Introduction to the special Issue

The papers appearing in this Special Issue are selected from the First MENA MEETING on “Financial & Fiscal Policies, Economic Growth, and Integration in MENA Region” that was held in Sousse (Tunisia, North Africa) on May 5 & 6, 2011. The Meeting was organized by the University of Sousse, with the collaboration of some doctoral programs, research labs, and Business Schools, and other institutions (ECCOFIGES, International Finance Group, IHES, LIFE, UTICA, L’Economiste Maghrébin, Association Internationale des Experts Financiers et Bancaires Tunisiens.)

The first edition of the Meeting placed stress upon several facts. Indeed, the new phenomena shaping the Finance and taxation-related professions brought forth sizeable impacts on the economic growth for the emerging economies, as well as for the developed ones. More particularly, the creation of new monetary zones, coupled with the worst financial crisis the world had known over the last 70-plus years, require the development of new tools and techniques in the context of financing investment, taxation systems, and risk management. Such points seem to be the key elements of the mechanics for the “re-dynamization” of the capitalistic system. It is quite à-propos in this setting seeing its importance for the economic growth.

The economic integration and economic growth are taken for granted as a major requirement – especially for the emerging countries – to ensure their economic development and social stability. The study of the multifarious aspects linking between the financial theory, the taxation system and the economic growth, on the one hand, and the economic integration, on the other hand, seems to be of a paramount importance, especially in the current period of post-crisis. The scope of this Meeting in its first edition covers such themes. Other facets of the fiscal and financial theories are also embedded.

The Conference was attended by more than 108 participants, basically from Tunisia, Algeria, and France. The organizing committee would like to thank the Keynote Speakers for their valuable articles, and particularly Professor Toni M. Whited from Rochester University in New York. She won the prestigious Brattle Prize for the best paper corporate finance paper in The Journal of Finance. Further, Professor Hafedh Bouakez from HEC Montréal is also thanked for his collaboration and excellent presentation.

The organizing committee would like also to thank the scientific committee. Specifically, Abdelkader Boudriga (ISCC Bizerte, University of 7 November, Tunisia); Abdelwahed El Omri (ISG Tunis, University of Tunis, Tunisia); Ahlem Dakhlaoui (FSEG of Nabeul, University of Carthage, Tunisia); Belal Kaifi (Franklin University, USA); Chaker Aloui (ISCAE, University of Manouba, Tunisia); David Offenberg (University of Loyola Marymount, Los Angeles, USA); Dhafer Saidane (Skema Business School, University of Lille 3, France); Fayçal Mansouri (IHEC, University of Sousse, Tunisia); Jalelddine Ben Rejeb (ISG Sousse, University of Sousse, Tunisia); Jameleddine Chichti (ESC, University of Manouba, Tunisia); Lefteris Tsoulfidis (University of Macedonia, Greece); Lotfi Belkacem
The selected papers in this First Special Issue deal with a variety of problems basically in economic and financial theories and their applications.

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Article 19: MANAGERIAL OWNERSHIP AND PERFORMANCE: A SIMULTANEOUS-EQUATION MODEL. By Fatma Tifafi and Dominique Dufour
CREATING INNOVATIVENESS THROUGH MANAGING KNOWLEDGE RELATIONSHIP WITH DISTRIBUTION CHANNEL

Hedia Maamri
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Abstract
The present research focuses on the role of Distributor Knowledge sharing competency (DKSC) in enhancing the firm’s innovativeness. We intend to identify the dimensions the firm’s innovativeness and to precise the contribution of DKSC to leverage it. We also intend to identify the forces and weaknesses of the organization in managing this competency. In order to address these issues, a case study research is conducted. The empirical data was gathered through triangulating interviews with key staff, documentation and observation. Case study analysis shows that DKSC reveals a process of three stages: (1) knowledge acquisition, (2) knowledge interpretation and (3) knowledge transfer and encompasses two dimensions; the first is distributor’s knowledge about customers and the second is distributor’s knowledge about the competitors. A diagnosis of forces and weaknesses of the company in managing DKSC is also presented. Based on this diagnosis, critics and recommendations are proposed.

