Entreprise risk management and firm performance: the case of Casablanca stock exchange

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ENTERPRISE RISK MANAGEMENT AND FIRM PERFOMANCE: THE CASE OF CASABLANCA STOCK EXCHANGE

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This Dissertation symbolizes the end of five years of hard work and dedication and prepares me for the transition from an eager university student to a young professional. Through this Research-Thesis, I am completing my last assignment as a Master's student in Management, with a specialization in Financial analysis and Audit. I started my academic journey in ENCG Marrakesh and I am concluding it at HEC ULiège with a research regarding Enterprise Risk Management and firm performance in Morocco.

I address my gratitude to my loving mother, and my two sisters for their limitless love and their infinite support. Many thanks to all my friends and the people who never stopped supporting me all along the way.

From the bottom of my heart, Thank you!

Yassine DRARI

“To the bright and loving memory of my father and my idol, Mohammed Drari, who always believed in me. You are gone, but your memory will always be present with me.” Y.D.

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List of abbreviations and definitions:

ERM: Enterprise Risk Management

RM: Risk Management

CSE: Casablanca Stock Exchange

Dahir: Moroccan Royal Decree

AC: Audit Committee

BoD: Board of Directors

CG: Corporate Governance

ROA: Return on Assets

Introduction

Enterprise Risk Management gained increased attention from practitioners worldwide in the last decade and continue to evolve. Firms all over the world start to focus on its pillars and build its processes according to recent literature. Literature about Enterprise Risk Management is still at its infancy; even though researchers aim at the importance of this new version of Risk Management, many gaps need to be bridged in order to assess precisely its relevance.

1. The context of this dissertation

One of the essential reasons explaining the choice of this topic is its context. In fact, the latter hits three targets. The first is the need for improvement of Enterprise Risk management's literature. The OECD[1] pointed, back in 2014, the failure of risk management regarding the financial crisis and justified this failure by the large number of companies who still relied on traditional risk practices rather than corporately integrated risk management (OECD, 2014). The crisis raised awareness about risk practices considerably, mostly in the financial sector. Therefore, the choice of studying Enterprise Risk Management on non-financial firms will offer new shreds of evidence on these kinds of firms.

The second contextual point of this research treats an emerging country, like Morocco. To the best of our knowledge, this is the first study that investigates the relationship between Enterprise Risk Management and Performance from a North African perspective. The Moroccan Kingdom, until recent years, was characterized by a closed economy and starting from 2016 the country began opening on other markets, mainly through south-south agreements. The last point proves the necessity of developing risk practices in Morocco. The study comes ten years after the financial crisis, but it is still relevant, since the Kingdom was not hit severely by the Financial Crisis, and the raised awareness toward Enterprise Risk Management, undoubtedly, touched Moroccan firms and institutions.

The third point of the context of this study is the increased efforts of Moroccan authorities to enhance the Casablanca stock exchange. The latter failed to become one of the primary sources

[1] Organisation de coopération et de développement économiques

of revenues for the country, that is why it is of high importance to enhance its performance. This can be achieved by improving most of the listed firms' performance, by doing so, the stock exchange will generate more profits and evolve, considering that the Moroccan stock exchange is one of the major actors of African stock markets.

2. Research questions:

The research directions elaborated in this thesis stem from existing literature on Enterprise Risk Management and its association with performance. We aim to investigate this Risk Management approach repercussions on enterprises performing on the Moroccan Stock Exchange. We found that many researchers debated the relevance of Enterprise Risk Management and its consequences on firm performance and firm value. Thus, we now want to present the two central research questions that this work tries to provide the most answers for:

Research question 1: *How are the components of an ERM system impact firm performance in the Moroccan context?*
Research question 2: *What is the impact of ERM, evaluated as a system, on both the accounting performance and market value of Moroccan listed companies?*

In order to optimally answer these questions, we have established a literature review answering the following sub-questions:

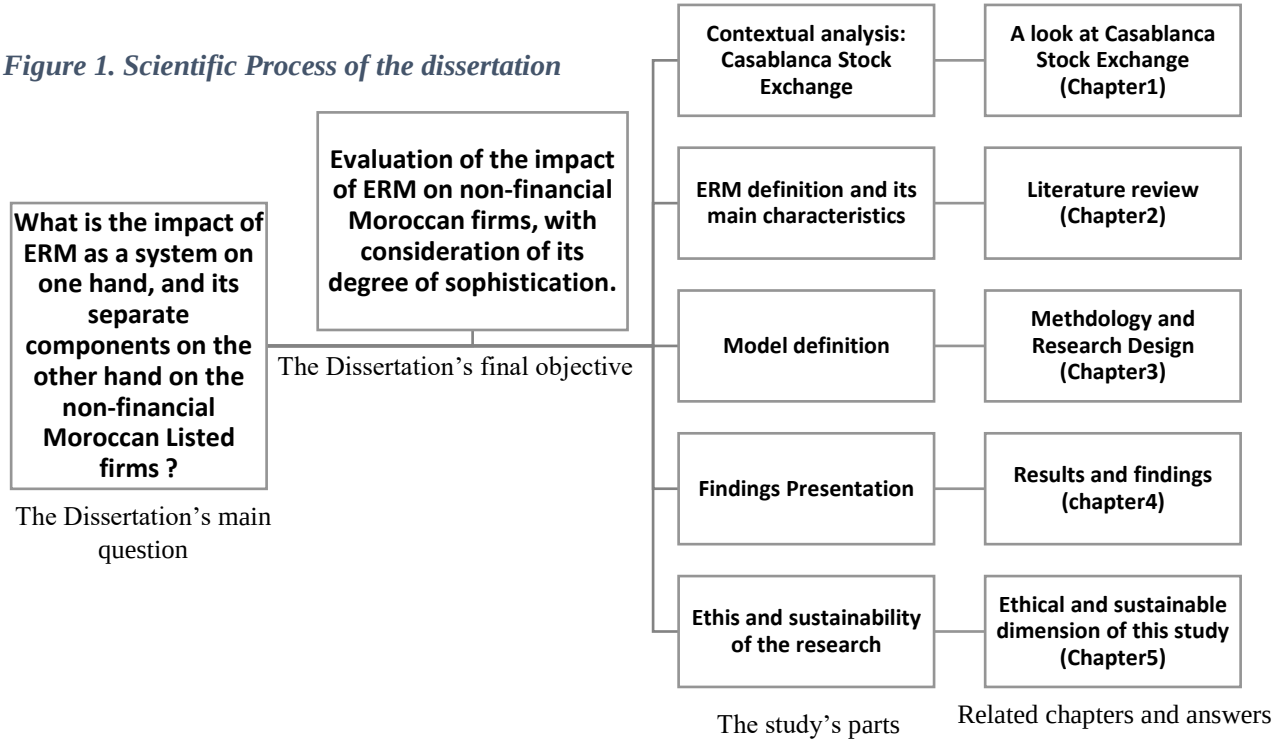
- What is ERM and what are its objectives?
- What added value a good ERM system can bring a company in the case of an international financial disaster, as the 2008 financial crisis?
- What is the impact of an ERM system on the quality of risk management, and more generally on the operation of the company according to current literature?

We, also, answered the following sub-questions in our analysis part:

- What are the vital components of an ERM system following literature and in adaptation to the Moroccan context?
- How are these components impact, separately and jointly, Moroccan firms' performance?

The sub-questions, in their turn, are segmented into sections. By answering these sections and the sub-questions, we will be able to answer our research questions. Figure 1 describes the scientific sequence of our work in answering the research questions.

Figure 1. Scientific Process of the dissertation



3. The contribution of the study

This Dissertation participates in enriching the literature concerning Enterprise Risk Management. It supplements literature through enhancing evidence through an analysis in an emerging market about the causality between Enterprise Risk Management and firm performance. This study is, to the best of our knowledge, the first of its kind in the Moroccan and North African context. Moreover, based on the fact that previous researches were mainly conducted on financial firms, this study offers new insights about the non-financial firms. Although it is too early to judge with conviction the relationship of performance with Enterprise Risk Management, this study may constitute the base and guide further research about this subject in emerging markets, generally, and North African markets as Morocco, specifically. This research can also participate in the improvement of laws and regulations regarding Moroccan listed firms.

4. The approach

This dissertation is structured as follows. Afterward, a contextual positioning through the chapter describing Casablanca Stock Exchange, this chapter will briefly present the history of the Moroccan stock market, then we will identify its main actors and discuss corporate governance and risk management in Morocco. Further, a literature review on Enterprise Risk Management, the chapter will define risk management and Enterprise Risk Management, it will also comment it through results obtained during the financial crisis of 2008, and by the end, it will present empirical findings about its relationship with firm performance. The first and second chapters will help us set the hypotheses we will test based on the theoretical conceptual model and the statistical model. The last point will be developed in the third chapter, which will detail the research design followed all along this study and present the measurement period, the choice of variables and the data collection. The fourth chapter will present the results obtained and test the validity of the statistical model. Before drawing conclusions, the subject will be discussed from an ethical and sustainable dimension. Then by the end of this work, final conclusions are presented along with the answers to the research questions, accompanied by the limitations and future research possibilities.

Casablanca Stock Exchange: Environment, Context and Corporate Governance

Introduction

The Moroccan financial market has undergone a significant modernization movement, aiming to shift Morocco's debt-based economy to a financial economy. The historic shift towards a financial market economy is expected to facilitate the optimal allocation of resources.

Present for nearly 90 years, The Casablanca Stock Exchange (CSE) is a key institution in Morocco, it gathers many bodies who are in charge of structuring the market and enhancing its competitiveness.

To understand the highly complex mechanism of the CSE, the following chapter outlines the essential features and the main particularities of the financial environment in Morocco. It would allow understanding the bigger picture of CSE and the significant factors influencing Morocco's finance landscape. Therefore, this chapter is segmented as follows: 1. CSE history, 2. CSE's organization, 3.CSE market operators, 4. CSE in 2017, 5. Corporate governance in Morocco, 6. Creation of specialized committees.

1. Casablanca Stock Exchange's history:

The CSE is one of the principals and oldest Moroccan institutions. It was established on the 7th of November of 1929 under the name "Securities Clearing Office"[2] (Casablanca, s.d.). However, the development of the institution did not meet the expected levels. The Moroccan authorities joined efforts to adapt to the continuously changing financial environment and the growing importance of Stock Exchange markets by undergoing several

[2] Translated to English, named intitially: Office de Compensation des Valeurs Mobilières.

reforms since the early life of the institution in both legal and technical aspects. In 1948, the Securities Clearing office became the "Securities Rating office"[3] (Casablanca, s.d.).

Until the mid-nineties, the primary type of communication between different actors in the CSE was the *open outcry.* With an attempt catch up with the use of new technologies, from 1997, CSE started testing new ways, which were mainly based on electronic technology. In 1998, all the securities in the CSE were traded electronically.

Today, the CSE is one of the leading stock exchanges in the African Continent, as it is the 2nd important one behind Johannesburg. The Market capitalization reached 626 965 404 206 MAD in 2017 (Bourse de Casablanca, 2017).

2. The organization of the Casablanca Stock exchange:

The Moroccan financial market is composed of 75[4] enterprises classified by three interdependent compartments. The compartments are structured differently according to many criteria, as represented in Appendix I.

3. Casablanca stock exchange market operators:

1.1. The managing company:

The CSE is a joint stock company in charge of the management of the stock exchange. It works by following the requirements of the Ministry of Finance. The latter creates a statement including all the objectives to be achieved and sets the rules regarding the operation of the stock exchange, the registration and specifies the rules of conduct to be respected by the personnel of the managing company.

The law n°01-93-211 of September 21st, 1993 (Dahir portant loi n° 1-93-211, 1993) governing the regulation of CSE, defines the crucial missions of the stock exchange managing company: It is an actor of the Moroccan stock exchange who is:

[3] Translated to English, named initially: Office de Cotation des Valeurs Mobilières.
[4] Number of companies in 2018.

- Responsible for the introduction and cancellation of securities to official listing;
- Setting the operating rules of the market;
- Ensuring that the transactions carried out by the brokerage firms comply with the current laws and regulations;
- Reporting to the regulator any offense identified;
- Organizing the listing;
- Calculating the MASI[5] and MADEX[6] indices.

1.2. The Market regulator:

Established in 1993, the CDVM, (Conseil déontologique des Valeurs mobilières), ensured that the information to be provided by public corporations, security holders, and the public, is communicated with respect to the laws and regulations. It oversaw the securities and assisted the government in the exercise of its market regulation responsibilities. The CDVM was subject to the supervision of the Moroccan state as the 1st Minister chaired it or delegate the Minister of the Economy and Finance to take hold of his responsibilities. In 2016, the CDVM became AMMC (Autorité Marocaine du Marché de Capitaux) following the publication in the Official Bulletin of 11 April 2013 of Law 43-12 (Dahir n°1-13-21, 2013), and the Publication in the Official Bulletin of 24 January 2013 of Law 44-12 dated from 2013 (Dahir n°1-12-55, 2013), offering the regulator more **Independence:** The AMMC is chaired by a president nominated by the King of Morocco with one renewable mandate. The AMMC is no longer dependent on the executive power. **Scope:** The AMMC supervises the whole stock exchange, unlike the CDVM which only was supervising securities. **Power:** An independent body within the AMMC was established, it is headed by a magistrate who is responsible for investigating infractions that should be sanctioned or transmitted to Justice.

The AMMC's missions are, as stated by Dahir establishing Law No. 1-13-21 bearing Law No.43-12 (Bourse de Casablanca, s.d.) (Dahir n°1-13-21, 2013):

- Ensuring the protection of savings invested in financial instruments;

[5] Moroccan All Shares Index
[6] Moroccan Most Active Shares Index

- Ensuring equal treatment of investors, transparency, and integrity of the capital market and the investors' information;
- Ensuring proper functioning of the capital market and ensuring the implementation of legislative and regulatory provisions;
- Ensuring control of the activity of different organizations and persons within its scope;
- Ensuring compliance with laws and regulations related to the fight against money laundering by individuals and institutions subject to its control;
- Contributing to promoting financial education for savers;
- Assisting the government in the regulation of the capital market.

The AMMC's functions are:

- Investigating requests for approval of UCITS[7];
- Conducting surveys of public corporations and securities firms;
- Publishing each year, a report on the activities and the markets under its control;

1.3. The Ministry of Economy and Finance:

The Ministry of Economy and Finance does not participate in the management of the stock exchange as stated earlier, since it is of the duty of the managing company to do so. However, this ministry constitutes the supervisory authority of the Casablanca Stock Exchange, in other words, it assists the market regulator (AMMC) in laws promulgation and ensures the proper functioning of the stock exchange. It is also present in the Board meetings of CSE, represented by a delegate.

1.4. Other market actors:

There exist other actors in the Casablanca Stock exchange, like brokerage firms, Central depository, and the brokers association.

4. Casablanca Stock Exchange in 2017

The CSE was demutualized in 2016 which significantly changed the structure of the Moroccan stock market. 2017 was marked by the execution of many bold actions, like the

[7] Undertakings For The Collective Investment Of Transferable Securities

opening on the African financial markets and strengthening relations with regional growing markets. The idea of developing the relationship with neighbor stock markets constituted the primary objective of 2017, and as an example, we can recall the memorandum of Understanding with the Ghana Stock Exchange. Furthermore, and as any calendar year, 2017 knew the refinement of the regulatory context by the publication in the BO[8] of March 2017, of the law 19-14 relating to the Stock exchange, brokerage firms and financial investment advisers; the publication, in the BO of March 2017, of Law 70-14 relating to OPCI (Organismes de Placement Collectif en Immobilier); and the publication, in the BO of November 2017 of the decree of the Minister of the Economy and Finance No. 1705-17 of 19 October 2017 which determines the composition and operating rules of the Capital Markets Committee. Regarding the competitiveness of the stock market, the Casablanca Stock Exchange ranked second in capitalization and third in trading volumes in Africa.

5. Corporate governance in CSE:

5.1. Moroccan Corporate governance code

Morocco published its first (and last) corporate governance (CG) code in March 2008 under the name: “Moroccan code of good corporate governance practices”[9]. This code was created in partnership with the most active actors of the Casablanca Stock Exchange, as the Ministry of Finance, the managing company, the Moroccan Central bank, etc. arranged in a national commission named “Corporate Governance”[10] with the assistance of The Organisation for Economic Co-operation and Development (OECD).

