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FINANCIAL ECONOMICS | RESEARCH ARTICLE

Does CEO emotional bias affect performance?

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Abstract: This article is focused on tackling the issue of the impact of the bank CEO's emotional bias on the Tunisian banks' performance level while accounting for the mediating role of the control systems. In this regard, an empirical study has been set up through a questionnaire undertaken as an appropriately fit data collection method administered to a sample of 100 CEOs of Tunisian banks. Actually, the present research is intended to help in reflecting an original approach, since it serves to highlight the behavioral aspects' crucial role in explaining the performance level within the framework of the organizational architecture theory. To the best of our knowledge, this work represents a pioneering study that deals with exploring such a research area within the Tunisian context. Indeed, the achieved results reveal with no doubt that the behavioral dimension constitutes a central aspect in the organizational architecture as it helps greatly in reflecting the intermingling of the incentive aspect with the evaluation system with respect to the accounts manager.

Subjects: Finance; Corporate Finance; Business, Management and Accounting

Keywords: behavioral management; emotional biases; organizational architecture theory; control systems

1. Introduction

The literature of behavioral finance has matured to the point where one can study the indirect trajectory of the relationship between behavioral biases and performance. Behavioral literature is attentive about the impacts of emotional bias on financial decisions. Hence, the effect of bank's regional CEO's emotional bias on bank performance is a complex phenomenon that can go beyond the simple direct effect.

With respect to the organizational architecture theory, organizational performance is defined as the practice of co-locating decision-making rights and specific knowledge at a lower cost (Brickley, Zimmerman, & Smith, 2008). In other words, an efficient organizational architecture results in a

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PUBLIC INTEREST STATEMENT

According to the cognitive theory, the CEO behavior affects performance. The effect of CEO behavior on performance is a complex relationship that can go beyond the simple direct effect. We suggest an intermediate factor for this relationship, control system. The previous literature offers evidence about the impacts of control system on bank performance. A successful firm develops control system that will allow decision makers to make decisions maximizing firm value. We find that, the bank CEO behavior affect its strategic choices and consequently bank performance.

trade-off between the costs associated with the misuse of specific knowledge (insufficient decentralization) and the ones related to the conflicts of interests (due to decentralization). The entirety of these costs' minimization could be achieved only through the application of control systems.

Works dealing with the areas of accounting, control, audit, and finance, as based on the agency theory or the organizational architecture one, tend to aim predominantly at studying the influential factors impacting the structural architecture of the organization. Such factors involve, namely the interdependence of units (Bouwens & Van Lent, 2007), information and communication technologies (Zouari, 2008), leadership mode (Abernethy, Bouwens, & van Lent, 2010), as well as environmental uncertainty (Bousslama & Nekhili, 2007). Noteworthy, however, is that these studies tend most often to disregard the influence of behavior and individual objectives within the organization on the components of the organizational architecture, and on the performance thereof. In this respect, several conducted studies have undertaken to highlight the fact that emotions and moods prove to play an essential role with regard to organizational performance (Campbell, Gallmeyer, Johnson, Rutherford, & Stanley, 2011; Damasio, 1994, 2003; Degeorge & Fayolle, 2009; Forgas & George, 2001; Hilary, Hsu, Segal, & Wang, 2016; Hirshleifer, Low, & TEOH, 2012; Sirén, Patel, & Wincent, 2016; Warwick & Nettelbeck, 2004 etc.). Inspired by the behavioral approach, the major focus of this research consists in highlighting the effect of the bank manager's emotional biases on the bank's performance while stressing the control systems' mediating effect as an organizational architecture component.

The notions we discuss may apply for bank's regional management team's positions in general. The bank's regional CEO position, as the intermediate manager, is an important area of investigation. We adopt this focus since that, bank's regional CEOs may have some influence on choosing the incentive system and the evaluation system. Therefore, they may influence team members through their loyalty and obedience bonds. Therefore, they may influence team members through their loyalty and obedience bonds. Since they have the highest influence on the strategic choices (Nagar, 2002), they can play a critical role in arranging banks strategies. As Abernethy et al. (2010) argue, the division managers has the ability to engage and promote employees and so, he/she has the aptitude to affect decision-making process and organisational outcomes through his/her personalized interpretations and individual characteristics. Such impact will have consequences on the organizational performance levels (Brickley et al., 2008; Plöckinger, Aschauer, Hiebl, & Rohatschek, 2016).

The research question that this paper is repeated below to merit further discussion and formulation of hypotheses:

Does the indirect effect of bank's regional CEO's emotional bias on the level of bank performance through control systems? This question is certainly not new, but some links are still not investigated. This work aims to provide theoretical implications to both behavioral and financial organisational literatures by investigating the impact of bank's regional CEO's emotional bias on control systems as well as the impact of control systems on bank performance. Based on a data-set collected from annual reports and through administration of a relevant questionnaire, our paper presents the following empirical contributions. We contribute to both behavioral and financial organisational literatures by exploring control systems as an intermediate factor that can mediate the bank's regional CEO's emotional bias-bank performance.

The present work is organized as follows: The two upcoming sections are devoted to developing the study's theoretical framework followed by a formulation of the research hypotheses. The third section deals with a conception of the research protocol, exposing the empirical approach and the measurements of the related variables. The next section is reserved to analyzing the reached findings, whereas the ultimate part encompasses the major concluding remarks while paving the way for a prospective potential work.

In effect, the latter would serve to ensure the maintaining of alignment of behaviors and actions (e.g. Bouquin, 2010, Ferreira & Otley, 2009; Jensen & Meckling, 1992). In this regard, Bouquin (2010) determines two missions likely to be allotted to the control systems namely: (1) enhancing the decision-making proves relevant to strategic objectives and (2) guiding or directing the managers' as well as the employees' action towards effectively achieving the performance improvement goal. According to the organizational architecture theory, control systems can be split into two major components, namely the performance measurement system and the incentive one.

2. Hypotheses development

An effective investment policy could well have its explanation in the firm's ability to implement, on the one hand, a system that helps in transferring knowledge from operational levels to higher ones and, on the other hand, a system of incentives that encourages agents to disseminate the knowledge necessary for effective decision-making (Brickley, Smith, & Ziemmerman, 1997). Indeed, the organizational architecture must be designed in such a way as to reduce the conflict-incurred costs by setting up incentive and performance evaluation systems whereby to align the agents' interests with those of the principal (Charreaux, 2000).