INTRODUCTION

Nowadays, companies are in the race for improving their organizational competitiveness in order to compete in the global market. Therefore, companies are trying to improve their agility level with the objective of being flexible and innovative to meet the changing market requirements.

Developing such capability is not a simple task, it is much unlikely that the firm processes all the knowledge needed to manage its business and introduce innovation on its own. So, it is crucial to grasp pieces of knowledge whatever and wherever they are, inside and/or outside the organization in order to combine, exploit and transform them into business opportunities and to have an innovation working climate.

Thus, it is important that firms identify and select the right partners who can provide valuable knowledge. In fact, the unprecedented speed of communications is putting increased pressure on the manufacturer and the distributor to work more closely as a team, sharing information in order to rapidly respond to the demands of a consumer and this collaboration
gives distributors and manufacturers the ability to view one another's inventory or other information in real time.

RESEARCH PROBLEM

The knowledge sharing and its associated effects have been examined in a variety of contexts, including within firm, across global units within the firm, across subsidiaries within Multinational Corporation, across strategic alliances, across buying and selling organizations in business to business markets and across international joint venture, (Griffith, et al, 2001). However, within marketing the transfer of knowledge have received little attention, notable exception being Frazier (2009) provided a conceptual framework to explain the relative importance of manufacturer knowledge transfer and integration into distribution channel. Our intention is to explore the contrary sense of knowledge i.e. the knowledge that flows from distributor to manufacturer and to explore how this knowledge can enhance firm’s innovativeness.

RESEARCH OBJECTIVE

The objective of this research is to get a deeper insight in the role of distributor knowledge in enhancing and leveraging firm’s innovativeness. To reach this goal, we focus on two pillars:

- enhance our understanding on various forms of knowledge in a distribution channel partner relationship
- we envision sharing knowledge within distributor partners impact on firm’s innovativeness.

So, the findings shed light on new theoretical thinking to channel relationship management literature, which integrates knowledge flow from distributor to manufacturer, by proposing a new concept labeled Distributors’ Knowledge Sharing Competency DKSC.

LITERATURE REVIEW:

1. Firm’s innovativeness:

1.1. Definition of innovativeness:

Historically the concept of innovativeness has not been addressed because it is not directly observable; it’s a “spiritual force” that drives value creation (Kenny and Reedy, 2006). Hurley and Hult (1998) defined firm innovativeness as: “the openness to new ideas as an aspect of a firm’s culture” in other world Innovativeness is the property of being an innovation it is relevant to the firm’s capability to engage in innovation. It is “the propensity of a firm to adopt innovative products, construction methods/practice; management system and adopts or introduce business systems that are new to the firm”
Thus, as suggested by Wang and Ahmed (2004) the innovation capabilities of the firm include five main areas that determine an organisation’s overall innovativeness: product, market, process, behavioural and strategic innovativeness.

These five aspects are inter-linked. In particular, product innovativeness and market innovativeness are externally focused and market based, whereas behaviour and process innovativeness are both internally focused, and underline the need for product and market innovativeness. Product and market innovativeness embody the process, behavioral, and strategic innovativeness.

Firms that cope with rapidly changing environments and turbulent markets must be Open-minded; i.e. they must develop the willingness to evaluate the organisation’s operational routine and to accept new ideas by intra-organizational knowledge sharing.

Some scholars have developed the notion of knowledge network and argue that organizational networks can produce more innovations and better performance if they provide access to new knowledge developed by other units (W. Tsai, 2001).

2. Distributor’s knowledge sharing competency (DKSC):

Eriksson and al, (1997) defined the market knowledge transferred by a distributor as that which mainly involves objective and experiential knowledge about products, consumers, competitors and markets (Tsai & Shih, 2004). Objective knowledge can be collected and transferred in standard ways, such as market investigation, while experiential knowledge derives from the distributor's evaluation of consumer preferences and market potential (Schlegelmilch & Penz, 2002). Thus, firms seeking to be innovative and to gain a competitive edge in order to survive, must generate market knowledge about either customer or/and competitors, (Li and Calantone RJ, 1998).