The code brings a set of standards for favorable corporate governance. For example, Moroccan listed companies should add a specific chapter called "Governance" where the company has to specify all the characteristics related to its governance and risk management systems. We should aim to the fact that it is not mandatory to follow the rules stated. The Moroccan CG is based on the principle of “comply or explain”. The principle of "comply or explain" gives the listed companies on the Moroccan market great flexibility as it does not

[8] Bulletin Officiel
[9] Translated to English, named initially: Code marocain de bonnes pratiques de gouvernance d'entreprises.
[10] Translated to English, named initially: Gouvernance d’Entreprises.

damage the companies' image vis-à-vis good governance if they have reasons not to disclose the section "Governance" on their annual report.

5.2. Corporate governance body

The Moroccan CG Code (Gouvernance d'Entreprise, 2008) defines the corporate governance body as the one in charge of the company's strategic decisions and is the supervision organ of the management of the company. It is accountable to the shareholders and partners, majority and minority, and must be animated by a real "affection societatis"[11] in respect to the other company's stakeholders.

The corporate governance code (2008) highlighted the primary functions of a well-functioning Corporate Governance body in the following:

- Reviewing and guiding the company's strategy, its action plans, its risks, annual budgets and programs of activities; defining its objectives, monitoring the implementation of those objectives and the company's results, and controlling its significant investments and divestments;
- Appointing the company's Directors, determining their remuneration and ensuring that they are qualified and transparent, by monitoring their activities and performance and, when appropriate, replacing them and preparing succession plans;
- Monitoring and managing any conflicts of interest that may arise between management, members of the governance body and the shareholders or partners, including misuse of corporate assets or abuses committed under-regulated conventions;
- Ensuring the integrity of accounting and communication systems of financial and non-financial aspects of the company, ensuring in particular that accounting principles and the existence of internal control and appropriate risk management, organizing the statutory audit and improving relations with the external auditors;
- Monitoring the process of publishing information and the company's communication concerning in particular: Legal and regulatory obligations regarding information; Strategic orientations; Social policy; The debt and dividend policy; Regulated agreements, in particular with key management and holding companies; Executive compensation.

[11] The action of sharing resources and pooling assets in an exploitation of simple commercial activity with the objective of realizing profit and sharing it.

- Focus on the smooth running of General Meetings, the execution of decisions taken by shareholders and to ensure corporate governance in all its forms.
- Ensure full compliance with laws and regulations and ethical business practices;
- Continually improve the Governance of the Company.

5.3. Corporate governance body independence

In 2009, the number of non-executive administrators was 89% of the total number of administrators in the listed companies (Conseil Déontologique des Valeurs Mobilières, 2009). This can be explained by the fact that most listed companies are owned by families who do not play a role in managing the enterprise.

Article 67 of Law 17-95 on Limited companies (Dahir n° 1-96-124, 1996) stipulates "Administrators who are neither chairman nor general manager nor an employee of the company exercising managerial functions, must be more numerous than the directors having any of these qualities." In addition to that, the CG recommends reserving some places exclusively for independent administrators for the sake of Independence and Objectivity.

5.4. Corporate governance body size

Law 17-95 on public limited companies imposes a minimum of 3 directors and a maximum of twelve, which can be increased to 15 if the company is listed on the stock exchange (Article 39). The Moroccan Code of Good Governance Practices (2008) insists that its recommendations should be adopted by companies which "have a margin of maneuver to implement them according to their legal structure, size, shareholding (...) ". It is also recommended to periodically evaluate the size and composition board and committees to ensure they are adequate.

6. Creation of specialized committees

The corporate governance code (2008) recommends the creation of specialized committees to ensure the good execution of good governance practices, as in the matters of accounts reviewing, internal controls, the selection of external auditors, remuneration and appointment policy, investment and debt policy and the selection of the members of the governance body and corporate officers.

The idea is that these specialized committees do not have the authority to question the Governance body decisions but to facilitate the execution of its duties and help it perform efficiently. These specialized committees have to report frequently to the corporate governance body their work and must present an assessment of their activities and a summary to be included in the annual report.

The CG highlights most importantly the creation of at least two distinct committees: Audit Committee (AC) and a Remuneration and Appointment Committee.

For our research, we will focus on the AC as it is the committee responsible for the risk management. The Moroccan CG code (2008) defines the Audit Committee as "the emanation of the governance body who is responsible for reviewing the draft financial statements and **manage the risks**. It plays, therefore, a central role in the transparency of the accounts of companies and in their ability to inform shareholders, partners and stakeholders about all the economic, financial and operational risks they face, and how it should be managed."

6.1. Audit Committees missions and objectives

Article 106-bis of Law 17-95 relating to limited companies, states that "companies whose shares are listed on the stock exchange, an audit committee acting under the responsibility, as the case may be, of the board of directors or the supervisory board, must be created. It monitors issues related to the preparation and control of accounting and financial information. The committee's composition is fixed by the council as mentioned above and may include only directors or members of the Supervisory Board, excluding those holding any other position within the society. Committee members must "submit sufficient financial or accountant information" and be "independent" according to criteria specified and published by the terms and conditions set by the Moroccan Capital Market Authority."

Without prejudice to the powers and responsibilities of the bodies responsible for 'the administration, direction, and management, the audit committee is responsible in particular for:

- The Monitoring of the communication of information to shareholders, the public and the Moroccan Authority of the capital market;
- The monitoring of the effectiveness of the internal control, internal audit and, where appropriate, management systems; risk management of the firm;

- ➢ The monitoring of the statutory audit of the parent company and consolidated financial statements;
- ➢ The review and monitoring of the independence of the auditors.

It issues a recommendation to the general meeting on the auditors proposed. It reports regularly to the Board of Directors or the Supervisory Board on the exercise of its missions and informs it, without delay, of any difficulty encountered.

Article 10 of Circular 40/G/2007 stipulates: The governance body shall set up an audit committee to assist it in internal control. The functions of this committee include:

- ➢ Assessing the quality of the internal control system, in particular, the consistency of measuring devices, monitoring, and risk management and proposing, as appropriate, complementary actions to this matter; recommending the choice of the statutory auditors;
- ➢ Defining the zones of minimum risks that internal auditors and auditors must cover;
- ➢ Verifying the reliability and accuracy of the financial information intended for the directors and third parties, and assessing the relevance of the accounting methods adopted for the preparation of the individual and consolidated accounts;
- ➢ Assessing the audit plan and the human and material resources allocated the audit function;
- ➢ Ensuring that internal auditors have the necessary competencies and qualifications to propose the measures to be taken;
- ➢ Evaluating the relevance of corrective measures taken or proposed to address deficiencies detected in the internal control system;
- ➢ Taking note of the activity reports and recommendations of the internal audit function, the statutory auditors and the supervisory authorities and corrective measures should be taken.

The Audit Committee should include members of the governance body that have excellent knowledge of the Company's environment, its accounting and reporting policy, and are capable of assessing and managing the risks. Financial managers and accounting managers can participate in the execution of the Audit Committee’s tasks without being members.

6.2. The frequency of Audit Committees reunions

The CG does not include recommendations about the frequency of the reporting of Audit Committees. There's no minimum number to complete, the reunions depend on each specific case of every company and its environment. The IMA (Institut Marocain des Administrateurs) has done a study in 2012 (IMA, 2012), we can see that in the majority of cases the Audit committee reports to the Board of Directors after each reunion. Only 26% of the companies that have an Audit committee report once a year in the form of a summarized annual report. On a similar study, but done in 2015 (IMA, 2015), shows that audit committees meets three to four times in 53% of the cases where listed companies have an audit committee, two times in 26% of the population, and 16% and 5% for more than four times and only one time respectively.

Conclusion:

The Moroccan stock exchange has undoubtedly made clear progress since its establishment through the numerous reforms and corrections undertaken. Nevertheless, its results failed, in general, to meet the expectations. The objective of making the stock market a source of revenues to the Moroccan economy remains a goal to be achieved and tending towards a market economy a goal harder to be imagined in 2018. More initiative and dedication are needed to enhance its performance.

Even though Morocco cannot count, today, on the stock market as a mean of financing as it remains marginalized and narrow compared to other countries, it still has active areas to evolve. One possible way is to empower Enterprises existing in the stock exchange and strengthen their profitability and value. In this context, the next chapter will investigate further Enterprise Risk Management and study its effectiveness in the Moroccan context.

A literature review on Enterprise Risk Management

Introduction:

Every organization, wherever it is located and in whatever area it operates in, is submitted to risk-taking. From this idea, risk management was born and was developed over many years and many ways of thinking, making the literature on Risk Management one of the richest in the Management fields. Many definitions exist related to Risk Management; simply, this discipline is all measures and activities carried out to manage risk (Aven, 2008). The literature continued its development, as a result, and in recent years, we started talking about a new derivative of risk management, more consistent and adapted to Enterprises than traditional practices. This new derivative is called "Enterprise Risk Management (ERM)."

Enterprise Risk Management utility cannot be framed only on reducing risk and likely uncertainties that can harm the organization. ERM practices can be a way of enhancing the company's financial and operational health through seeking and seizing opportunities and structuring how the organization operates. Hence, ERM gives the organization a customized way to manage risk which will serve the latter at all levels.

This chapter will be segmented as follows: I. A look at ERM, II. ERM and the financial crisis and III. ERM and performance.

I. A look at Enterprise Risk Management

1. Risk & Risk Management

The Business Dictionary defines risk by *"A probability or threat of damage, injury, liability, loss, or any other negative occurrence that is caused by external or internal vulnerabilities, and that may be avoided through preemptive action."*. From the previously stated definition, we see that risk has a negative connotation and that it could be avoided if necessary actions were undergone. Those necessary actions, and everything that will help reduce this uncertainty is risk management.

The definitions of risk usually neglect an important perspective. Risk does not only have a negative dimension but could also bring opportunity, this is clearly explained through the financial principle, the greater the risk the greater the return. Most companies and corporations

focus more on eliminating uncertainties in order to reduce the possible adverse outcomes, more than seeking to maximize profit through risk-taking.

The techniques for dealing with risk are called “Risk Management”. Risk Management is the way companies could fight the hazardous effect of the market, Aven (2008) considers risk as a mixture of future events (1), and the consequences of these futuristic events (2) and finally the simultaneous uncertainties accompanying these events (3). Thus, risk management allows a company to realize its goals efficiently, which means, without wasting resources and with respect to laws and regulations. COSO (2004) describes risk management as mean that “helps an entity to get to where it wants to go and avoid pitfalls and surprises along the way”.

Risk is nowadays segmented into two major parts. The first one is “Risk Management” in its old definition, and now it is called “Traditional Risk Management”, this type of risk management is based on a silo-based approach. The main limitation of those traditional practices is that they are not able to spot the relations between risks, thus at some point, they will surely become inefficient. The other segment is “Enterprise Risk Management”, it was created from where Traditional practices failed, ERM offers a consistent way in dealing with risk through an integration risks in a corporate level. As the first only focused on financial risk the newborn adds to this strategic and operational risk.

2. Definition of Enterprise Risk Management

Enterprise Risk Management -ERM- is one of the main business strategies that gathers all the methods used to identify, assess and seek opportunities through risk management. ERM delivers a plan that fits precisely to the organization, in other words, ERM determines the level of risk to be accepted according to the corporation's objectives regarding the use of resources and the generation of profit. The ideology behind ERM first appeared in the 90s but only started to gain significant importance in the 21st century, as it began to draw the attention of many researchers trying to understand the concept and its benefits (and/or limitations) on today's organizations.

In the contrast of what the name may aim for, ERM is far more than a simple risk management approach. It was used starting from the last mid-decade as a strategic management tool rather than a risk management practice (Hexter & Gates, 2005). ERM suggests integrating

management of all risks, linking risk management practices to corporate governance and corporate strategy. (Bromiley, McShane, Nair, & Rustambekov, 2015)

ERM is a way of dealing with uncertainties through determining the major risks that could stop an organization from achieving its missions. Organizations can be easily distracted by smaller risks, which may facilitate failure in the rise of higher risks. ERM draws attention to all the risks that could end a corporation life and understand all the vulnerabilities, rather than focusing on every day's minor risks.

The Harvard Business review listed ERM as one of their "Breakthrough Ideas for 2004" (Buchanan, 2004). Its adoption is highly encouraged by professional services firms as the BIG4 or rating agencies like Standard and Poor's which included ERM sophistication in their global corporate credit rating process starting from the 3rd quarter of 2008 (Standard and Poor's, 2008).

3. Objectives

ERM's objectives differ according to every organization, its industry, and the market environment. Based on the existing literature we highlighted and summarized its primary goals:

- **Reducing the uncertainties and negative surprises** which may lead to dramatic losses by driving the managers to understand better the organization and potential scenarios that may cause such damages and be able to respond effectively once they occur. *(Committee of Sponsoring Organizations of the Treadway Commission (COSO)., 2004)*
- **Value creation** and positive consequences on firm performance and firm value. (Hexter & Gates, 2005)
- **Seeking and seizing opportunities** thanks to the understanding of the vulnerabilities and strengths of the organization and the market environment (Committee of Sponsoring Organizations of the Treadway Commission (COSO)., 2004). ERM gives the corporation a competitive advantage; the 2008 financial crisis illustrated that many valuable corporations failed which gave the ones that survived considerable market shares and growth opportunities.
- **Ensuring a fluid communication flow**, where information travels vertically and horizontally without being hindered. The latter will help raise awareness about more significant risks and optimize reaction. (Stanton, 2017)

4. ERM’s key characteristics

ERM proved its weight and importance in today's risk management, and many aspects can explain this. Before stating some essential characteristics, we want to clarify that traditional approaches are not necessarily useless as there is nothing wrong with them. Once, they were as useful as a good ERM system is today, and even nowadays they still prove their worth as a basis of every ERM system.

Planned and systematic risk management

ERM is all that traditional risk management is lacking. Traditional practices in this discipline were based mainly on ad hoc risk management. To clarify this main difference, risk management before ERM was reactive rather than proactive, which means it relies on the historical experience of an organization in order to **“not make the same mistake twice”,** also it was mainly conceived in the basis of **“I've been doing it this way since the beginning, and until now nothing has ever gone wrong”.** These practices deprived risk management of its essential virtue, which prepares and protects the corporation from uncertainties in a way to benefit from their hazardous effects. The core of a decent ERM system are these two points, and this will benefit the organization a competitive advantage instead of sticking to the mindset **“Everything will be perfect if I do what everyone else’s doing."**

Global risk management

ERM, and in contrast to traditional practices, relies on aggregating risk management. To put it another way, ERM gathers risks on a corporate level which gives the organization a whole view of the risks/opportunities in its environments and in comparison, with their competitors. Traditional approaches manage risk in a fragmented way, this is inconsistent in a way that all risks are not equally dangerous/rewarding; therefore, they shouldn't be managed in the same way not to overestimate some and underestimate others.

5. Major limitations

Even though ERM is one of the most critical subjects of risk management, it is still subject to many critics from which we can highlight some severe flaws:

- **The significant differences between researchers and organizations specialized in risk management which can lead to the misunderstanding of the core elements of ERM:**

Many practitioners define ERM from their perspective leading to many definitions. Bromiley and al. presented in their scientific paper ***ERM: review, critique, and research directions*** (Bromiley, McShane, Nair, & Rustambekov, 2015) an in-depth analysis of the theoretical differences related to ERM according to primary essential sources in the subject matter.

The 1st distinction this scientific paper makes is about the relationship between risk and firm objectives:

The risk is defined independently of firm objectives:

Following this idea, risks are seen as obstacles that could threaten the organization from achieving its strategic objectives (Miccolis, 2000). Others take ERM to a broader dimension, as in Australia and New Zealand where it is defined as the culture, processes, and structures that are directed towards the effective management of potential opportunities and adverse effects (AS/NZS 4360, 1995).

Risk is defined in terms of achievement of organizational objectives:

The Institute of Internal Auditors defines ERM as a rigorous and coordinated approach to assess and respond to all risks that affect the achievement of an organization's strategic and financial objectives (Institute of Internal Auditors, 2001). Moreover, COSO (Committee of Sponsoring Organizations of the Treadway Commission (COSO)., 2004) states that all employees from different hierarchical positions should participate in ERM practices, and the latter should take part of the strategy and objectives setting across the enterprise. ERM, according to COSO, should identify potential risks and manage them according to the entity's risk appetite[12] to provide reasonable assurance regarding the achievement of the entity's objectives.