Only few among the contemporary scholars have tried to stress the importance of the leaders' values and objectives relevant to determining the control systems (incentives and evaluation) and thereof their effects on performance. Indeed, the individual reasoning may well display certain cognitive shortcuts likely to influence the decision-making. In this respect, a number of identified and classified types of biases include the following terms: representational biases, along with biases related to analogical reasoning, conservatism and confirmation, as well as emotional ones such as risk aversion, optimism, and overconfidence.

Based on these facts and observations, the present work's major focus lies in studying the behavioral dimension's effect on performance. In fact, the aim consists in underlining the effect of the bank CEO's optimism, overconfidence and loss aversion on bank performance while considering the control systems' mediating effect (i.e. the accounts manager's oriented incentive and performance appraisal systems).

2.1. The bank CEO's emotional bias, the incentive systems, and the bank performance

The organizational architecture is usually composed of two fundamental variables that need to be coherent, namely the distribution of decision-making rights within the organization along with the establishment of a control system involving two major elements: evaluation and incentives (Bousslama & Nekhili, 2006). The main purpose attributed to the incentive system consists in motivating the individuals to act in conformity with the firm's interests. In other words, the incentive mechanisms are actually intended to induce agents within the organization to formalize the knowledge they hold in a format that can be understood by the hierarchy.

As matter of fact, aligning the organizational coalition members' interests should entail appealing to a wide range of incentives, monetary and non-monetary.

So, for the sake of minimizing the risk associated with employee behavior, bank managers usually tend to implement incentive mechanisms for subordinates that appear to be motivating, quite innovative and specific in comparison to other accomplished activities (Lamarque & Maurer, 2009).

In effect, a consideration of the CEO's emotional biases (optimism, loss aversion and overconfidence) turns out to open up new perspectives with respect to organizational finance, notably through a new reviving of the issue of conveniently selecting the most equitably fit incentive systems and investigating and analyzing the organization's major performance determinants.

2.1.1. *The bank CEO's optimism, the incentive systems, and the bank performance*

Being encumbered with uncertainty and tasks in addition to the executive's special profile are all factors that help either enhance or curb the rate of optimism. Besides, the decision-maker's proper competences would well tend to accentuate the level of optimism related to bias and result in even considerably biased choices. This implies that the manager's proper judgments, profile, and emotional state intervene noticeably by affecting his choices in terms of organizational dimensions and performance.

In this regard, Wang, Sheng, and Yang (2013) have documented that executive optimism tends to reduce agency costs and to improve business performance. In other words, a leader who is too optimistic about the others' abilities would usually tend to introduce a remuneration system likely to induce the transfer of knowledge from the organization's operational levels to the higher levels for a more effective decision-making to take place. Such a director seems to have great confidence in the subordinates' held skills and knowledge and to confide in their behavior as being harmoniously consistent with the company's objectives, for instance, performance improvement.

In his turn, Otto (2014) has demonstrated that for the sake of maintaining his status and position at the top of the management team, an optimistic CEO would often opt for a highly incentive predominated compensation systems. Such a director tends to believe that, highly incentivized by the compensation systems, low-rank managers would tend to make decisions that sound rather consistent with the organization's set objectives and are, thus, valued and their self-esteem would increase. They would profit from the fact of seeing their work evolve with them at their own pace, and under their influence. As for the directors, they would enjoy a business running so smoothly, cheaply, and without destructive conflicts. Such a situation would certainly promote the firm's organizational performance.

As for Hribar and Yang (2016), they argue that an optimistic leader adopts an incentive compensation and remuneration system in a bid to achieve other objectives, including aligning the actors' interests with those of the firm. According to Sharpe, Martin, and Roth (2011), the optimism-related bias is firmly associated with friendliness and is greatly characterized with excessive trust. So, an optimistic leader is usually sure that the intermediate and lower level managers' actions are actually consistent with the company's strategy. Such a confidence should allow subordinates to work more effectively as they are encouraged to develop their skills and work harmoniously without constraints (loss of remuneration, punishment). In other words, the more initiatives the subordinates take, the more knowledge and learning they would acquire and the greater their amounts of new ideas would be. So, initiative-taking may well stand as the original source "constitutive of performance".

It is in this context that the present work can be set, with a modest attempt made to test this idea within the banking sector's context. Hence, the flowing hypothesis can be advanced:

H_1 : The greater the optimistic bank CEO's adopted incentive is, the better the bank's performance will turn out to be.

2.1.2. *The bank CEO's overconfidence, the incentive systems, and the bank performance*

In this respect, Moore and Healy (2008) have put forward several definitions and aspects highlighting the factors of overconfidence. A well-known definition, for instance, states that overconfidence is an overestimation of one's proper knowledge or aptitudes, the accuracy of detained information along with one's status or position among the group. Indeed, excessive confidence characterizes an individual who has an excess of confidence in one's own skills, capacity, or knowledge (Camerer & Lovallo, 1999).

On studying the effect of excessive confidence on the decisions taken by bankers, Lambert, Bessière, and N'Goala (2012) have concluded that bankers are overly confident about their knowledge and perception of performance in respect of others. They point out that confident bankers are

not interested in the colleagues' and subordinates' knowledge and information. These bankers have no incentive to motivate and value the efforts of others within the bank. They tend to often neglect the information held by those who are in direct contact with the daily reality of the bank, a vision which penalizes the bank's performance.

In their turn, Humphery-Jenner, Lisic, Nanda, and Silveri (2014) have suggested that overconfidence or control illusion refers mainly to the individuals' tendency to overestimate their ability to control events whereby they maintain a certain influence over others. In fact, an overconfident leader seems to have no incentive to enhance subordinates to improve their knowledge and behavior through particular mechanisms such as training. In this regard, interest conflicts and agency costs would tend to increase. Such a situation demonstrates well the negative relationship between excessive managerial confidence and firm performance.

As for Hribar and Yang (2016), they argue that the manager's over-confidence denotes well an overestimation of his knowledge relevance by holding considerable belief in his proper assessments' accuracy while neglecting others' considerations. In this way, a leader of this type does not get interested in motivating the other company members to share, expand, or even diffuse their knowledge. Indeed, such a procedure does not seem to persuade individuals to disclose any form of knowledge necessary for an effective investment policy decision-making to take place and likely to help improve the organization's performance.

H_2 : By adopting a remarkably weak incentive system, the bank CEO's overconfidence turns out to be negatively correlated with the bank performance.