In this research, customers and competitors knowledge processes are treated as two differentiable sets of behavioral activities. This differentiation is important because each set of behavioral activities holds its own locus of interest. In fact, customer is a separate object of perception, which requires a different set of cognitive activities to learn and understand.

2.1. Channel’s knowledge competency about Customers:

In a selling context, distributor listens, observes and pays attention to different customer’s attributes. Sharma et al, (2000) distinguished two types of distributor knowledge structures of customers: (1) Declarative knowledge: consists in the categorization of customers on distinctive categories based on needs and physical characteristic, and in classifying customers based on appearances and inferences that will lead to stereotyping. (2) Procedural knowledge: distributor should use different sales strategies for each of their customer’s categories by drawing upon their procedural knowledge structures. The procedural knowledge structures of experts are expected to be more elaborate, more articulate and contain more information units. Practically, it consists in (1) acquisition step that enable the distributor to acquire information about their customers by asking questions, listening and observing customers to get knowledge about their needs and their preferences. (2) this information has been leveled to reveal a clear idea of customer’s needs. (3) This knowledge, transferred to the firm, may be useful to make a distinction in the firm’s
knowledge base between actual and modified customer’s preferences and so exploit that knowledge in new market opportunities, services and product innovativeness.

In conclusion, distributor customer knowledge processes consists four sequential aspects: customer categorization, customer gathering information, customer knowledge levelling and customer knowledge transfer.

2.2. Competitor channel’s knowledge competency:

In this context the distributor is considered as a mediator actor that can understand the short-term strengths, weaknesses, long-term capabilities and strategies of both the key current and the key potential competitors. In fact, by observing and socializing with competitors, the channel partner acquires the ability to assess competitors’ goals, financial results, and successes and failures, as well as competitors’ assumptions about themselves and the industry (Sorensen, 2008). Then interpret this knowledge by: (1) Advising the firm on advantageous positioning of future product introductions that would impact the competitor, (2) Prevent firm of competitor intentions to introduce new products, (3) Provide knowledge about various competitors and their activities in an evolving market (Sudharshan and Ron Sanchez, 1998).

This knowledge or intelligence as advocated by Sorensen (2008) has no value if it is not shared with the focal firm and especially with relevant decision-maker(s). Systematic transfer and in a timely manner of information is therefore important. So competitor knowledge process involves three behavioral aspects; competitor information acquisition, interpretation and transfer.

CASE STUDY:

To enhance our understanding on various forms of knowledge in a distribution channel, we have adopted the case study method; the choice of this method is justified by the need to understand the impact of distributor’s knowledge on firm’s innovativeness by deploying reflexivity and evaluative skills to organization’s data analysis. So proceeding with an “immersion” in reality was an imperative step to explore “hidden” data and capture the entire depth and benefit from multiple sources of comprehensions. We choose the case of an exporting firm as the need for innovation in this sector is so crucial to improve international competitiveness. In fact export sector is characterized by local and foreign competition and firms must proceed for innovation to maintain its market share and attract markets. In fact, the main problem of this sector resides in how to implement a strategy of differentiation according to each market specification. So, referring to distributor knowledge is so crucial especially knowing that success in export markets is often equated with the export firm’s ability to initiate and sustain strong and mutually beneficial relationships with their foreign distributor. This is because market knowledge is likely to reside with the local partner or distributor.

1. Presentation of the case study:

Boudjebel S.A VACPA is an exporting firm. It is a leader in the Tunisian dates-export sector. It has distributors’ partners in over 30 countries Mercadona Spain Waitrose UK – ICA Sweden – Coop Denmark & Sweden – LIDL Europe and Carrefour France, etc. It offers a wide
range of products: Dates Deglet Nour with Branches (natural dates), Standard Dates Deglet Nour (natural in loose), Processed Dates Deglet Nour (washed and dried), Pitted Dates Deglet Nour.