The 2nd distinction is made on whether risks are problems or sources of value creation:

Risk is a problem to be mitigated

[12] The ISO 31000 risk management standard refers to risk appetite as the "Amount and type of risk that an organization is prepared to pursue, retain or take." (International Organization for Standardization (ISO), 2009)

According to S&P (Standard and Poor's, 2008), ERM is a toolkit that should be used for trimming excessive risks. According to this perspective, risk is the sum of adverse situations that could lead to losses which may threaten the enterprise's stability and wellbeing. This point of view is supported by other corporations' way of managing risk, as RIMS (Risk and Insurance Management Society, 2011) who defines risk as a barrier between the organization's management and the achievement of its objectives. Hence, the corporation should address the full spectrum of its risks and manage it globally.

The risk is a potential source of value creation

Tillinghast-Towers Perrin (Perrin, 2001) who defines risk as the main source of business opportunities, and ERM is a way to define those risks and exploit it in a way to develop its competitive advantage. In other words, ERM serves the purpose of increasing the organization's short and long-term value (Casualty Actuary Society (CAS), 2003).

- **Misconceptions**

As many practitioners expressed their interest in ERM, many researchers were able to highlight some significant misconceptions. John Fraser published in one of his articles the major common misconceptions about ERM (*(Fraser, 2007)*:

The complexity of ERM implementation

Even if all the theories on ERM globally agree that ERM is a way to manage risks on a global level using a holistic approach, many organizations fail in applying this approach. Usually, and in large corporations, there exist many risk managers (supervised by the Chief Risk Officer) and specialized in many types of risks, as operational risk, financial risk, market risk, etc. In such cases, the risk management is quite limited according to every manager's specialization, and in most cases, it stays on a functional level rather than on a corporate level.

Inherent Risk[13] as a workable basis for ERM

Inherent Risk is a broad concept, even as easy as its definition can be understood it is hard to test it practically. Since a total absence of controls and risk identification processes can't be measured in a real corporate world.

[13] The COSO Enterprise Risk Management Integrated Framework defines Inherent Risk as follows: "Inherent risk is the risk to an entity in the absence of any actions management might take to alter either the risk's likelihood or impact." (Committee of Sponsoring Organizations of the Treadway Commission (COSO)., 2004)

Managing risks as equally important

One of the main points of a sophisticated ERM system is making the difference between high, less critical and minor risks. Many practitioners encourage organizations to set an up-to-date risk register. The latter is a list of the identified risks; it should present all the practical information about the probability of occurrence, scenario, consequences, the existing controls to avoid such losses and the risk manager responsible of the risk. This document is vital to the success of the ERM system. The risks should be regularly updated, to avoid paying excessive attention to some relatively low risks and being well prepared in case of the emergence of a dramatic event.

The blurred relationship between ERM and performance or firm value

Many articles were written about that point, but as of today, the literature fails on providing strong pieces of evidence about the relationship between ERM and performance or firm value. The majority of researches are only limited to particular areas and study a specific kind of companies. The increased attention to the domain started to enrich the research field but only in very developed markets, as the USA, which is very mature in comparison to the large number of markets worldwide.

- **Internal challenges**

From another dimension, ERM can also be limited by the differences and the characteristics of every organization. In their article on the challenges of an ERM system, Fraser and Simkins (Fraser & Simkins, 2016) presented some internal challenges that could harden the implementations of an ERM system. We chose to present the following:

Corporate and people's culture

The corporate culture can be one of the greatest objections to an ERM system. Whereas the latter manage risk on a corporate level, there's a great need for transparency and openness between the different departments of an organization. If we take the example of most of the companies: departments are usually managed in different ways according to the differences of people in charge. These differences can be taboos, as no one can criticize someone's work and way of managing his/her department as long as he or she are efficient and bring added value to the business. The last point reduces the willingness of managers to be open and share what is

OK and what's not OK with other managers to an extremely low level which threaten the effectiveness of the ERM system.

ERM knowledge

Even if the interest on ERM is growing worldwide, many managers do not understand it deeply. Surveys, done by Deloitte in 2007 and in 2004 (in partnership with Economist Intelligence Unit) (Deloitte, 2007) (Deloitte/Economist Intelligence Unit, 2004) , show that directors lack a deep understanding of an ERM system and how it should operate, which lead to unqualified people to assess the relevance of the system. Even worse, directors and managers with many years of experience in the field, refuse to take further education and limit themselves on the idea "I have been doing it this way."

Starting with a sophisticated ERM system taken from another enterprise

Many organizations urged to adopt an ERM system. They try to gather all the features that we can observe in organizations with mature ERM processes. They ignore the fact, that a process should start as simple as possible and only when it starts to prove its efficiency (or lack of efficiency) there's a need to upgrade it and develop it. Jumping on the most complexes ERM systems and applying it blindly to an organization push the "customization" away, these kinds of systems should not be copy-pasted but should be developed alongside the company's development and ways of work.

ERM vs. Change management

The fear of change and its management push many organizations to avoid everything that can lead to a difference in the way they operate. Mainly these types of companies fail in recognizing ERM as change management. This process transforms the communications flows dramatically; information should travel rapidly and openly to every stakeholder within the organization, which will lead to the integrated approach of risk management.

II. ERM and the Financial Crisis

The challenges common to research in fields like management, in general, affects significantly the results of studies and surveys, which affects the literature and leads to mixed findings. The financial crisis was the first assignment when we saw, in a practical way, the

repercussions of a good ERM system in the global business world. Researchers from Bentley University studied the relationship between ERM and performance, the analysis focused on three periods before the crisis, in the crisis, and after the crisis. (Baxter, Bedard, Hoitash, & Yezegel, 2013)

1. ERM before the financial crisis: (January 1st, 2008 to August 31st,2008)

The global financial crisis was the result of the accumulation of many unfortunate events, mainly in the subprime market in the USA since the beginning of last decade, but no one believed it would bring as much chaos as it brought. One crucial point is that it started suddenly, and no one was prepared for a dramatic situation of this level, which led to many massive corporations being bankrupt and disappearing from today's world economy.

ERM programs were not as used as today and were only limited to prominent organizations who had enough resources to implement such costly systems. ERM is mainly used, as discussed earlier, as a management and strategic tool, which explains the results that companies with ERM systems implemented in the period before the crisis, outperformed others. This can be explained by the exemplary resources allocation, excellent communication and the holistic view of the company's risks.

The study led by Baxter et al. shows that there's no concrete association between the level of sophistication of an ERM system implemented and the equity market before the crisis. This means that, in the case of systematic "low" risk, the study could not prove the positive correlation between ERM and firm performance.

2. ERM during the financial crisis: (September 1st, 2008 to February 28th, 2009)

Many practitioners in Risk Management believed that ERM would help corporations avoid financial disasters and guarantee their profitability and their market value. This idea was soon questioned as ERM could not entirely protect its adopters back in 2008. Among the firms with an ERM system, some experienced very delicate situations which raised questions about the efficacy and efficiency of such a costly system. The Institute of Internal Auditors pointed out the maturity of Countrywide Mortgage’s ERM system and held it as an example to follow

in Risk Management in 2007; unfortunately, it faced bankruptcy as soon as the financial crisis started in 2008.

The results, obtained during the crisis period, show that companies with sophisticated ERM processes did not suffer and/or fare differently in comparison with companies with less sophisticated ERM systems. The last point backs up the finding of the pre-crisis period. ERM, no matter how sophisticated was, failed to deliver protection to its adopters in a critical situation. This doesn't mean that ERM is unable to protect companies, but it shows that in similar circumstances, where the financial world was affected globally, ERM can't guarantee that appropriate risk management is going to make the company stand out from the crowd and be financially healthy when all other actors in the market are suffering intensely.

3. ERM after the financial crisis: (March 1st, 2009 to October 31st, 2009)

The 2008 financial crisis proved the weakness of the risk management practices worldwide. In the shadow of that event, governments and financial regulators started to invite organizations to adopt risk management practices through codes and corporate governance laws that align with ERM practices. That way, corporations can base their risk management on these regulations which help to manage risks efficiently and avoid another catastrophic financial crisis. Although the continuous efforts and raising awareness of ERM practices, results show that good ERMs are still not adopted in more than a quarter of large organizations as demonstrated by the surveys done among members of the AICPA's Business and Industry group[14]. The surveys done on a timeframe of 8 years demonstrate that even if the numbers of organizations adopting a complete ERM system is increasing, it is still under 30% which is very weak, and is less than financials regulators are hoping for after approximately 10 years of one of the most catastrophic financial disasters in recent history (Beasley, Branson, & Hancock, 2017).

[14] The American Institute of CPAs is the world's largest member association representing the accounting profession, with more than 431,000 members, and a history of serving the public interest since 1887. (AICPA, s.d.)

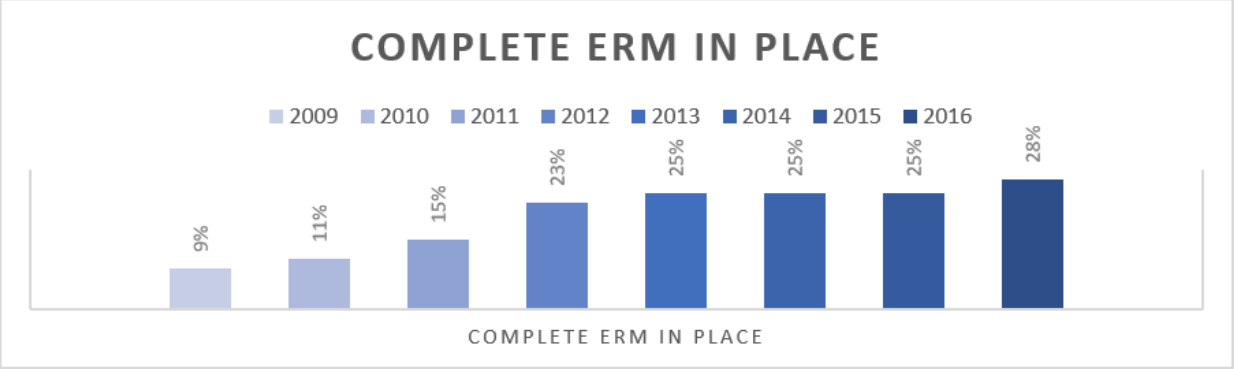


Figure 2. Complete ERM in place, members of the AICPA's Business and Industry group *(Beasley, Branson, & Hancock, 2017)*

Figure 2 proves there's a sharp increase in the percentage of enterprises implementing an ERM system, as it launches by nearly 20% in 9 years. The survey considers only organizations with a complete and formal ERM system, which means that corporations that are conceiving and in-process of implementing their ERM systems are not included in the percentage. To summarize these results, we can deduct that the financial crisis increased the attention to ERM.

In contrast of what was discussed before and during the global financial crisis, Baxter et al. found that companies with a sophisticated ERM system were able to rebound and stand up after the crisis, gaining easily in market value and recording good profitability and enhancing their market shares. (Baxter, Bedard, Hoitash, & Yezegel, 2013)

Summary

The global financial crisis profoundly challenged ERM, not only it was catastrophic and dramatic for the corporate world, but it also shook the world economies as many countries are still trying to resolve their financial problems. If we had to take out one good thing from this experience, it would be that it was very enriching regarding research for the management field in general, and risk management in particular.

The shreds of evidence show that ERM failed significantly, in a way, to avoid the global financial crisis or more merely ensure the survival of its adopters. No association was highlighted between the ERM quality, the market value and the profitability during the pre-crisis and the crisis periods, which means that even companies who used to have a masterpiece ERM system, suffered from the financial crisis and some of them were even bankrupt. This

can be explained by the significant harm caused at all financial levels, which makes it impossible for one company to survive when the whole ship is sinking.

Only during the post-crisis period, where companies with good ERM systems stood up and proved the worth of their systems, as they survived (with difficulty) the crisis, and found it easier to regain their market value and market shares. This also serves the idea of companies with ERM systems benefit from competitive advantages resulting from the market opportunities' seizure. The companies that survived had the chance to develop their market shares and empower their positions in their industries.

III. ERM and firm performance/firm value

ERM is the first derivative of Risk Management that adjusted the silo-based approach on which traditional risk practices were operating. The idea of managing risk on an aggregated level gives the organization a tool to adapt its internal controls, which will help it increase performance (Woods, 2009). Although we're still unable to concretely judge the causality between risk and value in imperfect markets (Modigliani & Miller, 1958), we are closer than ever to link a company's risk management practices (based on the integrated approach offered by ERM) to its performance, both in terms of return and in terms of market value.

Managing uncertainties should, logically, reduce the probability of bankruptcy (Pagach & Warr, 2010) and improve the decision-making process within the firm (Grace, Leverty , Philips, & Schimpi, 2015) thanks to the holistic view of the corporation's risks, and the fluidity of communication circuits. Unfortunately, and as seen by Modigliani, the market imperfection tends to disturb the parallelism of ERM. In other words, if we take the same ERM process and we apply to it to another company, we surely won't get the same results because of the market and regulatory framework differences, but even in the opposite case, if we imagine 2 companies operating in the same market and regulated by the same laws, details such as the organization's culture, its dimension, it people etc. will cause different consequences (Gordon, Loeb, & Tseng, 2009). Others may think since ERM rationalize the firm's risk-taking, which may lead the organization to take lesser risks than it used to, affecting the revenues through the positive relation between risk and return, which can lead to a negative association between ERM and performance (Ellul & Yerramilli, 2013).

Prior empirical research:

There's no consensus about the association between ERM and performance. The investigations already led on the field presents mixed findings. Table 1 provides the significant results from various researches:

Table 1. Summary of existent literature on ERM and firm performance

(Beasley, Pagach, & Warr , 2008)	*"The appointment of a Chief Risk Officer is firm-specific, it determines positive market equity for non-financial firms, in contrast to financial firms."*
(Hoyt & Liebenberg , 2011)	*"There's a highly significant relation between ERM and firm value, with ERM increasing the shareholder value for U.S. insurance companies by approximately 17% to 20%, respectively."*
(McShane, Nair, & Rustambekov, 2011)	*"An integration of risk management enhances more the financial performance in comparison with silo-based approaches, but stagnates when switching to a more sophisticated ERM."*
(Farrell & Gallagher, 2014)	*"Firms with more mature ERM exhibit higher firm value, due to embedded risk culture, ERM integration within the organization, and the view of ERM as a component of strategy and planning activities."*
(Grace, Leverty , Philips, & Schimpi, 2015)	*"The more the firm invests in its ERM system, the higher the firm value."*

In general, and even though those researches were mainly done in the US, a remarkable divergence is observed in the results. Even among those who agree that ERM enhances the firm value, many disagree about the **why?** and the **how?**. The differences of the researches methodologies cause such divergences, for example, the study of Beasley et al. (2008) is the only one to measure the quality of risk management by the ratio of the standard deviation of

sales to the standard deviation of return on assets. Apart from the differences of the methodologies followed, Bromiley, McShane, Nair and Rustambekov (2015) state in their article that a large number of these studies ignored a critical aspect of econometrical studies which is "endogeneity." Endogeneity, in this case, is that firms do not randomly adopt ERM, for instance, if highly profitable companies adopted ERM more than lower profitability companies will bias the results to tend toward ***the better ERM, the profitable the company***, which may not be the case; to make things simpler, we consider the following example: "We take a sample of 100, and we want to compute the mean annual revenue" knowing that one person from the sample is Bill Gates, we will conclude that the mean annual revenue by person is close to 1bn$ when, in reality, it's much less than that. Considering this limitation, it's impossible to assess accurately the real value of ERM and how it should improve the company's business life.

Conclusion

This chapter reviewed the existing literature about ERM, we defined the concept and analyzed it to put the reader in the theoretical concept before presenting the methodology and the practical results we obtained through a study done at Casablanca Stock Exchange.

To sum up, ERM is still one of the management fields that needs extensive research, in many geographical points in the world. Even though the scholars followed different methodological paths and theoretical bases and obtained, we can still understand in a blurry way the relationship between ERM and firm performance.