2.1.3. *The bank CEO's loss aversion, the incentive systems, and the bank performance*

A large number of the conducted psychological studies appear to indicate that loss aversion proves to bring about individuals with rather difficult hard payment earning, avoiding not lose it, than people earning the same amount in the form of a gain. Some of the recently elaborated works have discovered that incentives presented in the form of loss contracts help noticeably in increasing employee performance (Fryer et al., 2012; Hossain & List, 2012; Imas, Sadoff, & Samek, 2015). Very few are those research works that have predominantly focused on the behavioral dimension's noticeable role in consolidating the control systems and hence on incentives.

Thus, and upon studying the relationship between the management incentive in a system assured by stock options and loss aversion, Baixauli-Soler, Ruiz, and Marín (2015) demonstrated that the other managers show that the more compensation is linked to performance, the greater the risk the manager is ready to take will be. In effect, a loss-taking daring executive would, by these means, encourage the other low-level members in the hierarchy to take any risk through monetary incentive systems. Thus, the subordinates would turn out to be less autonomous: the fewer the initiatives they might take, the fewer the innovative ideas they would have to contribute, and, consequently, the less opportunity would be available for them to come together around a common goal. This fact implies evidently that the CEO's loss aversion extent or level proves to be negatively correlated with performance.

Regarding Schütte and Wichardt (2013), who have conducted a study investigating the relationship binding a biased CEO's behavior and the firm's performance, they have come to the conclusion that the loss-averse executive would look for appropriate tools whereby s/he could ensure his/her position's stability. Such a CEO would provide no incentives inducing subordinates to make risky decisions likely to affect their *status quo*. Such a perspective would certainly kindle the agency costs and might well jeopardize performance.

In this regard, Cettolin and Riedl (2010) states that it is the uncertainty about the available information relevance that brings about the loss aversion tendency, causing the leaders to adopt a rather conservative posture, thus, avoiding any decision likely to engender any alteration in their current

status. Such a managerial executive would appear to be disinterested in improving and motivating the subordinate's proper skills through such a mechanism of training. Indeed, a CEO of this type would never devote even a certain scope of autonomy to the subordinates, nor would he incite them to seize any opportunities likely to help improve performance.

H₃: By adopting a weak incentive system, the bank CEO's loss-averse character is negatively correlated with the bank's performance.

2.2. The bank CEO's emotional bias, the accounts manager's performance appraisal systems, and the bank performance

According to the organizational architecture theory, decision-making rights' decentralization among the members of the organization consists in assigning new responsibilities to agents at intermediate and lower hierarchical levels. The latter are rationally tempted to pursue their own interests instead of pursuing the organization's set objectives. Hence, an urgent need would emerge as to the appropriate performance assessment mechanisms. Such mechanisms would actually help the intermediary managers and operational units to manage the investment policy at lower costs in a bid to improve the organization's performance.

At this level, banks would have a disposition to use relatively sophisticated control tools, in terms of both commercial monitoring of their customers and their targeted objectives. Noteworthy is that such tools do not always stand as an adequate guarantor of the acquired performance, and it would then seem rather interesting to try to explain why some standards of this control framework prove to be somewhat effective. In fact, the cognitive biases likely to overwhelm the bank executive leadership might well affect the director's strategic policies within the organization.

At this junction of research, the objective lies in studying the effect of the bank manager's behavioral dimensions (optimism, over-confidence, and loss-aversion) on performance while accounting for the executive assessment systems' mediating role or effect, as applied in the control systems.

2.2.1. The bank CEO's optimism, the accounts manager's performance appraisal system, and the bank performance

The optimism-related bias may well lead an individual to maintain that their prospective potential would be far future better than the others' (Bazerman, 2006) while overestimating the uncontrollable events' positive outcomes (Hmieleski & Baron, 2008). Besides, they might also overestimate the others' abilities and competences. As a matter of fact, optimism is most often associated with friendliness, usually characterized with trust (Sharpe et al., 2011).

In this context, and upon examining the optimism's effect on the decision-making process, Langabeer and DelliFraine (2011) have documented that most often, an optimistic leader proves to have a certain confidence in the subordinates' held skills and knowledge as well as in their behavior. In such a case, the manager would prove to be certain that the intermediate and lower level managers' behavior and actions are actually consistent with the organization's objectives. Hence, the executive's optimism would help well in strengthening the role of control and monitoring, but advice and support are also required to improve performance.

As for Hilary et al. (2016), they have discovered that the managers' profile appears to affect well their choices with regard to the company and staff. Indeed, and with regard to the others' capacities, an optimistic leader would be rather inclined to encourage the challenge-surmounting initiative-taking spirit in a bid to mobilize middle and lower level managers while increasing their potential for autonomy. Optimistic as s/he might be, an executive of this type usually tends to avoid the control of the acts performed by the other subordinates. The more the superiors and subordinates engage in relationships involving a great deal of cooperation and better confrontation, the more the company's performance turns out to improve.

With regard to Wang et al. (2013), they argue that the optimistic leader is more capable of managing the expansion of tasks within the organization (cooperation and communication) owing mainly to the spirit of initiative, the risk appetite, and the trust in others that he enjoys. This optimistic leader would display noticeable willingness to sacrifice his control rights for the colleagues' benefit. In such a case, the optimistic leader is no longer to be controlled, but would rather help, facilitate, encourage, enable, and assist initiative as well as performance for the sake of further improving output and efficiency.

Similarly, Ma (2015) points out that the Bank Director's optimism helps well in overestimating the positive results of decisions as made by others. In other words, the optimistic leader would have a certain confidence in the skills and knowledge of other partners operating within the bank institution. In this way, the whole team would naturally unite around the common objective of improving the bank's performance.

H_4 : By overestimating the accounts manager's knowledge, the bank CEO's optimism is positively correlated with the bank's performance.

2.2.2. The bank CEO's overconfidence, the accounts manager's performance appraisal system, and the bank performance

It is worth highlighting that overconfidence usually takes place whenever an individual proves to overestimate his proper skills and competences and willingness to improve performance (Langer, 1975). Indeed, overconfident individuals are most often convinced that they can correctly control and predict the fallout based on future events. This overvaluation may well affect the strategic choices closely associated with the credit approval decision.

Actually, several researchers appear to confirm the remarkable persistence of such a bias among business leaders (Barabel & Meier, 2002; Bertrand & Schoar, 2003; Bouwman, 2014; Fairchild, 2005; Gervais, Heaton, & Odean, 2003; Hawkins, Hoch, & Meyers-Levy, 2001; Heaton, 2002; Malmendier & Tate, 2005). Noteworthy, however, is that upon indulging to identify such a bias' effect on the decision-making process, only few research works have appeared to be seriously interested in elaborately studying their potentially serious effect on the control system and performance.