In order to understand and to explore firm’s innovativeness and DKSC practices in the real life context, we had an immersion experience of a period of two months in this company. Two types of innovation are proceeding in this company; radical innovation and an incremental innovation. We have chosen respectively two new products (1) organic dates, and a new packaging called (PET) for the Dates Deglet Nour with Branches and explored the DKSC related to those products.

2. Data collection techniques:

Case study is known as a triangulated research strategy. Triangulation is protocols that are used to ensure accuracy and alternative explanations (Stake, 1995). The need for triangulation arises from the ethical need to confirm the validity of the processes. According to Yin, (2003), this could be done by using multiple sources of evidence. The three sources of evidence that are considered valuable in this case study are; direct-observation, documentation and in-depth interviews.

3. Case study analysis:

Keeping in mind the objectives of our research, the aim of this section is to investigate the role of the DKSC in enhancing firm’s innovativeness, and to point out how this firm encourage and manage this competency.

Two categories of knowledge are shared by distributors: Distributor’s knowledge about customers and Distributor’s knowledge about competitors. The next section tries to present two products adopted respectively from the use of the already mentioned type of knowledge.

2.3. Distributors’ knowledge about customers:

VACPA deals with European countries in which consumers are more anxious about the food they eat and they are increasingly concerned with food production issues such as food safety, quality, health and environment (Bernt, 2004). That drives customers claim the organic food. Accordingly, distributors support this production and have encouraged dealing with organic dates. According to commercial director; “Our distributors are seen as an active participant in product innovation. They provide us with a background of knowledge about our customers. In fact, especially in the context of exportation, our knowledge about the foreign customers is limited. So our distributors help us to propose more suitable products to customers. In fact, the idea to produce organic dates results from a ceaselessly increasing demand of the market and quite particularly from our distributors’ partners. Drawing on to the distributor’s knowledge about customers the Company launched a new product organic dates labelled Lyna Bio with a specific packaging.”

In keeping with previous research of Murillo & Annabi, (2002) and Sudharshan & Sanchez, (1998), the case reveal the DKC as a process of four stages: (1) Customer categorization, (2) Customer gathering information, (3) Customer knowledge levelling and (4) Customer knowledge transfer.
(1) Customer categorization: In this phase distributor try to categorize customers, product and firm’s position on distinctive categories based on needs and physical characteristic. It consists in classifying customers based on appearances and inferences that will lead to stereotyping behavior. This knowledge allows the company to discover new ways of development. According to this case study, VACPA’s distributors distinguish between two types of customers: Customers who are looking for organic products (About two-thirds of our customers of food shoppers have positive expectation to the organic dates) and those who not report consideration of the fact. This customer categorization suggests that there might be a favorable climate for an organic food marketing campaign.

(2) Customer gathering information: Once distributors have identified customers’ segments they move to the second phase in which they concentrate on collecting and gathering information about the new segment by socializing and interacting with customers. This socialization reveals customers’ prior knowledge and preferences that they derived from their own experiences. So, distributors begin to create a mental map and gather knowledge about reasons for buying organic product and to identify the pieces of knowledge that help customers to make a decision, they sort knowledge regarding some initial basic information of the product such as product characteristics, functional attributes, competitive products, aesthetic considerations, price, time limitations, convenience, beliefs, ...etc. According to commercial director “We assist our distributor by building truthiness relationship and by giving them a list of issues to get data that effectively reveals the product features”.

(3) Customer knowledge levelling: In this phase the distributor engage in gaining valuable knowledge and having a clear idea about customer’s needs and expectations. Thus, knowledge has been levelled according to the priority and the degree of importance. In fact, the distributor has optimized his interaction with its customers, after exchange of knowledge has taken place. This knowledge is analyzed and synthesized to be used in the prototyping phase of the new product development. This knowledge is concerning the design of the product, the price of the new product, the packaging, certification, competitor assortments, and other technical feasibility.