The following part will focus on studying this relationship in an underdeveloped stock exchange, in comparison with the US, we will discuss the hypotheses and the research design followed. To the best of our knowledge, this is the first study about ERM in the Moroccan context.

Methodology and Research Design

Introduction

The following chapter describes the research design followed in conducting our study. We demonstrated, theoretically, what is ERM and its effects on firms. The choice and the importance of the variables is highly based on previous literature and research on the field on firm performance. This is a real case study, done in an underdeveloped market and, to the best of our knowledge, remains uninvestigated. The criteria for measuring firm performance were based essentially on Florio & Leoni's article: Enterprise risk management and firm performance: The Italian Case (Florio & Leoni, 2017).

The Moroccan stock exchange, like the Italian one, failed in becoming a steady source of generating profit for the country. This failure is the result of several factors, among which we find a poor performance by the listed companies. That's why we want to investigate ERM's repercussions on a set of Moroccan listed companies to see if this integrated approach of Risk Management can enhance both the profitability and market value of these companies.

The chapter is segmented as follows: 1. Theoretical conceptual mode, 2. Methodology, 3. Hypotheses development, 4. Empirical model. And 5. Test validity.

1. Theoretical conceptual model

This research aims to identify the relationship between Enterprise Risk Management and Firm Performance. The study comes in the light of supporting empirical studies conducted for the same purpose, exploring a new context that remains uninvestigated. The empirical study is driven by offering a first insight on the relationship between ERM and performance from a new African lens.

The several research-papers done under this framework converge toward a generally accepted model of illustrating performance, presenting it by Return on Assets (ROA) and Tobin's Q (Bertinetti, Cavezzali, & Gardenal, 2013). In fact, the two variables offer two dimensions of firm performance as the ROA gives an idea about the **historical** and accounting performance, while Tobin's Q gives more insight on the value of the firm, the **future** expectations of shareholders with insinuation about the possible variation of their dividends (Liebenberg & Hoyt, 2011). According to existing empirical studies, sometimes Tobin's Q is criticized for a

potential inaccuracy by linking it to ERM, but it is still widely used by researchers because of the difficulty linked to its manipulation by the management (Lindenberg & Ross, 1981).

In this study, we excluded the financial sector since firms operating in such industries are subject to more complex regulation in risk management in comparison to non-financial firms. The financial firms reflect more implementation of ERM processes worldwide, and the majority of researches study these types of firms ((Hoyt & Liebenberg , 2011); (Baxter, Bedard, Hoitash, & Yezegel, 2013) etc.). The bailout and the financial crisis raised awareness of risk management in the financial sector, thus, nourishing empirical studies about ERM. Academic researches still need to study the effect of ERM in the non-financial sector, as it still, poorly investigated in comparison to the financial sector.

2. Methodology

2.1. The measurement period

The study investigates the effect of ERM on a timeframe of three years, but in contrast to Florio and Leoni (2017)'s work, the three years were taken with a three years interval. The Italian case article was published a few years after the introduction of the new Italian Corporate Governance, which was launched in 2011 but only started to be effective in 2012. The researchers measured the impact of the new regulation in 2011, 2012 and 2013. In Morocco the context is different, the only corporate governance code still effective today is the one published in March 2008, there are always new articles that complement it, but for the sake of organization, we considered that the main points were completed by regulation and laws published from 2009 to 2012.

As previously mentioned, Moroccan listed companies are invited to diffuse information about their corporate governance and risk management in their annual reports but aren't forced to do so, so for many firms, we faced a lack of information. We considered that the regulation about CG and RM was completed by 2012, and since it is not mandatory to comply, firms took some time to adapt, and a majority still does not publish information about their processes. We considered 2015 as the year where the first results could be drawn about ERM implementation.

The study period is consistent in a way and based on Baxter et al. (2013)'s study that proves ERM did not prevent companies from falling during the crisis but helped to hurry up their rebounding. This phenomenon constituted an important competitive advantage after the crisis.

Yet, Morocco wasn't affected profoundly by the financial crisis since it doesn't rely on an open economy; so, in contrast to most developed nations, risk management didn't evolve the following years importantly in Morocco.

2.2. The sample selection:

Our research aims to study ERM implementation and its consequences on firm performance regarding non-financial and listed companies on the Moroccan stock exchange.

First, we excluded all the financial institutions from the total number of Moroccan listed companies. Casablanca stock exchange is composed of six banks (*Attijariwafa bank, BCP, BMCE Bank, BMCI, CDM, and CIH),* four insurance companies (*AFMA, AGMA, Atlanta, Saham assurance and Wafa assurance*) and seven other financial institutions (*DIAC Salaf, EQDOM, MAGHREBAIL, Maroc Leasing, Salafin and Taslif*). The total number of financial institutions is 17 that we subtracted from 74 which is the total number of listed companies in 2017. For the remaining 57 listed companies, we prepared an excel sheet with all the data of Return on Assets and Tobin's Q, Leverage, and size of the company measured by its total assets at the end of 2009, 2012 and 2015. We excluded the companies with missing data on these years based on the data available concerning financial information on capital IQ. We gathered full information about 27 non-financial company. Since the set of data needed concerning risk management practices was not disclosed for the majority of these 27 enterprises, we prepared an interview guide (Appendix II) that will allow us to obtain the necessary information for the study. We contacted the 27 companies to plan meetings for the data collection, 14 companies finally agreed to meet us and share the data needed. Two of the companies were excluded from the final sample because of missing data, inaccurate responses or abstention to answer to one or more questions.

The 12 enterprises constitute the final sample (Appendix III) of our study, following the measurement period we gathered 36 firm-year observations, representing 21% of the entire population. We believe that the results obtained from analyzing these enterprises will help us draw first conclusions about the association between the performance of Moroccan listed companies and ERM practices.

In the next section, we will present the variables, and then we will talk about the data collection and the interview guide used for this purpose.

2.3. Variables presentation

2.3.1. The dependent variable:

In our context, the dependent variable is Firm Performance. Following this choice, a definition of performance seems to be mandatory. According to *Oxford Dictionaries* performance is "*the action or process of performing a task or function*"; the *Business dictionary* defines it by "*the accomplishment of a given task measured against preset known standards of accuracy, completeness, costs, and speed*". So, it is logical to quantitative this variable and present it through a financial indicator like ROA and Tobin's Q.

Our sample is composed of a set of non-financial enterprises operating in the Moroccan stock exchange. Given the nature of stock markets, ratios like ROA and Tobin's Q are easily found on financial databases thanks to the disclosure of financial information. Empirical studies strongly support the use of these two indicators for performance as in our basis article (Florio & Leoni, 2017), additionally other empirical studies ((Gordon, Loeb, & Tseng, 2009) (Hoyt & Liebenberg , 2011) (McShane, Nair, & Rustambekov, 2011)).

ROA:

The Equation 1 of ROA shows that it is an indicator that reflects the profitability of a firm to its total assets. This ratio gives an idea about the efficiency of the usage of a company's assets to generate profit.

$$ROA = \frac{Net\ income}{Total\ \ assets}$$

Equation 1. Return on Assets

The ROA is always presented as a percentage; a positive figure means that the company is creating value, while a negative one illustrates the loss.

Tobin's Q:

Sometimes referred to as the Q ratio, it represents the total market value of firm to total asset value (Equation 2). It was invented by James Tobin and gives an idea on the expectation of the firm on the market.

$$Q = \frac{Market\ capitalization + Book\ value\ of\ liabilities}{Book\ value\ of\ total\ assets}$$

Equation 2. Tobin's Q

If $0<Q<1$: The stock is undervalued, so shareholders should be cautious about generating future profits.

If $Q>1$: The stock is overvalued, shareholders are more optimistic to generate dividends in the future.

2.3.2. The main test variables used in the basis-article (Florio & Leoni, 2017):

The variables, we will present in this section, were used in the article we based our methodology upon. It will enable to visualize how the researchers conducted their analysis to study the relationship between the firm performance and ERM, and then we will highlight the adequate variables to our case.

- Based on (Florio & Leoni, 2017) and international literature, we present the variables that are undoubtfully important from a Risk Management perspective:

Chief Risk Officer:

The consideration of this variable is crucial, this is explained by its presence in approximately all the previous researches ((Beasley, Pagach, & Warr , 2008), (Liebenberg & Hoyt, 2011), (Pagach & Warr, 2010)). The Chief Risk Officer is a managerial position, where the officer's mission is to manage risk by organizing all risk management processes. Although some firms claim to implement an ERM system without nomination a Chief Risk Officer, Beasley (2008) sees that the existence of ERM system should be accompanied, unquestionably, with this critical position within the corporation.

Risk Committee

Together with a Chief Risk Officer, an ERM is often linked to the existence of a risk committee. A Risk Committee's primary mission is the risk oversight. In other words, this committee will enable the possibility of the holistic approach of risk management. Moreover, it is the organ in charge of aggregating information about all the risks of the business units/functions. The Risk Committee supports the idea that risk management should not be hindered in silos. (Beasley, Pagach, & Warr , 2008).

The reporting frequency

Based on the last variable presented, corporate governance codes tend to enhance the relationship between the risk committee and/or the Chief Risk Officer with the board of directors. COSO (2004) indeed, supports this idea, as it encourages the management to be more active in the risk management of the company, and be regularly in touch with the Board of Directors and other Governance organs.

- On the other hand, the next set of variables are related to describing the risk assessment process (Florio & Leoni, 2017):

Risk assessment frequency:

This variable characterizes how many times risk is assessed during one financial year.

Risk assessment level:

The assessment, based on a company data, the depth of the risk assessment. We see if the company evaluates risk by functions or by business units or if it is managed on a corporate level with the aggregation of both risk management on a lower and higher level.

Risk assessment method:

We see if the company uses both qualitative (benchmarks, interviews etc.) and quantitative approaches for risk management (risk measures and indexes etc.).

ERMadvanced

Florio & Leoni (2017) gave each company a score based on the six previous variables, and from which they created a new dummy variable named ERMadvanced taking 1 if the company takes a score more than the average (Score>3), or 0 if it is equal or less than 3.

- The model used by Florio & Leoni (2017) also considers corporate governance characteristics, by including:

The Board of Directors size

This represents the number of members of the Board of Directors.

The Board of Directors independence

This represents the percentage of the independent members of the Board.

The company's size

The total assets of the company by the end of each financial year, presented in the form of a natural logarithm.

The company's industry

This was represented as a categorical variable describing the industry which the firms operate in.

Leverage

The ratio of financial debt to shareholders' equity at the end of every year.

ROE:

The ratio of net income to equity at the end of every year.

2.3.3. The variables used in this study:

For the purpose of this study, we adopted all the above variables, with the exception of the **industry, return on Equity** and the **risk assessment method**.

- The industry variable wasn't adopted because of the sample number. The relatively small sample, composed of only 12 enterprises, would bias our judgment since some industries are not present in our sample. Dressing a model considering industries will give biased information about these and could threaten the validity of the whole model.
- The risk assessment method was not adopted also because of the inaccuracy of the respondents' replies, for the majority of the replies to the question, that we deleted afterward from our interview guide, were vague. This can be explained by the respondents' functions and positions when they are not specialized in risk management.

- Return on Equity was also excluded because our sample is composed of enterprises from the three departments, a wide difference in equities would influence widely the results; thus, may bias our model.

Also, we adjusted the variables to the Moroccan environment. According to the Moroccan CG code, it's the Audit Committee who is in charge of the risk management, so in our study, we studied the effect of the audit committee rather than the existence of a specific risk committee.

We believe that the independent variables considered for this study, are the main variables that could influence firm performance. But we don't neglect the fact that there are other variables which could also significantly affect firm performance. This where comes our identification of four control variables:

Size: We believe that the size affects the firm's performance and risks greatly. As Baumol (1959) showed in his work, that with greater resources larger companies have more investment options than smaller firms, this could enhance the firm performance by generating more profits, but also, it strengthens the risk scope of the enterprise (Florio & Leoni, 2017). Florio and Leoni (2017) believe that a bigger risk exposure will lead to minimize resources dedicated to ERM. And in our perspective, firms with smaller resources tend to focus more on enhancing their investments rather than developing an ERM system.

Leverage: Bertinetti (2013) found a negative relationship between leverage and Tobin's Q. The leverage can affect positively firm performance but also could lead to higher risks, in particular, financial distress. So, it presents both risk and opportunity at the same time.

Board of Directors' total members and independent members: These two control variables constitute one of the main aspects of Corporate Governance, as ERM is highly linked to CG (Florio & Leoni, 2017) we adopted both to control for ERM implementation.

Table 2. summarizes the variables used, their explications, the studies that used similar variables and the sources:

Table 2. Variables presentation

Variables and "abbreviations"	Explanation	References	Sources
Tobin's Q "Q" ➢ *Dependent variable*	The sum of market capitalization and the book value of liabilities divided by the book value of total assets	(Florio & Leoni, 2017) (Liebenberg & Hoyt, 2003) (Liebenberg & Hoyt, 2011) (McShane, Nair, & Rustambekov, 2011) (Baxter, Bedard, Hoitash, & Yezegel, 2013) (Bertinetti, Cavezzali, & Gardenal, 2013)	Computed from Capital IQ
Return on Assets "ROA" ➢ *Dependent variable*	$\frac{Net\ income}{Total\ assets}$	(Florio & Leoni, 2017) (Baxter, Bedard, Hoitash, & Yezegel, 2013) (Eckles, Hoyt, & Miller, 2014) (Bertinetti, Cavezzali, & Gardenal, 2013) (Şekerci, 2011)	Capital IQ
Audit Committee "AC" ➢ *Independent Variable*	Dummy variable: 1: The company has an Audit Committee or a similar committee ***which*** has a responsibility in managing risks 0: Otherwise	(Florio & Leoni, 2017) (Beasley, Pagach, & Warr , 2008) (Liebenberg & Hoyt, 2003) (Grace, Leverty , Philips, & Schimpi, 2015)	Annual reports Interviews
Frequency of reporting to the Board of Directors by the Audit Committee "ACtoBoD" ➢ *Independent Variable*	Dummy variable: 1: The Audit Committee or a similar committee ***reports*** at least biannually to the BoD 0: Otherwise	(Florio & Leoni, 2017) (Liebenberg & Hoyt, 2011) (Ellul & Yerramilli, 2013) (Arena, Arnaboldi, & Azzone, 2010)	Annual reports Interviews

Variables and "abbreviations"	Explanation	References	Sources
Chief Risk Officer "CRO" ➢ *Independent Variable*	Dummy variable: 1: The company **has** a Chief Risk Officer 0: Otherwise	(Florio & Leoni, 2017) (Beasley, Pagach, & Warr , 2008) (Liebenberg & Hoyt, 2011) (Pagach & Warr, 2010) (Gordon, Loeb, & Tseng, 2009)	Annual reports Interviews
Risk Assessment frequency "Rafreq" ➢ *Independent Variable*	Dummy variable: 1: The risk assessment is **undergone** at least 2 times during the financial year 0: Otherwise	(Committee of Sponsoring Organizations of the Treadway Commission (COSO), 2012) (Florio & Leoni, 2017) (Mikes & Kaplan, 2013)	Annual reports Interviews
Risk assessment depth "Depth" ➢ *Independent Variable*	Dummy variable: 1: Risk is undergone on **both** corporate level and the business units 0: Otherwise	(Florio & Leoni, 2017) (Committee of Sponsoring Organizations of the Treadway Commission (COSO), 2012) (Farrell & Gallagher, 2014)	Annual reports Interviews
ERM score "ERMscr"	ERMscr=AC+ACtoBod+CRO +Rafreq+Depth	(Florio & Leoni, 2017)	-
ERM Advanced "ERMadvanced" ➢ *Independent Variable*	Dummy variable: 1: ERMscor equals or higher than 3 0: Otherwise	(Florio & Leoni, 2017)	-
Board of Directors size "BoDsize" ○ *Control Variable*	The number of BoD members	(Florio & Leoni, 2017) (Gordon, Loeb, & Tseng, 2009)	Annual reports Interviews
Board of Directors independence "BoDindependence" ○ *Control Variable*	The number of BoD independent members presented by percentage	(Florio & Leoni, 2017) (Gordon, Loeb, & Tseng, 2009)	Annual reports Interviews

Variables and "abbreviations"	Explanation	References	Sources
Size ○ *Control Variable*	Natural Logarithm of total assets of the company by the end of each year	(Florio & Leoni, 2017) (Gordon, Loeb, & Tseng, 2009)	Capital IQ
Leverage "Lev" ○ *Control Variable*	Ratio of total debt to equity measured at each end of financial year	(Florio & Leoni, 2017) (Pagach & Warr, 2010) (McShane, Nair, & Rustambekov, 2011)	Capital IQ

2.4. Data collection:

After identifying the variables to be used in this research, we will detail the data collection process in this part. The variables ROA, Tobin's Q, Size, and Leverage were all collected from capital IQ database, we gave each variable a column on an excel sheet and started saving information. After finishing with the collection of the financial data of 27 companies for our measurement period, we referred to annual reports but because there's no obligation for Moroccan companies to share their corporate governance and risk management information we faced extreme unavailability of data. This is where we contacted the companies, and because of the complexity of this study, a physical interview was necessary to ensure the data's collection accuracy, and to ensure the company's representative understood the questions properly.