In their turn, Han, Lai, and Ho (2015) point out that a manager who is confident of his personal abilities tends to overestimate his probability for maintaining his position as a head at the top of the management team. In fact, such a manager often seems to have no considerable confidence in the skills and knowledge held by subordinates and, therefore, has difficulty accepting to cede a greater margin of freedom to subordinates, as he is used to commanding and controlling the whole system. As such, a manager of this kind has no intention to mobilize the information held by those who are in direct contact with the daily operating reality of the company. Such a vision is likely to penalize and jeopardize the company's performance.

In the same line of thought, Hribar and Yang (2016) argue that overconfidence is but an overestimation of one's proper knowledge through overestimating the held-information accuracy. This confident manager tends to neglect the information held by lower-rank managers. In this respect, it seems necessary to control the mid- and low-level managers. This leader is liable to find himself faced with a company that does not run well, with considerable costs and destructive conflicts predominantly prevailing. This finding highlights well the negative relationship persisting between the manager's overconfidence and the firm's performance.

This has led Beavers and Mobbs (2015) to postulate that confident leaders most often make forecasts and then seek to confirm and implement them by relying on their own skills, thus neglecting the skills and knowledge of the other parties within the company. The leader's overconfidence would pave the way for consolidating and strengthening the aspect of control and supervision, rather than that of advice and support autonomy. Hence, almost no autonomy is being left to subordinates for the sake of seizing unexpected opportunities and improving performance.

H_5 : By under-evaluating the accounts manager's proper knowledge, the bank CEO's overconfidence turns out to be negatively correlated with bank performance.

2.2.3. *The bank CEO's loss-aversion, the accounts manager's performance appraisal system, and the bank performance*

It is natural that any individual seeks to maximize and improve his well-being consistently. Having already satisfied most of his/her needs, every individual is inclined to tend towards self-esteem, which, they intend to eagerly satisfy (Maslow, 1989). Thus, the manager should seek to value his work at the head of the company by resorting to the least costly means to make relevant knowledge available to decision-makers at the appropriate time.

Herweg and Schmidt (2014) argue that managers with a discretionary margin use tools enabling them to maintain their job stability and increase their brand image. The loss-wise aware leader tends to adapt a conservative posture and to reject any decision made by the subordinates likely to affect their *status quo* or being about any change in their current state. This undertaking entails controlling subordinates and their various actions. This procedure is likely to reduce the employees' latitude to adapt to a given situation and may well endanger the performance.

In a study, investigating the relationship between a biased manager and firm performance, Schütte and Wichardt (2013) show that a manager who is averse to loss should look for suitable tools whereby to ensure his/her position's stability. For instance, s/he may resort to controlling the subordinates in the various aspects of their actions. Too concerned about loss, such an executive would not be able to work within a team, conduct meetings, make group decisions nor even listen to the others to improve performance.

Additionally, Gudmundsson and Lechner (2012) point out that decisions made in situations of uncertainty must be conveyed in light of the directors' mental models. Thus, any choice of evaluation systems undertaken within the organization is not exclusively dependent on organizational factors (organizational complexity, information and communication technologies, units' size, etc.) but is also affected by the executives' preferences. By way of illustration, a director who seems to be too averse to loss would often underestimate the subordinates' detained knowledge, thus failing to recognize the performance likely to be derived from their advanced initiatives. Such a procedure shows well to what extent the negative relationship between the manager's loss aversion policy to loss and firm performance can be harmful or even more destructive.

H_6 : By underestimating the accounts manager's defined knowledge, the bank CEO's loss-aversion character proves to be negatively correlated with the bank's performance.

3. Research design

3.1. *Data sample selection*

The empirical study is based on a quantitative research framework, through administration of a relevant questionnaire, designed for data collection purposes.

The questionnaire involves six major parts, focused on some specific theoretically-elaborated areas, as explained below:

- The first area targets both the bank and the related branch (branch size, branch organizational complexity, bank size, and organizational complexity).
- The second section treats the accounts manager's performance appraisal system.
- The fourth part aims to identify the accounts manager's relevant incentive systems.
- In the last parts are attempts to illustrate the bank CEO's associated loss aversion, optimism, and overconfidence levels.

It is worth noting that the questionnaire is addressed to a number of Tunisian bank CEOs. The study sample includes 100 bank CEOs pertaining to 11 commercial (universal) Tunisian banks, listed on Tunis Stock Exchange (TSE).

Our focus has been exclusively laid on the TSE-listed banks for reasons of data availability and continuity. Indeed, by regulation, the listed banks have to publish their financial statements along with a plethora of information predominantly reflecting their actual status. Thus, they could serve as a reliable data-base background, on the basis of which an effective model could be devised and estimated. It is to be noted that the listed banks account for almost 92% of the entire banking sector's total deposits and for almost 87% of the credits allotted to the economic sector in 2013, based on their historical presence, the orientation of their universal activity, and their branch number (91% of banking branches operating across the Tunisian territory) (AMEN INVEST, 2014).

Regarding the banks' financial data, our focus is centered mainly on the annual reports of the professional association of banks and financial institutions (APTBE) and on the study sample banks' annual report concerning the year 2014 as well.

The selected sample involves bank managers or CEO's whose average age ranges between 35 and over 50. Most of the questionnaires have been distributed by means of the door-to-door method; some others have been delivered or handed to the concerned person, while a few have been mailed. Still, some difficulties relating mainly to the questionnaires' administration have been encountered: the CEOs we met during the questionnaire distribution have, unfortunately, not always been available. Besides, the request has also been repeatedly rejected owing mainly to the survey's subject's sensitivity (Table 1).

3.2. Variables' measurement

This section is aimed to determine the variables' relevant measurements.

3.2.1. The dependent variable: Bank performance

For the purpose of measuring bank's performance, an appeal will be made to apply two indicators: return on equity (ROE) and profitability of economic assets (ROA). Both of these profitability ratios, ROE and ROA, represent, respectively, the bank's "net result" to "total assets" ratio along with its proper funds.

Concerning Return on Equity (ROE), this "profit" to "funds" ratio, as applied by the bank, expresses financial profitability. It helps in measuring the bank's successful strategy in the application of investment funds: it stands for the return from the shareholders' point of view, as it indicates the return rate scored on their investments. This ratio was initially *inter alia* opted for by Holderness and Sheehan (1988) and by Ang, Lauterbach, and Schreiber (2002) as well.

