optimal size proposed by Jensen (1993).

As for board composition, hypothesis is retained. Indeed, the percentage of independent directors present in the board has a positive effect on the intensity of IT investment. This finding and those found by Dong and Gou (2010) in the Chinese context, confirm the idea that the presence of independent external directors in the board increases its control effectiveness and limits managers' opportunism. These directors, who are essentially free from management influence, have all the power to encourage them to pursue investment strategies that are in line with shareholder interests, such as IT investments, to increase future performance and firm value.

The result shows that presence of an audit committee has a positive and a significant impact on IT investments. This result confirms the role played by this committee in guiding managers towards choosing profitable investments such as information technologies.

4.4.3 Effect of Control Variables on the Intensity of IT Investments

According to previous studies (Hill and Snell 1988, Baysinger and Hoskisson 1989, Chen and Hsu, 2009), bank size has a significant positive effect on the intensity of IT investments. It can be concluded that large banks invest more in IT than small banks. This can be explained by their enormous resources and strong incentives to develop new products and their support for expensive technological projects.

Table 3. Regression Results

Variables	Coefficient	P-Value > z
BLOC	0.020564	0.001***
ACT_INST	0.023662	0.000***
ACT_ETR	-0.004530	0.001***
ACT_PUB	0.01752	0.000***
T_CA	-0.00197	0.000***
IND_CA	0.03389	0.000***
CUMUL	-0.00396	0.363
COM_AUD	0.014916	0.000***
SIZE	0.00578	0.012**
Intercept	0.01760	0.778
Wald chi2	$\chi^2 (10) = 1214.56$	
Prob> chi2	0.0000	
Observations	100	

Note. *** significance at 1%, ** significance at 5%, significance at 1% level.

5. Conclusion

The issue of governance and IT investment has gained momentum recently. The aim of this paper is to study the impact of internal governance control mechanisms on the intensity of IT investments in Tunisian banks.

Examining ten Tunisian banks over the 2005 to 2014 period, we studied the impact of ownership structure and the board of directors on the intensity of IT investments. The obtained results show the significant effect of some internal governance mechanisms on IT investment.

The results on the effect of ownership structure on IT investments show that ownership concentration of the first three shareholders and institutional investor ownership are significantly positive. These results confirm the long-termism hypothesis of investors. Finally, foreigner investors' share in Tunisian banks has a negative and a significant impact on the intensity of IT investments. This can be explained by the short-term perspective of these foreign investors. They seek to minimize risk and opt for short-term profits. State ownership in banks has a negative effect on the intensity of IT investments. This can be explained by the cumbersome administrative processes of public banks.

As for the impact of Board characteristics on the intensity of IT investments, the results show that board size have a negative and a significant impact on the intensity of IT investments. However, independence of the directors and the presence of an audit committee in the board have a positive and a significant effect. These results indicate that a small board, with predominantly independent external directors and an audit committee, favors long-term investments and subsequently an increase in the intensity of IT investments.

We believe that the present paper offers at least two main contributions. The first is highlighting the importance of the role played by internal governance mechanisms, in particular ownership structure and the board of directors, in ensuring the use of bank resources in IT investments. The second contribution is including the role of the audit committee.

In conclusion, this study could be extended in different ways. The first is to examine other governance variables while trying to establish interactions between them. The second is to study the effect of corporate governance on the intensity of IT investments in different institutional contexts, given the differences in governance systems between the banking sector and other sectors and also across countries (Morocco / MENA region / Europe). It is the intent of the author to pursue these venues in future research.

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