As mentioned before, for the purpose of the interview, we prepared an interview guide (Appendix II), the questions were adapted to respond to all the variables we need. The following table 3. summarizes the questions and their aim:

Table 3. Interview guide presentation

Question	***Description***	***Purpose***
1st and 2nd	These questions treat the reference to the Moroccan Corporate Governance code and ERM knowledge from the firm's perspective.	Introducing the subject.

3rd and 4th	These questions give an overview about the Board of Directors organization.	Data collection for: - Board of Directors size - Board of Directors independence - Board of Directors' meetings
5th ,6th and 7th	These questions refer to the Audit Committee.	Data collection for: - Existence of an AC - Risk assessment frequency - Frequency of reporting to the BoD by the AC
8th	The question investigates the existence of a Chief Risk Officer	Data collection for: - Existence of a CRO
9th	The question refers to the risk assessment depth	Data collection for: - Risk assessment's depth
10th	An enterprise's proper assessment to the maturity of their ERM	Concluding the interview

2.5. Respondents profiles:

Another criteria that impacted our sample size noticeably were the nature and the profile of the respondents. As we were highly concerned with the capacity of the respondent to answer our questions and provide us with the accurate information about ERM and risk management practices in the firms; we aimed mainly for C-level employees. We based our choice on the idea that the respondent should be very well-informed about the subject and be close to the Board of Directors and Audit Committee. Furthermore, C-level employees ensure that they have not negligible working experience and qualifications to be precise while answering the questions.

Over and above, we ensured that the interviewees worked for the six years in question (2009-2015), and if it's not the case, they were assisted, physically or via phone, when they need further details about the period they weren't in the company. Our interviewees included CFOs,

Supply-chain Directors, Communication Managers, External Administrators from the Board of Directors, Managers or Employees in charge of a Business unit or a Department.

3. Hypotheses presentation

We presented earlier, in the introduction of this thesis, the research questions we are aiming to draw conclusions for. From the two research-questions we raise two main hypotheses, and based on these we will define the research path we will follow to determine the relationship between ERM and firm performance among Moroccan non-financial listed companies:

Hypothesis 1:

H1: *ERM components are positively associated with Firm performance*

Following previous literature, we expect that this hypothesis will not be rejected. However, we should bear in mind the fact that the Moroccan stock exchange is still uninvestigated, and not mature compared to the stock markets similar studies were done in. A rejection of this hypothesis would also be totally logic, as it will not mean there is no impact of ERM on firm performance, but in Morocco it is still early to judge its effectiveness.

The hypothesis above is general, so to answer it we will detail it and aim to answer a set of sub-hypotheses:

H1a: The presence of an Audit Committee is positively associated with firm performance.

H1b: The frequent reporting to the Board of Directors by the Audit committee is positively associated with firm performance.

H1c: The presence of a Chief Risk Officer is positively associated with firm performance.

H1d: The risk assessment frequency is positively associated with firm performance.

H1e: The risk assessment depth is positively associated with firm performance.

Hypothesis 2:

H2: *ERM integration is positively associated with firm performance.*

For the same reasons of Florio and Leoni (2017), we believe that an integration and an evaluation of ERM by joining its components is more adapted and gives better estimations. Since ERM, as defined earlier, is best described as a system; its components work together, thus should be evaluated jointly.

4. Empirical model

This section details the empirical model followed for testing our hypotheses. First, we will start by analyzing and describe the variables statistically. Second, we will draw a correlation matrix prior to dressing the regression models. Before drawing conclusions about the causality of the variables, we will check the validity of our models, and then finally answer our research questions. The tests will be executed by using STATA[15] (Interface in Appendix IV).

Descriptive statistics:

We will discuss here the total number of observations presented by firm-year in our sample. We will describe results for the entire period by presenting the mean, the standard deviation, the minimum and maximum values for every quantitative variable. Then a frequency distribution, global and decomposed by years, for the binary variables, giving a broader visualization of the key elements that will drive the study.

Correlation:

The first statistic test to be executed is a correlation matrix. According to the Oxford Dictionaries, correlation is "*a mutual relationship or connection between two or more things*". This test will aim to assess the strength of the association between a set of variables. We believe that this test will draw first conclusions about the association between all the variables at one

[15] Stata is a powerful statistical software, mainly used in the field of research. (StataCorp LLC, -)

time; it will also serve to detect the correlation between the independent variables themselves in order to prepare the regression model.

The main purpose of this test is to measure the correlation coefficient, the latter takes values from -1 to 1 to comment the pertinence of the interaction between the two variables in question. We can then interpret the coefficients obtained following the 'Rule of Thumb" (Hinkle, W., & Jurs, 2003)

Table 4.The correlation matrix's rule of thumb

Size of Correlation	Interpretation
.90 to 1.00 (−.90 to −1.00)	Very high positive (negative) correlation
.70 to .90 (−.70 to −.90)	High positive (negative) correlation
.50 to .70 (−.50 to −.70)	Moderate positive (negative) correlation
.30 to .50 (−.30 to −.50)	Low positive (negative) correlation
.00 to .30 (.00 to −.30)	Negligible correlation

The correlation does not explain the relationship between the output and input variables. The causality is not specified, but it gives an idea about the association between the two variables in question.

By this test, we can first assume if there is any association between firm performance represented by ROA and Tobin's Q, and the other variables of the analysis. It will give us first sight of how variables could be linked to each other. We can highlight through this test the key variables that we will analyze through a Robust-Clustered multivariate regression.

This test wasn't performed in our basis-article (Florio & Leoni, 2017), or at least not disclosed, but, in our judgment, its essential to identify the association between the accounting performance and the market performance, as the two, even if they represent firm performance are still different. And also, by focusing on the nature of the Moroccan stock exchange as an uninvestigated market, such a test is vital to understand more its complexity and draw first conclusions on the link between ERM as a joint measure, and its separate components with the performance of the sample. The test was used in other researches (McShane, Nair, & Rustambekov, 2011).

Before talking about the Robust-Clustered Multivariate regression, it's essential to highlight that it is an adaptation of the Ordinary Least Squares (OLS) regression. We will speak of the multivariate regression and then clarify the specifications of the regression used.

Multivariate OLS regression:

The OLS regression draws conclusions about the relationship between a set of independent variables and the outcome variable. Through this type of regression, we can comment the way the input variables can impact the dependent variable, and how they serve in predicting it.

Robust-clustered standard error:

Clusters are critical in our analysis, because as one of the assumptions of OLS regression is independence, in our case, this is not completely true. Even though the sample is taken from an identical population (non-financial and listed firms in CSE), the total of 36 firm-year observations, is composed of 3 times the same enterprise repeated according to the year. Clustering, while regressing the data, would allow us to "relax" the assumption of independence, on this wise, we assume that the data are independent across clusters (enterprises), but can be dependent within the cluster. In other words, even if the observations within the cluster are correlated, this model can estimate the regression model correctly.

This model is vital to our study. It will allow us to deal with some problems that are likely to exist within our sample as non-linearity and heteroscedasticity, which are essential OLS assumptions. The Robust-clustered standard error considers these complexities while regressing. This model was developed by Huber in 1967 and White later in 1982.

The output, in this case, is the firm performance. We want to study the elements of ERM, separately and jointly, with the historical accounting performance (ROA) and the future expected market performance (Tobin's Q). This methodology was used by Baxter et al. (Baxter, Bedard, Hoitash, & Yezegel, 2013) and was adopted by many researchers afterward, as Florio and Leoni (Florio & Leoni, 2017).

The inputs, used, can be categorized as:

Risk management variables: these characterize the integration of risk practices within the culture of the enterprise, represented by the existence of a Chief Risk Officer, an

Audit committee and the rate at which the Audit Committee reports about risk to the Board of Directors.

Risk evaluation characteristics: represented by the risk assessment frequency and the risk assessment's depth. They reflect the way the company executes its risk procedures and how they make use of the risk management variables listed above.

The variables mentioned before will be used for the first two models of regressions (for ROA and Tobin's Q), where we will study the effect of ERM components separately. For the second set of regressions, we will combine both risk management variables and risk evaluation characteristics into one independent variable to give a score out of five to every observation, and then based on this score we will judge the maturity of the ERM implementation within the firm. For the enterprises with a score exceeding the average (ERMscr equals or higher than 3) will be categorized as companies with sophisticated ERM system. This sophistication will be represented by the variable "ERMadvcd". Then we will assess its causal relationship with the performance.

Control variables: this set of variables include the aspects that may influence ERM implementation and/or firm performance, but that are not associated to risk practices. They include the total assets and resources of the company, the Board of Directors composition and independence and leverage.

To visualize the model, we present the following regressions:

1. $ROA = \alpha + \beta_1 AC + \beta_2 ACtoBoD + \beta_3 RAfreq + \beta_4 Depth + \beta_5 BoDsize + \beta_6 BoDindependence + \beta_7 Size + \varepsilon$

2. $Q = \alpha + \beta_1 AC + \beta_2 ACtoBoD + \beta_3 RAfreq + \beta_4 Depth + \beta_5 BoDsize + \beta_6 BoDindependence + \beta_7 Size + \beta_7 Lev + \varepsilon$

3. $ROA = \alpha + \beta_1 ERMadvcd + \beta_2 BoDsize + \beta_3 BoDindependence + \beta_4 Size + \varepsilon$

4. $Q = \alpha + \beta_1 ERMadvcd + \beta_2 BoDsize + \beta_3 BoDindependence + \beta_4 Size + \beta_5 Lev + \varepsilon$

With:

$\boldsymbol{\alpha}$**:** The intercept	The value of firm performance when all the inputs equal 0.
$\boldsymbol{\beta_n}$: $The\ slope$	The coefficient by which firm performance change as X change.
$\boldsymbol{\varepsilon}$: $Error\ term$	A statistical representation of all the other variables and factors that may influence firm performance other than the independent variables and control variables used in the model.

We presented earlier in the chapter the alternative hypotheses, in which we expect a positive relationship between ERM components, and ERM as a joint measure are positively affecting the firm performance. We didn't mention the null hypotheses, these would be that there's no causal relationship with the independent variables, in other words, it is β equal 0. The null hypotheses remain supported until it can be significantly rejected (Moore & McCabe, 2008). We chose a confidence level of 5% based on prior research-papers and usual practices.

5. Test validity:

After dressing the regression models, it is necessary to discuss the test validity. We will briefly analyze our regressions considering $R^{2,}$ and the residuals.

$R^{2:}$ Known also by the name of Coefficient of determination. The higher the R^2 , the more reliable the test, because it reflects the power of prediction of the output based on the inputs.

The Residuals: If the residuals are normally distributed and homoscedastic, that means they follow a normal path around the regression line, we can conclude that the test is valid. We can test the normality of Residuals and Homoscedasticity visually by analyzing the

residuals plots, or numerically by using a statistical software, as STATA, and performing a normality test like the Shapiro-Wilk, and a heteroscedasticity test as Breusch-Pagan.

Chapter conclusion:

This chapter describes the path we followed to answer our research questions. First, we specified the conceptual model of our research, and based on that we developed our methodology. In the latter we discussed the timeframe of the study, the sample, and the data collection; we also presented the variables we will use for the next part. Then, we introduced our hypotheses in accordance with our research questions, and how we will verify these. The model we used for this study, will be tested and verified, before assessing the accuracy of the results and then we will draw conclusions about the model.

The following chapter will display the results obtained from the empirical model testing, we will quantify the effects and then dress primary conclusions about the model, and the answers we are seeking. Through the next chapter, we will investigate the relationship between firm performance and ERM in the Moroccan stock exchange.

Results and findings

Chapter Introduction:

This chapter presents the results we obtained through our investigation of the relationship between ERM, its components and firm performance. We obtained the results by analyzing 12 companies across different years, 2009, 2012 and 2015. The companies included are all non-financial and listed on the Casablanca Stock exchange, we gathered financial data from Capital IQ, and Risk Management and Corporate governance using an interview guide, the data then were processed into an Excel sheet, and classified, we gave every company a number from 1 to 12, and then used the STATA software for data analysis. This is the first study, to the best of our knowledge, to address a similar topic using a quantitative approach in Morocco.

The chapter will tackle first the statistical description and the frequency distribution of the dependent, independent and control variables. Then, we will use a correlation matrix to investigate the association between all the variables. The regression results are presented afterward, and finally, the model was tested visually and statistically. In the last part of the chapter, we will draw our primary conclusions, which we will present further in the concluding part of this research-thesis.

1. Descriptive statistics:

The descriptive statistics give a broad view of the sample. First, we will comment the quantitative variables using the mean, the standard deviation, the minimum and maximum value. And then we will discuss the binary variables, using a frequency table distribution for the different measurement periods.

1.1. Descriptive statistics for: ROA, Q, Size[16], Lev, BoDsize, BoDindependence:

[16] For the variable Size, we also included the Size in Million Dirhams.

Table 5. Descriptive statistics, STATA

```
. summarize ROA Q SizeinMMAD Size  Lev BoDsize BoDindependence, separator(0)
```

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	36	.0758889	.077639	-.075	.306
Q	36	1.421555	.6938413	.2850571	3.090822
SizeinMMAD	36	7313.933	13987.85	185.6	60549
Size	36	7.705458	1.56917	5.223594	11.01121
Lev	36	.3804722	.3031809	.004	1.174
BoDsize	36	6.916667	2.556504	3	12
BoDindepen~e	36	61.99074	20.83021	11.11111	100

Table 5 summarizes the data of 12 non-financial companies listed in the Casablanca Stock Exchange.

The sampled companies show reasonable operating profitability in general, the average ROA is equal to 7.6%, which means that on average and for every Dirham (MAD) invested a company would generate 7.6 cents. The minimum firm-year ROA recorded was -7.5%, this figure proves that companies did not experience huge losses during the measurement period. The maximum ROA amount is 30.6%, the results show that the sample gathers both companies with low profitability and firms that efficiently use their assets.

The variable representing firm value, which is in our case Tobin's Q, is .42 higher than one, proving that expectations about firms are positive in general. It shows that Moroccan listed companies are overvalued on average. This aims to the attractivity of the Moroccan market, ordinarily, such results would encourage more companies to operate in this market since the replacement cost is relatively lower than the companies' earning rates. The standard deviation of this variables is approximately equal to 0.7 which reflects the data's distribution around the mean is supporting the attractiveness of the stock market.

For the control variable, we also included the original variable from which we derived Size. It is the natural logarithm of the variable SizeinMMAD (Size in Million Moroccan Dirhams). The mean of the total assets of the sampled companies is equal to 7.7 Billion MAD. The descriptive statistics table show a large standard deviation, indicating the values are dispersed around the mean with an average distance of more than 1.5B MAD, this proves the difference in resources and total assets across the companies and supports the high contrast between the minimum and maximum values of the sample.

The average leverage ratio is 38%, this is the percentage of debt in comparison with the company's equity. The sampled companies present low financial leverage on average, this means that Moroccan companies rely more on shareholder's equity than debt for enhancing their activities. We can see from the sample that the debt is null in some cases and exceeds 100% as a maximum value.

The board size varies between 3 to 12 members, according to our sample, with a standard deviation of 2.5. Its independence varies from 11% to 100%, so some Board of Directors are fully constituted of independent administrators, and the minimum value supports that for all the sample there's at least more than one independent member in every Board of Directors.