Table 1. CEO-characteristics percentages

Age	Percentages
35-50 years	22
50-55 years	50
Over 55 years	28
<i>Gender</i>	
Male	47
Female	53
<i>Degree</i>	
Baccalaureate	18
Baccalaureate +2	32
Baccalaureate +4	29
More	21

ROE = Net income/equity

With regard to Return on Assets (ROA), this ratio is computed by applying the ratio of “net income” (or profit) to “total assets” (the equivalent of the balance sheet total), i.e. the return on asset, and generally economic profitability. Its major advantage lies in the fact that it covers the entirety of the bank’s activities. The ROA has been used by several authors worth mentioning among whom one could cite researchers such as Yan (1998), Bektas and Kaymak (2009) along with Haw, Simon, Hu, and Donghui (2010).

ROA = Net Income/Total assets

3.2.2. *Independent variable: Emotional biases*

The administrated questionnaire aims at measuring the three major constituent behavioral biases (loss aversion, optimism, and overconfidence). The questions have been inspired from a questionnaire already conducted by solidarity funds of the Quebec workers’ federation for the purpose of determining the relevant confidence and optimism indexes concerning a number of Quebec-based SMEs. Every item is scaled from 1 up to 5 points on the Likert scale (do not agree = 1/ strongly agree = 5) (Table 2).

We can calculate the bank CEO’s optimism as follows (Table 3):

$$\text{Optimism (OPT)} = \left(\sum \text{items} \right) / \left(\sum \text{points calculated for all items with positive responses (strongly agree)} \right)$$

Subsequently, we brought back the number to a value equal to zero point two (0.2) as follows (Table 4):

$$\text{Overconfidence (OVER)} = \left(\sum \text{items} \right) / \left(\sum \text{points calculated for all items with positive responses (strongly agree)} \right)$$

The score is calculated on the basis of the conducted questionnaire using the following methodology:

$$\text{Loss aversion (LA)} = \left(\sum \text{items} \right) / \left(\sum \text{points calculated for all items with positive responses (strongly agree)} \right)$$

3.2.3. *Variable mediator*

3.2.3.1. *Incentive systems:* With reference to the works elaborated by Catelin (2001) and Zouari (2008), the items reflecting the monetary and non-monetary incentives would constitute the dependent variable’s major components. Every item is scaled from 1 up to 5 points on the Likert scale (do not agree = 1/ strongly agree = 5) (Table 5).

Table 2. Items used with respect to the optimism bias scale (6 items)

Items	Component optimism (57.125% of the total variance)
I foresee the upcoming life events positively	0.640
I plan to contribute with accomplishments that would sound greater than the average achievements	0.758
In general, I would feel really optimistic whenever I have to decide for something important	0.813
I feel pessimistic with regard to the bank’s internal status	0.481
The surrounding bank managers appear to have an effective needs’ analysis	0.678
I feel confident as to my colleagues’ estimations	0.660

Table 3. Items used with regard to the overconfidence bias scale (5 items)

Items	Component overconfidence (62.236% of the total variance)
My files' assessments prove to be accurate	0.861
I think I can anticipate the customers' deception	0.841
It is easy to pay a particular attention to my objectives and accomplish my goals	0.786
I feel rather intelligent with respect to the majority of my colleagues	0.743
My colleagues take me for a good CEO	0.712

Table 4. Items used regarding the loss-aversion bias scale (6 items)

Items	Component loss aversion (62.47% of the total variance)
Even in those cases when success is not taken for granted, I would make an attempt to achieve it	0.805
I have a comprehensive insurance coverage	0.861
My decisions are always taken with great care and precision	0.664
In financial contexts, the word « risk » signifies « danger »	0.689
I would take challenging decisions once I feel sure of the targeted results	0.625
I usually try to predict the negative results likely to emanate from my acts	0.777

Table 5. The incentive systems' factors (4 items)

Items	Factor 1: (28.82% of the total variance)	Factor 2: (16.87% of the total variance)
Increasing the salary or the premium	0.929	
Bonus	0.928	
Promotion		0.899
Working autonomy		0.446

The incentive systems take the following two points (see Table 6):

$$\text{Monetary incentive system (INCS1)} = \frac{(\sum \text{items})}{(\sum \text{points calculated for all items with positive responses (strongly agree)})}$$

$$\text{Non-monetary incentive system (INCS2)} = \frac{(\sum \text{items})}{(\sum \text{points calculated for all items with positive responses (strongly agree)})}$$

3.2.3.2. *Evaluation systems relevant to the accounts manager's performance*: Referring to the works elaborated by Catelin (2001), Bouslama & Nekhili (2007) and Zouari (2008), performance evaluation mechanisms denote two separate categories of measures; financial measures and non-financial ones. Every item is scaled from 1 up to 5 points on the Likert scale (disagree = 1/strongly agree = 5).

Table 6. Items used with respect to the evaluation systems' scale

Items	Factor 1: (50.71% of the total variance)	Factor 2: (29.45% of the total variance)
The skills acquired by the accounts manager are regularly determined and evaluated	0.842	
I observe the accounts manager's decisions following the setting up of expectations	0.845	
Among the files decided upon after being delegated to the branch, the criteria adopted to interpret the decision-maker's declared decisions are performance and objectives' achievement	0.857	
Among the files decided upon after being delegated to the branch, the criteria adopted to interpret the decision-maker's declared decisions are skills and professionalism		0.774
I only state to the accounts manager the objectives expected to be achieved by the bank		0.751

The evaluation systems involve the following two points (Table 7):

$$\text{Financial evaluation system (ESP1)} = \frac{(\sum \text{items})}{(\sum \text{points calculated for all items with positive responses (strongly agree)})}$$

$$\text{Non-Financial incentive system (ESP2)} = \frac{(\sum \text{items})}{(\sum \text{points calculated for all items with positive responses (strongly agree)})}$$

Table 7. Descriptive analysis of the variables of the model

LV (latent variable)	MV (manifest variable)	Observations	Missing observations	Minimum	Maximum	Average	Deviation standard
Bank performance	ROE	100	0	-1.400	2.200	0.653	1.184
	ROA	100	0	-8.400	22.600	8.215	10.355
Incentive systems	INCS1	100	0	0.200	1.000	0.505	0.209
	INCS2	100	0	0.200	0.933	0.523	0.203
Evaluation system of the performance of accounts manager	ESP1	100	0	0.200	1.000	0.574	0.260
	ESP2	100	0	0.100	1.000	0.586	0.263
Optimism of the Bank CEO	OPT1	100	0	0.200	1.000	0.561	0.299
	OPT2	100	0	0.200	1.000	0.571	0.283
Loss aversion of the Bank CEO	LA1	100	0	0.200	1.000	0.571	0.253
	LA2	100	0	0.200	1.000	0.597	0.254
Overconfidence of the Bank CEO	OVER1	100	0	0.200	1.000	0.597	0.262
	OVER2	100	0	0.200	1.000	0.518	0.218
Size and organizational complexity of the bank	SIZB	100	0	0.000	1.000	0.500	0.500
Size of the branch	SIZAG	100	0	0.000	1.000	0.310	0.462
Organizational complexity of the branch	COMAG	100	0	0.000	1.000	0.460	0.498