(4) Customer knowledge transfer: In this phase, distributors transfer knowledge to the company. The knowledge is transferred further to the visits lead monthly by the firm and through emails. In the visits the whole idea and proposition is discussed and via emails some specifications are completed. The key element in knowledge transfer is the extent to which the firm receives potentially useful knowledge, absorbs and utilizes this knowledge in its own operations. In this case, the firm creates a strategic innovativeness; it consists on the development of new competitive strategies that create value for the firms, (Besanko et al, 1996). It is a fundamental reconceptualisation of the business (Markides, 1998).

In fact, the company did not dispose farms where it can set up the system of biological culture. Thus, it creates a specific program which consists in upstream integration. This program is entitled the PASA (a programme aimed at improving the supply system: Programme d’Amélioration du Système d’Approvisionnement); this program’s main objective is to enhance raw material quality by means of creating a partnership with the farmers. At the moment, 178 farmers are adhering to the PASA program and this approach based on trust and transparency.
Today, these producers practise the culture following the biological system and are certified by Ecocert. According to distributor knowledge, the Company launched a specific price policy, packaging and label: Lyna Bio to make a distinction for the sale between the biological dates and the conventional dates. This product knew a success during the 2007 and 2010 periods.

2.4 Distributors’ knowledge about competitors:

Companies often benefit from competitors as sources for benchmarking and transfer of best practices (Drew, 1997). Indeed, distributors can provide knowledge about competitors. In fact they have the ability to assess competitors’ goals, financial results, successes and failures, as well as competitors’ assumption about themselves and the market (Sorensen, 2008).

According to the UN Food and Agriculture Organization (FAO), Tunisia has a natural potential that places the leading suppliers in Europe. In fact, Initial estimates for the date harvest in Tunisia for the 2009-2010 campaign expect around 42,000 tonnes against 40,000 for the previous year. This reveals that VACPA Company requires economic advantages for the local competition intensity as well as for the international competitor’s rivalry, such as Algeria, USA and Israel, to challenge its dominant position. Thus it relies on their distributors to share knowledge about their competitors to achieve this mission.

Distributors’ knowledge about competitors has the following three stages: knowledge gathering information, knowledge interpretation and knowledge transfer.

(1) Competitors gathering information:

According to the case study, VACPA Company is faced with both foreign and local competition. In fact, the current competitive environment is characterized by more competitors, new management practices, product standardisation and price competitiveness; all of which highlight the importance of competitors’ knowledge to differentiate from their competitors.

Thus, company considers the distributors as staff that actively participate on gathering competitors’ knowledge. Indeed, the Top manager explained that besides the ways of gaining competitors knowledge like knowledge databases, market research and tracking website browsing, the information shared during the interactions with our distributors are extremely valuable. He noted that distributor knowledge of competitors is more update and relevant. In fact, it is concerning competitors’ products and services quality, threat level facilities and methods, opinions and complaints, marketing strategies, research and development abilities.

(2) Knowledge interpretation:

After gathering information about competitors, distributors should have thorough understanding of how the enterprise, in different situations and times, could counter its competitors in the marketplace. They provide valuable and relevant knowledge according to the firm circumstances. In other word, they filter and interpret knowledge according to the market’s requirements. For instance, the commercial director states that: “according to our distributors, Tunisian dates are an especially rich energy intake, very tasty and have great value in comparison with Algerian, USA and Israeli dates. Despite all these advantages, Tunisian dates did not know the success it deserves. In fact, the narrow range of products, the traditional
packaging for the dates’ preservation that are limited in their ability to prolong the shelf-life of products under modified atmosphere and the lack of communication on this product have even raised doubts and accusations of certain customers. Thus, distributors advocate that “there is a real potential for the new product, “dates as ingredient”: dates can be integrated into energy bars and mixtures of cereal in a specific packaging.”