1.2. Frequency tables for: AC, ACtoBoD, CRO, Rafreq, Depth and ERMadvcd.

Table 6 represents the frequency distribution of ERM components. We can see that in our sample of 36 firm-year observations, the risk assessment is undergone from a low level to a corporate level by only 41.67% of the population. Considering the existence of an Audit Committee, or a similar committee, and the appointment of a CRO is spread across the whole sample by 25 and 16, respectively, which means that in nine cases where the company has an Audit Company they didn't appoint a chief risk officer. Approximately, one on every two Audit Committees assess risk at least bi-annually and 47.22% of the total sample report to the BoD at least 2 times a year. The total sample of companies show that a sophisticated level of ERM exists in 17 companies versus 19 companies.

Since the total distribution of variables does not give a reliable image across time, we will detail the frequency distribution according to the different years in Appendix V, Appendix VI, and Appendix VII regarding 2009, 2012, and 2015 respectively.

The frequency tables for 2009 gives a reflection about the ERM situation back in 2009, only two companies obtained a score higher than 3, in the horizon of 3 years; 4 firms joined these companies and by 2015, they became 9 to have a mature ERM.

Table 6. Frequency distribution for ERM components and ERMadvcd (whole population), STATA

```
. tabl Depth AC ACtoBoD CRO Rafreq ERMadvcd
```

-> tabulation of Depth

Depth	Freq.	Percent	Cum.
0	21	58.33	58.33
1	15	41.67	100.00
Total	36	100.00	

-> tabulation of CRO

CRO	Freq.	Percent	Cum.
0	20	55.56	55.56
1	16	44.44	100.00
Total	36	100.00	

-> tabulation of AC

AC	Freq.	Percent	Cum.
0	11	30.56	30.56
1	25	69.44	100.00
Total	36	100.00	

-> tabulation of Rafreq

Rafreq	Freq.	Percent	Cum.
0	24	66.67	66.67
1	12	33.33	100.00
Total	36	100.00	

-> tabulation of ACtoBoD

ACtoBoD	Freq.	Percent	Cum.
0	19	52.78	52.78
1	17	47.22	100.00
Total	36	100.00	

-> tabulation of ERMadvcd

ERMadvcd	Freq.	Percent	Cum.
0	19	52.78	52.78
1	17	47.22	100.00
Total	36	100.00	

We can see that in-depth risk assessment didn't evolve much through the years, as from 2009 to 2015 it only increased by three to reach seven. We can also remark the effect of the Moroccan corporate governance code, for example, the number of Audit Committees increased by five in 6 years in our sample. The reporting to the BoD doubled in 6 years, but we can see that it's mainly after 2012. The CRO was present in only 25% of our sample in 2009, but by 2015 it approximately covers 60% of the 12 companies. Finally, risk assessment frequency increased by 3 from 2009 to 2012 to reach and remained on that level until 2015.

The frequency distribution, through the years, demonstrates that Moroccan companies are increasingly interested in corporate governance and risk management practices. This is very clear with the continuous development of the different ERM components, which also represents some aspects of corporate governance as in the example of the frequency of reporting to BoD.

After all, even if the financial crisis didn't affect Morocco directly, Moroccan listed companies show their preoccupation about similar disasters and this is why they are expanding interest in ERM comes from.

2. Correlation analysis

We run a correlation analysis before modeling our regressions. Through this test, we are seeking to identify the associations between variables and draw first conclusions about the model and its components. We will also see if there are any strong correlations between the variables, as in the case of the existence of these, the model can be biased and then it would be considered invalid.

Table 7. Correlation matrix, STATA

```
. correlate ROA Q Lev Size Depth AC AChoBoD CRO Rafreq BoDsize BoDindependence ERMadvcd
(obs=36)
```

	ROA	Q	Lev	Size	Depth	AC	AChoBoD	CRO	Rafreq	BoDsize	BoDind~e	ERMadvcd
ROA	1.0000											
Q	0.7356	1.0000										
Lev	-0.3765	-0.4293	1.0000									
Size	0.2063	-0.1577	0.1517	1.0000								
Depth	0.2245	0.1576	-0.0190	0.1210	1.0000							
AC	0.1338	0.2187	-0.1560	0.1948	0.2176	1.0000						
AChoBoD	0.1457	0.1273	0.1338	0.2097	0.2754	0.1361	1.0000					
CRO	0.1489	0.2238	0.0877	-0.0203	0.2636	0.2337	0.1818	1.0000				
Rafreq	0.1941	0.2365	-0.2221	-0.0455	0.1742	0.1291	0.1976	0.0259	1.0000			
BoDsize	-0.0103	-0.1121	-0.0315	0.3280	0.0754	-0.0954	-0.1403	-0.0478	0.1478	1.0000		
BoDindepen~e	0.0123	0.0699	-0.0256	0.1885	0.1081	0.0081	-0.0494	0.1625	0.1721	0.6781	1.0000	
ERMadvcd	0.2734	0.2670	-0.0976	0.3280	0.1866	0.1631	0.1987	0.2376	0.2780	-0.0056	0.0685	1.0000

From the correlation matrix above in Table 7, we can see that all the variables are correlated to each other. As a first conclusion, we can see that there's a high positive correlation between ROA and Tobin's Q, this can be explained by the fact that companies with higher Q ratios record better profitability. As a reminder, the correlation matrix doesn't tell the causality between the two variables, it only shows the strength of their associations. So, we can't say that an increase in Tobin's Q causes an increase in ROA, or the other way around, but we can deduct that they're both linked with each other significantly.

The ERM's system components (Depth, AC, AChoBoD, CRO, Rafreq) are not linked significantly to firm performance, either to each other. The association is positive between these variables which could lead to first conclusions as ERM components are positively linked to firm performance. Moreover, the results don't contradict that ERM is a joint measure of Risk Management since all its components appear to be positively associated to each other.

The other independent variable, ERMadvcd, is positively linked to its components, which is logic and also to firm performance. The association with ROA and Q is considered negligible, even if it is close to 0.30, as after this level the correlation would be moderately strong.

The control variables show mixed results. The Leverage is moderately and negatively strong to both dependent variables, this can confirm Baxter et al.'s results (Baxter, Bedard, Hoitash, & Yezegel, 2013). It also can be explained by the fact that our sample only includes non-financial firms, so in the opposite case, if we sampled only financial companies it's totally logical to find moderate to strong correlations between leverage and profitability and also market value, as this kind of companies rely more upon debts. We cannot conclude that leverage is negatively affecting firm performance, as there are other variables correlating.

The BoDsize and BoDindependence are close to a strong correlation, this can be explained by the more numerous the members of the BoD, the more independence is needed. However, it can also be the result of the other variables correlation. These two variables are not significantly associated to the dependent and independent variables.

The size shows a negative but low correlation with Tobin's Q, and a positive and moderate association with the board size and ERMadvcd. This can be explained by the fact that bigger enterprises need bigger Boards of Directors from one hand, and on the other hand they are conveniently "fit" to embrace ERM adoption as they have bigger resources.

3. Regression analyses:

This section covers our regression analysis results. As a reminder, the regression is a way to estimate the possible relationship between an output and inputs that may, or may not, impact it. For this purpose, our model will serve to assess the causal relationship of ERM separate components, presented by Depth, AC, ACtoBoD, Rafreq, CRO from one hand and ERM as a combined measure, joining all the previous components and presented by ERMadvcd from another hand.

For the purpose of testing the first hypothesis; which is ERM components are positively associated with firm performance the regressions (1) and (2) are presented by:

- $ROA = \alpha + \beta_1 AC + \beta_2 ACtoBoD + \beta_3 Rafreq + \beta_4 Depth + \beta_5 BoDsize + \beta_6 BoDindependence + \beta_7 Size + \varepsilon$

```
. regress ROA Size Depth AC ACtoBoD CRO Rafreq BoDsize BoDindependence, vce(cluster Firm)

                                                Number of obs   =         36
                                                R-squared       =     0.4569

                                    (Std. Err. adjusted for 12 clusters in Firm)
------------------------------------------------------------------------------
             |
    Variable |      Coef.
-------------+----------------------------------------------------------------
        Size |   .8494745*
       Depth |   .4693714*
          AC |    .3266917
     ACtoBoD |    .3882267
         CRO |    .2059224
      Rafreq |    .1637996
     BoDsize |   -.0168557
BoDindepen~e |    .0151673
       _cons |    .0714481
------------------------------------------------------------------------------
legend: * p<.05; ** p<.01; *** p<.001
```

Table 8. Regression (1) results, STATA

As we can see from the STATA screenshot above (Table 8), that the regression model was clustered by firm. This procedure is expected to add accuracy to the model as the software took into consideration while regressing, the repetition of the same company through the different years.

We can see from the table that only the depth is significantly (at p< .05) linked to the ROA, this supports **H1e**[17] discussed earlier. We also remark, that all ERM components are positively related to firm performance, even though, they are not significantly associated to ERM. This paradox will be discussed in a later section called "Results summary".

- $Q = \alpha + \beta_1 AC + \beta_2 ACtoBoD + \beta_3 Rafreq + \beta_4 Depth + \beta_5 BoDsize + \beta_6 BoDindependence + \beta_7 Size + \beta_7 Lev + \varepsilon$

[17] H1e: The risk assessment depth is positively associated with firm performance.

```
. regress Q Lev Size Depth AC ACtoBoD CRO Rafreq BoDsize BoDindependence, vce(cluster Firm)

                                                Number of obs   =         36
                                                R-squared       =     0.5173

                                    (Std. Err. adjusted for 12 clusters in Firm)
------------------------------------------------------------------------------
             |
    Variable |      Coef.
-------------+----------------------------------------------------------------
         Lev |  -.5711667*
        Size |   .7028643*
       Depth |    .1904945
          AC |   .7247085*
    ACtoBoD |    .5838972
         CRO |    .2672789
     Rafreq |   .3823061*
     BoDsize |    .0274921
BoDindepen~e |    .0359922
       _cons |    .2147841
------------------------------------------------------------------------------
legend: * p<.05; ** p<.01; *** p<.001
```

Table 9. Regression (2) results, STATA

Table 9 shows the results of the regression model of Tobin's Q. First, the R^2 is high and equals 51%. We can see that the market value is affected by more than one variable. The audit committee and the Risk assessment frequency are both significantly and positively related to the Q ratio. Considering the control variables, the size also impacts largely the market value, in contrast to the leverage who affects negatively the market value.

Now we will present the results of regression (3) and (4):

- $ROA = \alpha + \beta_1 ERMadvanced + \beta_2 BoDsize + \beta_3 BoDindependence + \beta_4 Size + \varepsilon$

Table 10 depicts the results of the regression between ROA and ERMadvanced, with the latter being the aggregation of the ERM components. We perceive that the variables are significantly (at p<.01) and positively affecting this output. This means that, ERMadvanced heavily impacts the return on assets in our sample, and that an aggregation of ERM components impacts highly the profitability.

```
. regress ROA Size ERMadvcd BoDsize BoDindependence, vce(cluster Firm)

                                                Number of obs   =         36
                                                R-squared       =     0.4932

                                    (Std. Err. adjusted for 12 clusters in Firm)
------------------------------------------------------------------------------
             |               Coef.
-------------+----------------------------------------------------------------
        Size |   1.028749*
    ERMadvcd |   .6136418**
      BoDsize |   -.1631435
BoDindepen~e |    .1142249
       _cons |    .0525219
------------------------------------------------------------------------------
legend: * p<.05; ** p<.01; *** p<.001
```

Table 10. Regression (3) results, STATA

- $Q = \alpha + \beta_1 ERMadvcd + \beta_2 BoDsize + \beta_3 BoDindependence + \beta_4 Size + \beta_5 Lev + \varepsilon$

```
. regress Q Lev Size ERMadvcd BoDsize BoDindependence, vce(cluster Firm)

                                                Number of obs   =         36
                                                R-squared       =     0.4892

                                    (Std. Err. adjusted for 12 clusters in Firm)
------------------------------------------------------------------------------
             |               Coef.
-------------+----------------------------------------------------------------
         Lev |  -.4993454*
        Size |   .9843125*
    ERMadvcd |   .7106708**
      BoDsize |    -.055916
BoDindepen~e |    .0774885
       _cons |    1.154616
------------------------------------------------------------------------------
legend: * p<.05; ** p<.01; *** p<.001
```

Table 11. Regression (4) results, STATA

Table11 also supports the results obtained in table 10. And the results of the Italian Case (Florio & Leoni, 2017), as a joint measure of ERM constitutes a more complete variable, and corresponds better to the aim of our analysis, as it helps investigate ERM as a holistic approach of risk management and not a simple set of components. The results above support existing literature about ERM and how it improves firm performance, regarding profitability and market value.

Results summary:

To sum up the regressions results, we measured ERM's impact on firm performance both by an accounting performance ratio (ROA) and a market value ratio (Tobin's Q). Our aim was to

identify the most important ERM component affecting the two measures above, and also to measure how an integrated and mature ERM system can influence performance. Before assessing the validity of our tests, we will present the two hypotheses we put before starting our analysis, and we will summarize the corresponding results, comment, and explain the results.

- ✓ *H1: ERM components are positively associated with Firm performance*

The first hypothesis and its sub-hypotheses covers all ERM components and their assumed positive relationship with firm performance. We find out that only H1e[18], is significantly proved ($p<0.05$). This means that from our sample, we draw the conclusion that depth is the major component affecting positively ROA. Our model confirmed one hypothesis, and failed to support H1a, H1b, H1c and H1d, we want to clarify that the model doesn't contradict existing literature, but it couldn't prove it either.

The failure of ERM components in the exception of depth can be explained to the "everybody does it syndrome". As we seen in the literature review and from the frequency tables, the components in generally were enhanced through these six years, as after the financial crisis, the whole world started focusing on risk management measures, to avoid such disasters. Even though Morocco, was relatively "immune" to the financial crisis, the risk management trend clearly affected Moroccan companies as they started to develop their risk management, appointing CROs and Audit Committees, and also enhancing risk activities as more frequent reporting and assessment. From this perspective, we can assume that these practices were directed based on formalities and appearances rather than a risk-based perception.

Regarding the market evaluation, we can highlight that the Audit Committee and the Risk Assessment frequency are both positively linked to firm performance, and also, they are significant at ($p<0.05$). This model completes the first one, as it supports both H1a[19] and H1d[20], meaning that enhancing the risk culture by integrating a committee to manage risk, and performing risk evaluation more than two times a year could be beneficial in the financial market dimension. Even though, an Audit Committee doesn't focus only on managing risk, it proved its worth and efficiency. We still believe that an independent Risk Committee would

[18] The risk assessment depth is positively associated with firm performance.
[19] H1a: The presence of an Audit Committee is positively associated with firm performance.
[20] H1d: The risk assessment frequency is positively associated with firm performance.

offer better results, but until now, the Moroccan market is still well handled by more generalized committees.

Personal interests could also drive the creation of risk committees or creating new positions as CROs, who will mostly be filled by individuals very well-positioned in the enterprises' hierarchy. To explain this, while we were investigating the members of such committees, we noticed that CFOs, administrators, directors etc. are usually the same persons present in these committees. So, from a personal driven perspective, a highly positioned employee would benefit from another salary or at least a bonus thanks to his contribution and participation in these committees and their reunions, even if he's only participating formally and does not add value to these reunions.

Even companies, who don't rely on effective risk management, created similar committees under the disguise of good corporate governance and risk management, just to enhance some parties' fringe benefits. For the frequency of reporting to the Board of Directors, it may be true they reunite at least two times a year, but these reunions may be just a decorum, and those reunions aren't really anything except embracing the trending risk management practices.

- ✓ *H2: ERM integration is positively associated to firm performance.*

To be able to test this hypothesis, we created a variable named ERMadvcd, based on a score that was given to every observation based on the variables: Depth, AC, ACtoBoD, Rafreq and CRO.

Through the regression 3 and regression 4, we obtained similar results to our basis-research article, in both regressions the variable ERMadvcd is linked, positively and significantly with ERM. On both models, the significance of the variable is at $p<.01$; this confirms the Italian case's (Florio & Leoni, 2017) assumptions as an integrated approach of ERM gives a better visualization of the relationship between ERM as a holistic approach, rather than modeling its components in a fragmented way. The results give an idea about the relevance of ERM and its impact on firm performance, as the market value tend to appraise more companies with mature ERM components, who at the same time register better profitability.