3.2.4. Control variables

3.2.4.1. Bank size and organizational complexity: This dimension is treated on the basis of Kwan (2003)'s conducted work, highlighting that the bank's size does have a positive and significant effect on its profitability through advancing the economies of scale. This finding has been confirmed through establishing a distinction between listed and non-listed banks. Other elaborated studies, for instance, those by Pinteris (2002) and Adams and Mehran (2003), have discovered that performance is positively associated with the size of the bank. With regard to our specific study's context, the following measures are going to be applied:

The bank size and organizational complexity = the number of branches.

The bank size and organizational complexity may be assigned two distinct scores, namely:

- 1 if the number of branches appears to be important, i.e. exceeding 100 branches;
- 0 otherwise.

3.2.4.2. Branch size: Work has shown the significant effect of the size of the branch on bank performance (Bousslama & Nekhili, 2007; Smonel, 2011). Hence, the following measure will also be applied: the branch size = the number of staff working at the branch.

The branch size may take either of two different scores, respectively:

- 1 if the bank branch size turns out to be important, i.e. exceeding 25 employees;
- 0 otherwise.

3.2.4.3. Branch organizational complexity: Research has shown a link between the size of the operational units of the banks and the organizational architecture mechanisms (Degryse & Ongena, 2007; Stein, 2002). The size and organizational complexity of the operational units of a bank may have implications for bank performance (Bousslama & Nekhili, 2007).

So, the following measurement criterion is also going to be applied: the organizational complexity of the branch structure = the number of hierarchical ranks the branch has.

The branch structure's organizational complexity takes two different scores, namely:

- 1 if the number of hierarchical levels perceived within the branch appears to be important;
- 0 otherwise.

3.3. Data analysis method

As already set, our goal consists in testing the effect of the bank CEO's related behavioral biases (overconfidence, loss aversion, and optimism) on the Tunisian banks' performance. For the sake of modeling such causal relationships, we consider it useful to opt for a structural equations' model, which would particularly serve to minimize the residues' variations. Dubbed PLS (Partial Least Squares), this method proves to help greatly in estimating the parameters standing too close to the basic components with a regression multiplicity. In what follows is a presentation and interpretation of the structural equations' reached results, as tested via the PLS approach.

4. Analysis and interpretation of results

4.1. Descriptive statistics of the obtained variables

The dependent variable, bank performance, is explained using independent variables that measure behavioral biases while considering the mediating role of the control system (incentives and

evaluation). The inclusion of control variables allows us to ameliorate the degree of external validity of the results. According to this label, taking into consideration the control variables related to the organizational characteristics of the branch and those of the bank can influence the bank's performance.

The table above shows that we are using 9 latent variables and 15 patent variables to test the models. It provides also the average and the standard deviation of each variable.

4.2. Results of the model

We based our analysis on XLSTAT 2015 and more precisely on the PLSPM approach. Chin (1998) has put a catalog of criteria to assess partial model structures. A systematic application of these criteria is a two-step process, encompassing (1) the assessment of the measurement model and (2) the assessment of the structure model.

In what follows, we present the results of our analysis step by step:

4.2.1. Evaluation of the measurement model

The measurement model, also called the external model, is evaluated on the basis of the following criteria: reliability of internal coherence (the reliability of the manifest variables), unidimensionality of constructs, convergent validity of measurements associated with constructs, and discriminant validity. It is therefore a question of verifying the correlations of the latent variables with their manifests.

4.2.1.1. *Reliability of manifold variables and unidimensionality of constructs:* Internal consistency reliability measures the internal consistency of a scale constructed from a set of items. It is estimated by the correlations of the VM (loadings) with the latent variable to which they are attached. It can be verified by two measurements, Cronbach's Alpha and Dillon-Goldstein's Rho. These indicators range from 0 to 1.

The unidimensionality of a block is verified by studying the eigenvalues resulting from the principal component analysis: the first eigenvalue must be greater than 1 and the second eigenvalue less than 1 (or much less than the first). This characteristic ensures that despite their diversity, the block of the manifest variables measure a single latent variable (Table 8).

Cronbach Alpha tends to provide a severe underestimation of the internal consistency reliability of latent variables in PLS path models; it is more appropriate to apply a different measure, the composite reliability (Werts, Linn, & Jöreskog, 1974). An internal consistency of reliability values which is greater than 0.7 is regarded as satisfactory (Nunnally & Bernstein, 1994).

We can notice that the Cronbach Alpha and the Rhos of Dillon measurements are suitable for every scale. All the alphas as well as the Rhos of Dillon are above 0.7, which translates the effectiveness of the bloc of these variables. It is worthy to note that the first proper value is greater than 1,

Table 8. Effectiveness of the bloc (composite reliability)

Latent variable	Cronbach alpha	Rho DG	First VP	Second VP
Bank performance	0.943	0.972	1.892	0.108
Optimism of the Bank CEO	0.955	0.978	1.914	0.086
Loss aversion of the Bank CEO	0.906	0.955	1.828	0.172
Overconfidence of the Bank CEO	0.791	0.905	1.654	0.346
Incentive systems	0.817	0.916	1.691	0.309
Evaluation system of the performance of the accounts manager	0.828	0.921	1.706	0.294

while the second is less than 1 and this is applicable for every latent variable, which proves the dimensionality of the variables. Thus, we have the right to use the reflective model (mode A).

4.2.1.2. *Convergent and discriminant validity*: In PLS path modeling, two measures of discriminant validity have been put forward: The Fornell–Larcker criterion, the Average Variance Extracted (AVE), and the cross-loadings. The Fornell–Larcker criterion (Fornell & Larcker, 1981) postulates that a latent variable shares more variance with its assigned indicators than with any other latent variable.

A popular approach for establishing discriminant validity is the assessment of cross-loadings, which is also called “item-level discriminant validity”. According to Gefen and Straub (2005), “discriminant validity is shown when each measurement item correlates weakly with all other constructs except for the one to which it is theoretically associated” (Table 9).

Loadings reveal the strength of the relationship between manifest and latent variables. The results presented in the table above show that all the loadings are greater than 0.7 and every indicator has the highest loading on its desired variable; therefore, the measurement models fulfill the desired quality criteria (Chin, 1998). Additionally, we need to check the Average Variance Extracted (AVE) and the correlation among the latent variables (Table 10).

Table 9. Cross-loading

	OPT	LA	OVER	PER	SIZB	SIZAG	COMAG
OPT1	0.978	-0.887	-0.844	0.725	-0.653	-0.584	0.534
OPT2	0.978	-0.837	-0.800	0.721	-0.632	-0.557	0.484
LA1	-0.832	0.957	0.760	-0.711	0.638	0.471	-0.480
LA2	-0.853	0.955	0.832	-0.699	0.615	0.541	-0.491
OVER1	-0.808	0.788	0.916	-0.645	0.622	0.585	-0.487
OVER2	-0.717	0.724	0.903	-0.603	0.568	0.489	-0.490
ROE	0.695	-0.703	-0.645	0.971	-0.543	-0.386	0.367
ROA	0.741	-0.730	-0.690	0.974	-0.562	-0.425	0.389
SIZB	-0.657	0.655	0.655	-0.568	1.000	0.670	-0.522
SIZAG	-0.583	0.529	0.592	-0.417	0.670	1.000	-0.402
COMAG	0.520	-0.508	-0.537	0.389	-0.522	-0.402	1.000

Table 10. Convergent and discriminant validity (AVE > squared correlation)

	OPT	LA	OVER	SIZB	SIZAG	COMAG	PER	Average communalities (AVE)
OPT	1	0.776	0.706	0.431	0.340	0.271	0.546	0.957
LA	0.776	1	0.692	0.429	0.280	0.258	0.544	0.914
OVER	0.706	0.692	1	0.429	0.351	0.288	0.471	0.827
SIZB	0.431	0.429	0.429	1	0.449	0.272	0.323	
SIZAG	0.340	0.280	0.351	0.449	1	0.161	0.174	
COMAG	0.271	0.258	0.288	0.272	0.161	1	0.151	
PER	0.546	0.544	0.471	0.323	0.174	0.151	1	0.946
Average communalities (AVE)	0.957	0.914	0.827				0.946	0

The AVE should be greater than 0.5 and should be greater than any correlation with other latent variables (Chin, 1998). The AVE and the correlations among the latent constructs are presented in the table above and show that the measurement models fulfill these two criteria as well.

4.2.2. Evaluation of the structure model

The following approach is to test hypotheses concerning the mediating role of the control system (the incentive systems and the Evaluation system of the performance of the accounts manager) in the relationship “CEO’s emotional bias – bank performance”. To test the mediation, we use the approach of Baron and Kenny (1986), which proposes to test the following links:

Step 1: The regression of the dependent variable on the independent variable.

Step 2: The regression of the mediator on the independent variable.

Step 3: The regression of the dependent variable on both the mediator and the independent variable.

The purpose of Steps 1 and 2 is to establish that zero-order relationships among the variables exist. If one of these relationships is “not significant”, researchers usually conclude that mediation is not possible or likely. Assuming there are significant relationships from Steps 1 through 2, one proceeds to Step 3. In the Step 3 model, some form of mediation is supported if the effect of the mediator remains significant after controlling the outcome. If the outcome is no longer significant when the mediator is controlled, the finding supports full mediation. If the outcome is still significant (i.e., both the outcome and the mediator significantly predict the treatment), the finding supports partial mediation.

For this purpose, we made a model in PLS in two stages. First, we tested the effect of emotional biases on bank performance and then we integrated the variables: incentive systems and evaluation system of the performance of the accounts manager.

4.2.2.1. Analysis of model “a” results: According to these results, the optimism of the Bank’s Regional Manager has a positive and significant impact (at $p < 0.1$) with a value of 0.355 on the bank’s performance. In addition, the regional manager’s aversion to loss has a negative and significant impact on the bank’s performance, while his overconfidence has a negative and insignificant impact on the bank’s performance. **This confirms Relationship 1** for the first two variables (optimism and aversion to loss) (Figure 1, Table 11).

Figure 1. Model “a” results: Relationship between emotional biases–bank performance.

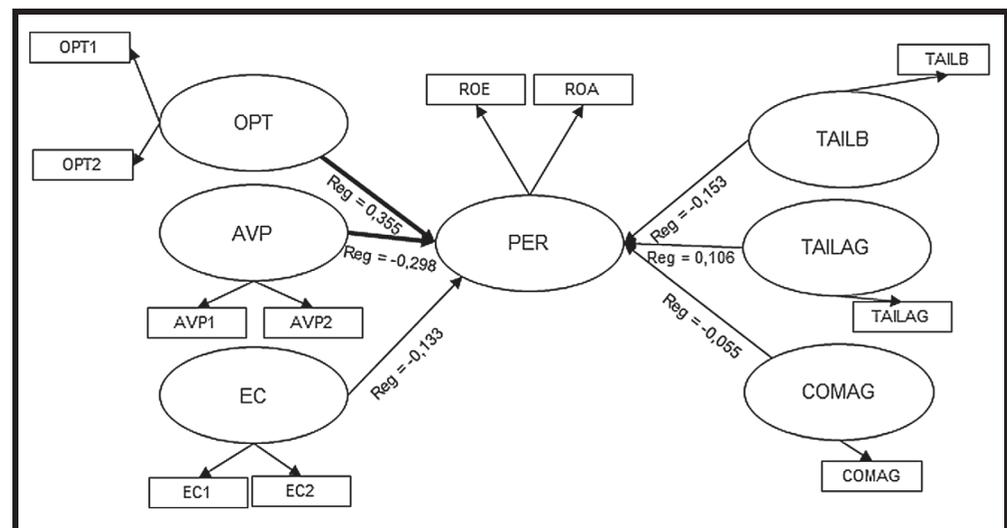


Table 11. Structural model (relationship between emotional biases-bank performance)

Dependent variable	Latent variable	Value	Standard deviation	t	Pr > t
Bank performance	Optimism of the bank CEO	0.355	0.156	2.272	0.025
	Loss aversion of the bank CEO	-0.298	0.152	-1.961	0.053
	Overconfidence of the bank CEO	-0.133	0.136	-0.974	0.333
	Size and organizational complexity of the bank	-0.153	0.105	-1.465	0.146
	Size of the branch	0.106	0.094	1.136	0.259
	Organizational complexity of the branch	-0.055	0.082	-0.677	0.500
	R ²		0.594		

The financial performance of the bank is based on the financial performance of the bank.