This can be explained by the fact, and as stated earlier on the literature review, ERM is not only a risk management measure, but it also serves the firm from a strategic perspective,

offering better visibility on the market and visualization on potential risk and opportunities. Strategically, ERM strengthens the philosophy of the firm dealing with risks, for instance, the corporation doesn't only want to survive current risks, but also to empower its position through them. This can be achieved thanks to the transparence established by ERM, and the company becomes very flexible and receptive to information, which travels without being hindered, as it's usually the case in silo-based risk management systems.

To sum up, our results support existent literature about ERM, as a mean to improve firm performance, both from an accounting aspect and a market perspective. ERM can, effectively, still be unused by all market participants, as only 17 showed a mature ERM implemented from our 36 firm-year observation. These 17 observations proved that integrating and enterprising risk management at a corporate level, rather than the traditional silo-based approach, showed significantly a better profitability and are better evaluated on the financial market even in underdeveloped markets like Morocco.

- ✓ *Control variables*

Since they are also present in this paper, and previous researches, it is necessary to analyze the control variables' effect on firm performance.

The Leverage and Size are the main variables we found affecting firm performance. In all models, they are significantly associated with it at $p<.05$. The size is positively associated with both ROA and Q; this means the bigger the firm's resources and assets; the higher profitability is expected and better judgements by investors. This supports Baumol's (1959) research; it can be expected by the fact that companies with greater assets, have more investments options to consider, as a result, they have more opportunities to generate profit. The market evaluation can be strengthened by the total assets, for the same previous purpose, as the company has more options to generate profit, the investors would be interested in investing in such company in order to expect higher dividends, thus leading to better market evaluation.

The leverage is negatively associated to market evaluation, this was found in earlier research by Bertinetti et al. (Bertinetti, Cavezzali, & Gardenal, 2013), who found similar results in Europe. In Morocco, it can be explained differently, as we seen from our descriptive statistics that sampled firms are only leveraged on average at 38%. This is very low, and reflects an

aspect of Moroccan culture, as borrowing is unsure money. Moroccan firms who rely importantly on leverage are seen to be riskier, which can explain the negative sign.

- ✓ The intercept

In our case, the constant would mean, the firm performance where all the variables taken into consideration were inexistent. This is impossible to imagine as a company without risk management and a board of directors isn't likely to be operating in the stock exchange.

4. Validity:

As discussed earlier, the cluster-robust least squares method offers accurate results and allows dealing with some problems related to the sample as the non-linearity and heteroscedasticity of residuals. In this section, we will test the validity of these regression models, and adjust the model if necessary. After examining the models, we can draw final conclusions about the relationship of enterprise risk management and firm performance among Moroccan non-financial and listed firms. First of all, we will discuss the R^2 obtained from every regression, and then we will check normality and homoscedasticity visually, using residuals plots for equation 1 and 2, and numerically, using the Shapiro-Wilk test for normality and Breusch-Pagan test for heteroscedasticity for equation 3 and 4.

The coefficient of determination:

Widely known as R^2 helps assessing the relevance of the regression model, it illustrates the impact of the independent and the control variables on the dependent variable. It varies between 0 and 1, following the strength of the prediction, the higher it is, the better the judgment over the quality of the regression and the description of the relationship between the output and the inputs.

All our models are relevant, and able to explain half of the relationship existing between our outputs and inputs. Such values mean that we can draw reasonable conclusions from the models above.

Analyzing R^2 only is not enough to determine the goodness of the model, that's why we have to assess the residual plots.

Residual plot analysis:

The residual is the difference between the observed and predicts value. It represents the distance by each point is far from the regression line. The residuals, or errors must be normally distributed and homoscedastic around the best fit line. Those two points are one of the main OLS regression assumptions.

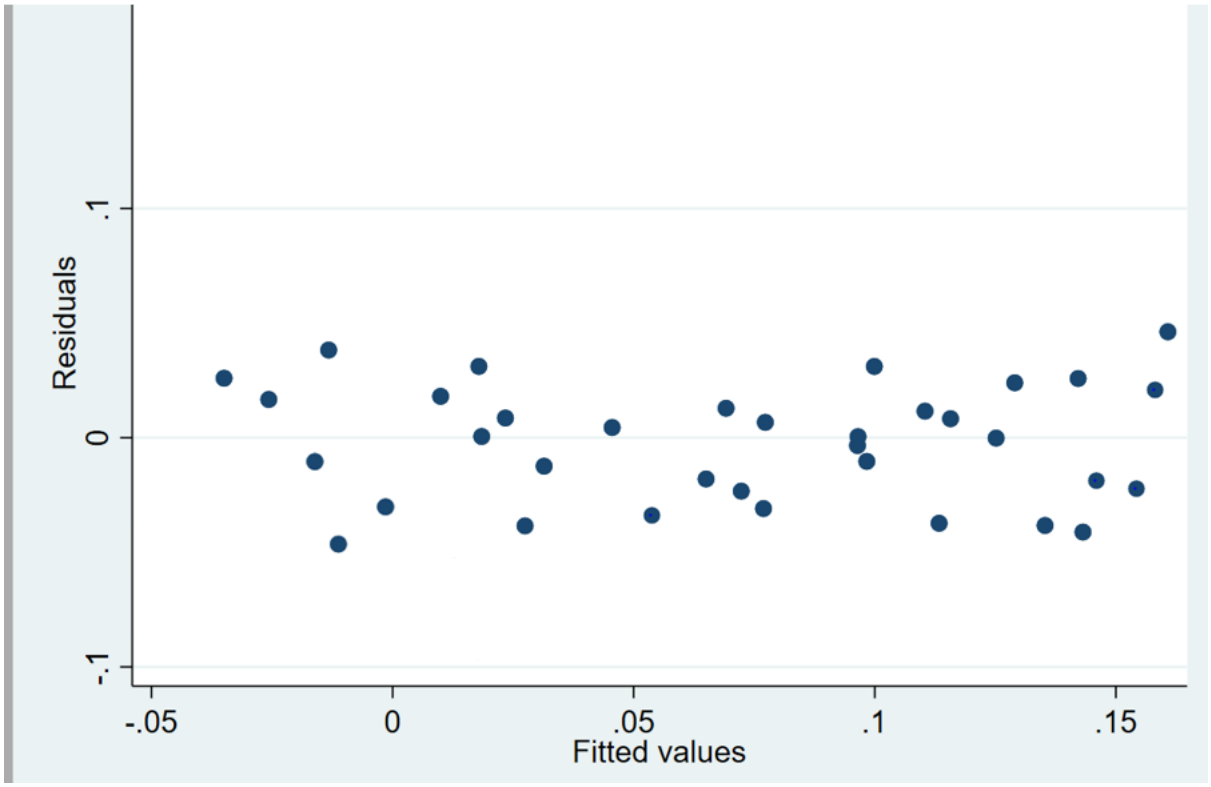


Figure 3. Tobin's Q regression (2), residuals vs fitted plots, STATA

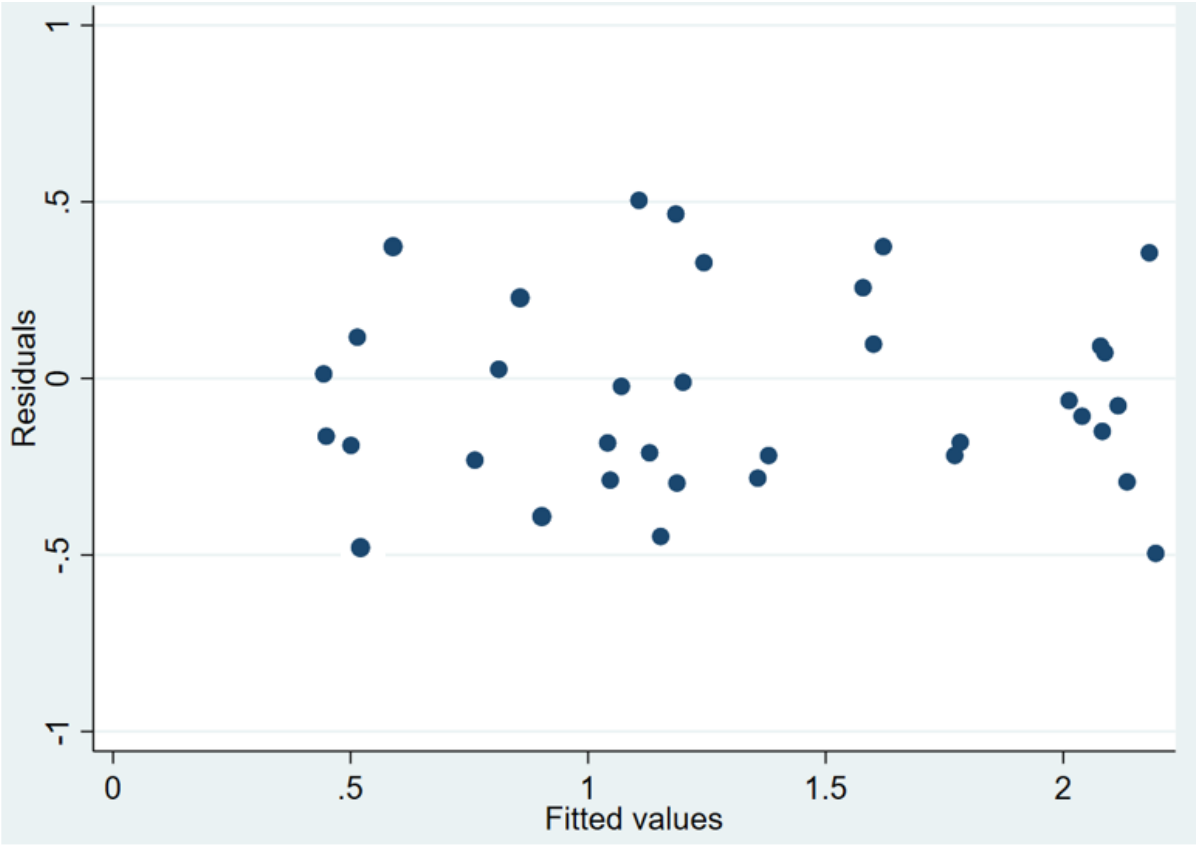


Figure 4. ROA regression (1), residuals vs fitted plots, STATA

We can see from the regression results that clustered-robust standard error regressions, indeed can manage the problems that could bias the regression, as non-normality and heteroscedasticity. We can also confirm its effectiveness as we can't spot any outliers. So, we can confirm for equation 1 and equation 2 that models could be valid. Both the models' residuals appear to be following a straight path and are spread equally across the line with a mean equal to 0.

Normality and homoscedasticity using statistical tests:

For equations 3 and 4, we will be checking the regression assumptions using statistical testing and assess our model results and also the efficacity of the clustered-robust standard error regressions.

As a normality test, we used the Shapiro-Wilk test:

We first predicted the columns residuals3 and residuals4, for equation 3 and equation 4, respectively. Then we applied the Shapiro-Wilk test for normality using the command ". swilk".

Table 12 and Table 13 shows a high p-value (p>.05), from this information we cannot reject swilk's H_0. On Stata, H_0 means the population is normally distributed. So, for both equations, the normality of the residuals is checked.

Table 12. Shapiro-Wilk test for regression 3, STATA

```
. swilk residuals3

                    Shapiro-Wilk W test for normal data

    Variable |        Obs        Prob>z
-------------+-------------------------
   Residuals3 |         36        0.18041
```

Table 13. Shapiro-Wilk for regression 4, STATA

```
. swilk residuals4

                    Shapiro-Wilk W test for normal data

    Variable |        Obs        Prob>z
-------------+-------------------------
   Residuals4 |         36        0.14762
```

For heteroscedasticity, we chose Breusch-Pagan / Cook-Weisberg test:

```
. estat hettest
hettest not appropriate after robust cluster()
r(498);
```

Figure 5. Heteroscedasticity test, STATA

The screenshot from STATA shows that it is impossible to perform a heteroskedasticity test after a robust cluster, as the latter adjust the residuals accordingly.

Conclusion:

The regression models and the results obtained support existing literature about ERM. Even in an underdeveloped market like Morocco the Enterprise Risk Management proved an important impact on firm performance.

Next chapter will discuss our research from an ethical and sustainable perspective and afterward we will dress our final conclusions, present our limitations and further research.

Ethics and sustainable development

Introduction:

This research thesis investigates the relationship existing between enterprise risk management and the performance of Moroccan non-financial listed firms. Even though, the Moroccan stock exchange is one of the major African stock exchanges, it is still not performing as the Moroccan government is expecting. That's why it is very important to identify potential solutions that may enhance the performance of Moroccan companies to develop the market as a whole. This chapter defines the relationship between the topic analyzed and the ethics and sustainable development of today's business world.

The ethical and sustainable dimension of this work will be tackled gradually. The chapter will be segmented into two major sections. The first section will treat the research thesis from an ethical perspective and the second will analyze if from a sustainable dimension.

1. Ethical dimension of this research:

The ethical point of this work will be divided into two main parts, the first will treat how the topic is linked to the ethical dimension of the business world, the second point will detail how the research was conducted using an ethical approach.

1.1. Definition

Even though there's no consensus about the definition of ethics, we can start from the definition existent in The Cambridge Dictionary as a basis, ethics are defined as "*the study of what is morally right and wrong, or a set of beliefs about what is morally right and wrong*". From this interpretation we can deduct that ethics is linked to good conduct practices, so, in that case, business ethics are a set of norms that regulate and decide the adequate conduct in the business world.

1.2. Ethical dimension of the subject treated

Enterprise Risk Management doesn't treat ethics directly, thus the ethical aspect of the subject seems blurry at first sight. ERM does not, as a matter of fact, divide risk management practices following the basis of right and wrong, neither shows what to do in case of the emergence of an ethical dilemma. However, if we dig a little deeper we can find out that existing literature about ERM brings a batch of ethical ideas on which enterprises could frame their risk management policies and processes.

The point where ethics meets our subject of dissertation, is that both concepts (Ethics and ERM) are wide and general notions. Ethics can't be framed by a culture or even regulations, it goes beyond a set of norms to follow, to reach a way to conduct and handle dilemmas where no rule stipulate what should be done. ERM is also a vast concept, from the existent literature, we can say, unquestionably, that ERM is far more than a simple approach of risk management; it goes farther than managing risk, it aims to improve the transparence of information and enhance the corporate governance. If we follow clearly ERM ideology, we will fall into the case where corporate governance is very well constructed, and no one can deny the importance of that actor in avoiding many of the scandals that rose in the financial world. These scandals were mainly caused by amiss conducts by some actors, under the poor supervision of managements; those scandals caused significant harm the company's image, but also to affect heavily all its stakeholders.

As our subject does not only treat Enterprise Risk Management, but also investigates its implementation in Casablanca stock exchange. From the last point we can highlight another ethical aspect of our research, as Morocco is an emerging market, it is still fighting corruption and fraud problems caused by many malicious actors. Therefore, we believe, if we raise attention to ERM practices, thus improve the transparence within listed companies, we will ensure a good information sharing. This way Morocco will be more efficient in its battle against fraud and all malevolent acts.

1.3.The ethical dimension of the research method

Ethics are required to be strongly present in the research field. As a matter of fact, ethical behavior should be respected since the first steps of a research until the publication of the final results. (Saunders, Lewis, & Thornhill, 2007) think that the researcher is under the obligation of clearly setting his objectives to avoid every confusion, and that he must carry out

his research professionally while interacting with his coresearchers on one hand, and all the participants by ensuring the confidentiality of the information provided and the anonymity of the respondents on the other hand.

All along our research process, we ensured that our objectives were accurately defined, we also made sure that the interviewers understood what was asked and had the capacity and the minimum level to fulfill what was asked of them. We guaranteed that the identity of the interviewees will be protected by complete anonymity and ensured the confidentiality of the information shared. The data collected will not be used, in any case, for the purpose of another research.

2. Sustainable dimension of this research

This section is the subject of this thesis using a sustainable development perspective.

2.1.Definition

The importance of sustainability is growing considerably in recent years. The term defined by the Cambridge Dictionary as "*the idea that goods and services should be produced in ways that do not use resources that cannot be replaced and that do not damage the environment*" it is also the "*the ability to continue at a particular level for a period of time*". Sustainable development is the concept that treats the consumption of today's resources without endangering the future's generations well-being (Brundtland Commission, 1987). To ensure a sustainable development approach, we must consider four dimensions, known as the 4P, "Prosperity, People, Planet and Participation".