Regarding Relationship 2, it should be noted that we have not studied the effect of the regional manager’s excess of confidence on the performance of the banks. **Assumptions H₂ and H₅ are not validated.**

4.2.2.2. *Analysis of model “b” results:* In order to verify Relationship 2, we studied the impact of the bank manager’s emotional bias on incentive systems and performance appraisal systems. The results show that the relationship between the bank manager’s optimism and the incentive systems is positive and significant (Reg = 0.259, t = 2.198). The same thing is true for the effect of the optimism of the manager on the systems of evaluation of the performance of the loads of business (Reg = 0.247, t = 1.910).

However, the relationship between the regional director’s aversion to loss and the managers’ performance appraisal systems is negative and significant (Reg = -0.422; t = -3.380). The same can be said about the effect of the regional director’s aversion to loss on incentive systems (Reg = -0.343; t = -2.977). **This validates Relationship 2 (Figure 2).**

Concerning Relationship 3, it should be noted that we have not studied the mediating role of incentive systems for managers since the incentive systems do not have a direct effect on the performance of the bank. **Therefore, H₁ and H₃ are not tested.**

Regarding the other hypotheses, and more particularly concerning the mediating effect of systems for evaluating the performance of the accounts managers in Tunisian banks, **the study of Relationship 3 gives the following results (Table 12):**

Figure 2. Model “b” results: Mediator role of control systems.

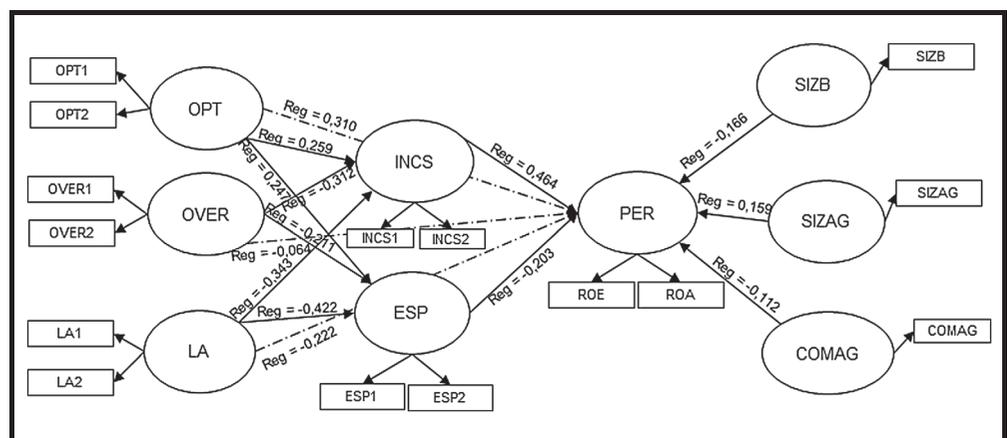


Table 12. Mediating effect of control systems

Model 4b	Reg	Sig(t)		Reg	Sig(t)	Mediation
Optimism of bank CEO → Bank's performance	0.176	1.107	Performance assessment systems → Bank's performance	-0.400	-2.978	Complete
Bank CEO's loss aversion → Bank's performance	-0.220	-1.384				Complete

From the table above, we conclude that:

- The performance appraisal system for bank accounts managers has a full mediating effect on the relationship between the bank CEO's optimism and the bank's performance. **H₄ is validated.**
- The system for evaluating the performance of accounts managers in Tunisian banks has a direct effect on the Tunisian banks' performance. The incentive system also has a mediating role in the relationship between the bank CEO's loss aversion and the bank's performance. **H₆ is validated.**

4.2.2.3. Result interpretation: The results of the first relationship show that there is a negative and non-significant relationship between the bank manager's excess of confidence and the performance of the Tunisian bank. The overconfident director overestimates his/her skills and tends to undertake more risky investments than an unbiased director (Ho et al., 2016). Thus, the excessive confidence of the director can penalize the performance of Tunisian banks.

The incentive system has no mediating effect on the relationship between the CEO's emotional bias and the bank's performance. On the other hand, managerial optimism is correlated positively with the motivation and involvement of the director in his work. This optimistic bank CEO makes investment decisions in order to increase the bank's competitiveness and ensure performance improvement. So, the choice of the incentive system for the accounts managers does not affect this relationship between the bank CEO's optimism and performance. The director of the bank who is averse to loss is not interested in improving and motivating the skills of the case managers. This choice of incentive system has no mediating effect on the relationship between the loss aversion of the bank CEO and performance. So, the director who is averse to the loss of a kind of remuneration or his/her post adopts "a quiet life". This choice has a negative effect on performance.

The results lead to a negative mediating effect of the performance appraisal system of accounts managers on the relationship between the emotional bias of the Tunisian bank CEOs and the bank's performance. We found that the optimistic CEO with respect to the capacities of others finds that it is not necessary to control others in the various aspects of their activities. With this choice, a low level of effort at the level of the accounts manager can penalize the performance of the Tunisian banks. Thus, the bank CEO's loss aversion causes him to decide to take control of himself so as not to lose a reputation and stable employment. In this case, this kind of CEOs does not leave a certain amount of autonomy to the accounts managers in order to seize the unexpected opportunities and improve the performance of the banks.

5. Robustness checks

We extend our empirical analyses by including two models in regression analysis; the first is for ROE, while the second is for ROA. In this occurrence, we obtain the same findings and inferences remain unchanged.

6. Conclusion

This article deals with the impact of Tunisian bank CEOs' emotional biases (optimism, aversion to loss, and excess of confidence) on the bank's performance while taking into account the mediating effect of the control systems. To do this, we have set up a survey of some CEOs of Tunisian banks

listed on the Tunis Stock Exchange in the post-revolution period. In fact, the analysis of the data collected showed that the behavioral dimension (optimism and aversion to loss) of the Tunisian Bank CEO affects the combination of control systems (incentives and evaluation) and consequently the performance of Tunisian banks.

The behavioral dimension brings enrichment to the organizational financial theory to explain the control systems as well as performance.

The performance of the banks could be related to other organizational factors that were not explored in this study, namely the decision system.

Overall, the results validate the theoretical arguments that advocate the importance of the Bank CEO's optimism on incentive and evaluation systems, which thus have a positive impact on performance. Indeed, the results show a negative relationship between loss aversion and control systems. This may be due to the fact that the control systems in banks are more affected by the emotional aspects than by the rational aspects. Hence, in order to improve performance and better manage their teams to achieve the objectives, Tunisian banks must include the psychological commitment aspect in the persuasive system.

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