2.2.The sustainable development dimension of the subject treated:

Attention to sustainability is growing steadily in today's corporate world. De facto, organizations are now paying more attention to all the dimensions stated above, we will present the subject of this dissertation according to every P respectively:

Prosperity: This term refers to the economic efficiency, in fact, our subject studies ERM and its positive impact in increasing a company's performance, thus its economic health.

People: or social equity, we should aim to the fact that it's the human who is at the heart of sustainability. ERM is an efficient way to ensure that the company is healthy and well

operating, this decreases the probability of insolvency, ensuring the existence of job opportunities and value delivery to the clients.

Planet: this is related to the environmental sustainability. We don't see any link between our subject and this dimension.

Participation: this is in relation with the transparent governance. We saw earlier that ERM is directly linked to corporate governance and information transparence.

Conclusion:

When we speak about Enterprise Risk Management, it's true that Ethics and Sustainability aren't the first things we think of, but they are surely linked to it. This chapter allow us to identify the most important aspects of our subject concerning Ethics and Sustainability, this enriches our dissertation in a way that it doesn't only bring information about Enterprise Risk Management and the Moroccan stock exchange but also it states directly the dignified values this work is bringing. The corporate world witnessed an increased attention to ethical and sustainable conduct in recent years, which proves the importance of these two aspects.

In addition to the importance of ERM this work is aiming to prove, for improving the performance of Moroccan listed companies, it also brings to attention, through this chapter, to the importance of transparency and the fraud fight. Before considering the improvement of the stock exchange, Morocco should focus more on implementing an ethical and sustainable environment, the country is still "tolerant" vis-à-vis some practices, tougher efforts should be made to delete these practices as a first step toward development and prosperity.

Conclusion

This dissertation examines the relationship between Enterprise Risk Management and firm performance based on a sample of Moroccan non-financial listed companies. We explored the effect of ERM as an integrated system on one hand and considering its separate components like the risk assessment depth, the risk assessment frequency, the existence of an Audit committee, the existence of a Chief Risk Officer and the frequency of reporting to the board of Directors on another hand. Thanks to the financial data disclosed on Capital IQ, and thanks to all the respondents we gathered data of 12 enterprises we studied during three separate years, 2009, 2012 and 2015.

The relationship between ERM and performance was never investigated, to the best of our knowledge, using an empirical model in the Moroccan Kingdom. This point deviate attention given to developed markets such as the US or UK, which offers new insights on countries with less capitalization and modest firms in comparison with the above stated markets.

We highlighted in the beginning of this dissertation two main questions, we planned to answer in this conclusion. Through the contextual positioning in the first chapter, the literature review on ERM, the research design, the regressions clustered by firms gave us first answers we will present according to every question:

Research question 1: *How are the components of an ERM system impact firm performance in the Moroccan context?*

Based on regression models for equation (1) and (2) we found that different variables impact performance. The risk assessment depth is relevant for improving the accounting performance represented by Return on Assets, while the existence of Audit Committee and risk assessment frequency enhancing the mart value represented by Tobin's Q. We find out that the control variables also impact performance, the total assets of firms impact both their accounting and market performance, whereas leverage only affect negatively the market value.

Based on these results, we remark that even taken separately Enterprise Risk Management's components are positively linked to performance. Even though, our model did not support all the hypotheses we set, for example the frequency of reporting to the Board of Directors or the existence of a Chief Risk Officer did not appear as relevant, we strongly think, and based on

existing literature, that they are very important for improving performance of Moroccan listed firms.

Research question 2: *What is the impact of ERM, evaluated as a system, on both the accounting performance and market value of Moroccan listed companies?*

By aggregating the components for every observation, we assessed the degree of sophistication of Enterprise Risk Management practices among firms based on Florio and Leoni's work (2017). The idea was to distinguish firms with mature ERMs put in place from companies which still didn't reach a certain level of maturity. The empirical model approved that the more sophisticated an ERM system the better the performance. In other words, our model shows that companies with mature ERM systems surpass Moroccan non-financial listed firms in terms of profitability and in market evaluation. This means also, ERM doesn't improve immediately performance while being implemented; the companies that are on-going an ERM adoption need to be patient, as until a certain level of maturity ERM will improve their performance.

Lastly, we tested the validity of our models. To a point the results obtained through the regressions are reliable and gives a truthful image on the causality of Enterprise Risk Management and performance. But, we don't neglect that biases could exist in our models, in the next section we will present some of the limitations of our study and afterwards we will present improvement tracks and future research possibilities.

Limitations:

While conducting this study, we highlighted a number of limitations regarding the work done. Firstly, there's no exact measures for ERM identification among firms, this hardens the possibility of assessing ERM's impact precisely on performance. Even though, we found a consensus about the variables representing performance as stated in the literature review; often, measures like Return on Assets or Tobin's Q are criticized for not reflecting accurately performance, thus conclusions are limited. From this point, we highlight another limitation regarding the measure of ERM, we chose based on Florio and Leoni's (2017) article the variables as direct ERM pillars, but in reality a ERM could be customized according to the

company in question, for example, if a company judge that a CRO is vital for its ERM that doesn't make it a rule, our study neglects other potential components that could exist.

The second limitation could be linked to the sample, we gathered information about 12 companies, which is relatively low to draw final conclusions about ERM in Morocco. Even though our sample covers more than 20% of the population it is necessary to deepen the research about this subject using larger samples and the whole population if possible. This limitation was highly affected by the non-disclosure of corporate governance and risk practices in Morocco, we strongly believe that with a larger sample another insight may rise. This limitation also caused the abandon of a control variable that is considered important following literature which is the "Industry", often used as a categorical variable; it is very important since risk practices are very sensitive to the areas companies operate in, as an example, risks are managed differently when it concerns phosphate and agriculture, knowing that both industries are one of the main industries generating profits for Morocco. This last point supports the one highlighted in the literature review about the endogeneity.

Third limitation is linked to the interviews done to collect corporate governance and risk management data. We believe it is very likely that interviewers may provide inaccurate responses or aren't informed by the latest practices regarding their risk management. We can't, in any way, verify the accuracy of the answers, moreover, we can't assess the relevance of the Board of Directors and Audit Committees meetings as they may be only formal, thus irrelevant concerning Enterprise Risk Management. The last idea supports strongly the perception of risk practices in Morocco, those practices are seen to be mandatory only based on other practices, while discussing with the interviewees we remarked there's no concrete purpose of managing risks.

A fourth limitation is highlighted considering the time of this study, as the data collection required physical presence for discussion, all the interviews were done in July. The seventh month of the year is the beginning of holidays in Morocco, that's why we received many refusals, due to the absence of qualified people, and employees not on holidays are covering the absents, or because it is a busy period as everyone is finishing all the tasks required before going on holidays.

Future research possibilities:

It is possible to make modifications to this work to improve its accuracy and draw conclusions reflecting better the reality. Many of the points covered lightly could be investigated further in future studies.

As stated in the conclusion, on-going implementations of ERM system do not reflect improvement in the short term, that's why in the upcoming years the same study could explain more the relationship between ERM and performance. Liebenberg and Hoyt (2011) collected data about appointment of Chief Risk Officers on ten years (1995-2005) but investigated repercussions on performance for an extended duration.

Further research could use the same model, and afterwards change the ERM components and dependent variables in order to check the performance of the same sample with ERM considering other risk and performance measures.

Additional statistical test could be used, or differ from the clustered regression, as a change in the empirical will tell more and other things maybe ignored following one model.

This study can also be reproduced using also financial firms, and by categorizing firms by their industries, as it would be more relevant in order to draw more general conclusions about ERM implementation in Morocco.

Ultimately, this research investigates the relationship between ERM and performance in Morocco. This study can be extended to investigate other African markets in order to enrich literature of ERM implementation in emerging markets.

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Appendices

Appendix I. Initial Public Offerings conditions in CSE: (Bourse de Casablanca, s.d.)

Preliminary requirements

	Main Market	***Development Market***	***Growth Market***
Company profile	Large companies	Medium-sized companies	High-growth companies
Minimum shareholders' equity (in MAD millions)	MAD50m	No fixed limit	No fixed limit
Minimum sales (in MAD millions)	No fixed limit	More than MAD50m	No fixed limit
Number of certified financial periods	3	2	1
Consolidated financial statements	Yes, for companies with subsidiaries	Optional	Optional
Additional requirements			
Minimum number of shares issued	250 000 shares	100 000 shares	30 000 shares
Minimum amount issued (in MAD millions) *	MAD 75m	MAD 25m	MAD 10m
Liquidity provision contract	Optional	1 year	3 years

(*): The minimum amount issued corresponds to the amount that your firm wishes to raise on the stock market. It concerns the number of securities offered to the public multiplied by the initial public offering price.

Appendix II. Interview guide

ERM & Firm Performance: The case of Casablanca stock exchange

Guide d'entretien

Bonjour, je suis étudiant en dernière année de Master en double diplôme ENCG Marrakech-HEC Liège. Dans le cadre de mon mémoire-recherche, je réalise une étude pour déterminer la relation existante entre les pratiques du Risk Management au sein d'une entreprise et l'influence de celle-ci sur la performance comptable de l'entreprise même et sa valeur sur le marché boursier de Casablanca.

L'étude, dont le but est purement informatif, vise à constituer une base primaire pour la recherche dans le domaine sur le territoire marocain.

Les données recueillies vont rester strictement confidentielles.

Nom de l'Entreprise :

1- Faîtes-vous référence au Code Marocain de bonnes pratiques et de gouvernance (2008) ?
   - Si oui, depuis quelle année ?
2- Existe-t-il une approche ERM au sein de votre entreprise ?
3- Comment est structuré le conseil d'administration ? (Veuillez fournir les réponses pour les années 2009, 2012 et 2015)
   a. *Quelle est la taille du conseil d'administration ?*
   b. *Quel est le nombre des administrateurs indépendants ?*
4- Quelle est la fréquence des réunions du conseil d'administration ? (Veuillez fournir les réponses pour les années 2009, 2012 et 2015)
5- Existe-t-il un comité d'Audit au sein de votre organisation ?

- Si oui, depuis quelle année ? Si non veuillez aller à la question 8.

6- **Quelle est la fréquence des réunions du comité d'Audit pour l'évaluation des risques ?** (Veuillez fournir les réponses pour les années 2009, 2012 et 2015)

7- **Combien de fois le comité d'Audit reporte au Conseil d'administration ?**

8- **Existe-t-il un responsable de risques (Risk Officer) ?** (Si oui, depuis quelle année ?)

9- **Le risque est-il évalué par fonction, département ou au niveau global de l'entreprise ?**

10- **Selon une note de 1 à 3, où 1 signifie aucune pratique ERM existante, 2 signifie développement d'un système ERM en cours et 3 système ERM mûr, quelle note représenterait le mieux l'état d'un système ERM au sein de votre entreprise ?**

Merci pour vos réponses !

Appendix III. The final sample

Managem
Alliances développement immobilier
Timar sa
Lesieur Crystal
Maghreb Oxygen
Compagnie miniere de Touissit
Aluminium du Maroc
Itissalat Al Maghrib
CTM
Afriquia gaz
Ciments du Maroc
Groupe addoha douja promottion

Appendix IV. STATA interface

```
  ___  ____  ____  ____  ____ (R)
 /__    /   ____/   /   ____/
___/   /   /___/   /   /___/   15.1   Copyright 1985-2017 StataCorp LLC
  Statistics/Data Analysis            StataCorp
                                      4905 Lakeway Drive
                                      College Station, Texas 77845 USA
                                      800-STATA-PC        http://www.stata.com
                                      979-696-4600        stata@stata.com
                                      979-696-4601 (fax)

Single-user Stata license expires 11 Feb 2019:
      Serial number:  301509316648
        Licensed to:  Yassine Drari
                      University of Liege

Notes:
     1.  Unicode is supported; see help unicode_advice.

. import excel "C:\Users\Yassine Drari\Desktop\Master\Thesis\Pratique\Sample final.xlsx", sheet("Financial Data")
```

Appendix V. Frequency table 2009, STATA

```
. by Year, sort : tab1 Depth AC ACtoBoD CRO Rafreq ERMadvcd
```

-> Year = 2009

-> tabulation of Depth

Depth	Freq.	Percent	Cum.
0	8	66.67	66.67
1	4	33.33	100.00
Total	12	100.00	

-> tabulation of AC

AC	Freq.	Percent	Cum.
0	6	50.00	50.00
1	6	50.00	100.00
Total	12	100.00	

-> tabulation of ACtoBoD

ACtoBoD	Freq.	Percent	Cum.
0	8	66.67	66.67
1	4	33.33	100.00
Total	12	100.00	

-> tabulation of CRO

CRO	Freq.	Percent	Cum.
0	9	75.00	75.00
1	3	25.00	100.00
Total	12	100.00	

-> tabulation of Rafreq

Rafreq	Freq.	Percent	Cum.
0	10	83.33	83.33
1	2	16.67	100.00
Total	12	100.00	

-> tabulation of ERMadvcd

ERMadvcd	Freq.	Percent	Cum.
0	10	83.33	83.33
1	2	16.67	100.00
Total	12	100.00	

Appendix VI. Frequency table 2012, STATA

-> Year = 2012

-> tabulation of Depth

Depth	Freq.	Percent	Cum.
0	8	66.67	66.67
1	4	33.33	100.00
Total	12	100.00	

-> tabulation of AC

AC	Freq.	Percent	Cum.
0	4	33.33	33.33
1	8	66.67	100.00
Total	12	100.00	

-> tabulation of ACtoBoD

ACtoBoD	Freq.	Percent	Cum.
0	7	58.33	58.33
1	5	41.67	100.00
Total	12	100.00	

-> tabulation of CRO

CRO	Freq.	Percent	Cum.
0	6	50.00	50.00
1	6	50.00	100.00
Total	12	100.00	

-> tabulation of Rafreq

Rafreq	Freq.	Percent	Cum.
0	7	58.33	58.33
1	5	41.67	100.00
Total	12	100.00	

-> tabulation of ERMadvcd

ERMadvcd	Freq.	Percent	Cum.
0	6	50.00	50.00
1	6	50.00	100.00
Total	12	100.00	

Appendix VII. Frequency table 2015, STATA

-> Year = 2015

-> tabulation of Depth

Depth	Freq.	Percent	Cum.
0	5	41.67	41.67
1	7	58.33	100.00
Total	12	100.00	

-> tabulation of AC

AC	Freq.	Percent	Cum.
0	1	8.33	8.33
1	11	91.67	100.00
Total	12	100.00	

-> tabulation of ACtoBoD

ACtoBoD	Freq.	Percent	Cum.
0	4	33.33	33.33
1	8	66.67	100.00
Total	12	100.00	

> tabulation of CRO

CRO	Freq.	Percent	Cum.
0	5	41.67	41.67
1	7	58.33	100.00
Total	12	100.00	

> tabulation of Rafreq

Rafreq	Freq.	Percent	Cum.
0	7	58.33	58.33
1	5	41.67	100.00
Total	12	100.00	

> tabulation of ERMadvcd

ERMadvcd	Freq.	Percent	Cum.
0	3	25.00	25.00
1	9	75.00	100.00
Total	12	100.00	

Executive Summary:

This study investigates the relationship between Enterprise Risk Management and firm performance in underdeveloped market like Morocco. Our sample is composed of non-financial listed companies on the Casablanca Stock Exchange. The research supports two main assumptions, the first is Enterprise Risk Management components affect positively firm performance when taken separately. The second combines all the components of an ERM system and assess their effect on Moroccan firms.

This paper includes a literature review of Enterprise Risk Management and presents the major empirical results about the subject. It also highlights the specifications of the Moroccan Stock Exchange through a scientific contextualization. Thanks to these two main segments, this paper offers a consistent study for evaluating ERM and performance in an Emerging Market.

The empirical model followed in this paper is the first, to the best of our knowledge, in Morocco. The positive causality between ERM and performance, even though it can be challenged based on the limitations present in the conclusion of the work, remains an important piece of evidence for further studies.

Key words: Enterprise Risk Management, Risk Management, Performance, Accounting performance, Market value, Audit Committee, Chief Risk Officer, Casablanca Stock Exchange, Morocco.