(3) Distributors’ knowledge transfer:

According to distributors, the key factor to beat the competition was differentiation. So, thinking about Product innovativeness, The Top manager wants to introduce a project of innovation which consists in differentiating VACPA’s dates from local and foreign competition for a better location on the target markets and particularly on the German market and the development of an appropriate marketing strategy. The project started on June 04th, 2007, the top manager wanted through this project to set up a “Guide of Good Practices of Innovation using collective intelligence” in other word by coordinate local activities with those of upstream suppliers – in this case Top manager sought to the Technical Center of Packaging and Conditioning (PACKTEC) and The Technical Center of Agro-Alimentaire (CTAA) -and downstream customers (in this case the German distributors, they know better the needs of the market) under uncertainty and imprecision in a very dynamic environment to benefit a technical cooperation and collaborative innovation (Sheremetov and Mier, 2008).

Thus, German distributors of foodstuffs transfer the following information: (1) Product is perceived as interesting, (2) Dates conditioned for energy bars considered "interesting", (3) Dates dried and crushed for mixtures of cereal considered "interesting", (4) Jam of dates, stuffed dates, syrup of dates, " averagely or little interesting”, (5) Packaging used perceived as low range.

Value of these reports: There is a real potential for the new product “dates as ingredient “: dates are already often integrated into energy bars and mixtures of cereal.

The collaboration between PACKTEC and the VACPA Company allowed realizing studies on the conservation of dates under modified atmosphere. This collaboration was strengthened by the study, engaged with the CTAA, for the development of products with dates as ingredient.

These works were finished by the development of new product called Date-bread: it is a Conditioned and pitted dates then pressed together with almonds to form date-bread and the proposition of new packaging (PET) with different designs directed in the ranges of products: gifts, BIO...

2.5 Distributors’ knowledge sharing competency as a process:
Figure 1: Distributors’ knowledge sharing competency as a process

Based on previous researches and the case study, distributors seem to have a potential knowledge about customers as well as about competitors. The wise use of this knowledge is believed to be considered as driving power that create and enhance firm’s innovativeness. Consequently, this competence is needed, for the organization, to be considered as a source to exploit adequately. On this base, we propose DKSC as a new concept in the marketing literature describe the willingness endowed with the expertise of the distributors in sharing knowledge that led to enhance the firm’s innovativeness.

In the following section, and based on a diagnosis of firm’s management of distributors’ knowledge, we expose some instructions for the firm to better exploitation of this competency that led and enhance its innovativeness and to get a competitive advantage based on DKSC.

4. Diagnosis of firm’s exploitation of distributors’ knowledge:

4.1 Strengths:

- First of all, the case in hand is a good illustration of an innovative firm it has diffused about 20 new products from 2007 to 2010, it pursues the technology evolution in the market place, customer preferences and needs in order to retain and offer to its customers more suitable products.
- The distributor knowledge is valorised in the firm; in fact the Top manager and the hierarchical units in the firm are building a trustworthiness relationship by leading monthly visits, responding punctually to their requests to encourage knowledge sharing.
- Firm’s awareness of the importance of DKSC has a directly impact on behavioural innovativeness, demonstrated through firm’s teams and management receptivity to new ideas and innovation hence the formation of an innovative culture. Consequently, it enhances product innovativeness, strategic innovativeness and market innovativeness.
- The distributors’ knowledge is decentralized in the different services (Top management, marketing department, production department, purchasing department, management quality department...) this mobilizes firm’s innovativeness.
- The firm is characterized by its “absorptive capacity” consisting in using a “collective intelligence” by integrating different partners upstream and downstream to enhance its innovativeness.
- The involvement of top management in the collaboration with distributors encourages the formation of an innovative culture within the firm and thus to enhance willingness to change, foster new ideas and commitment to encourage new ways of doing things.
- ITC has a significant role; it facilitates the knowledge spreads of, encourages frequent dialogue and communication and moves closer the distance between the two partners.
- After visit to the distributor, the commercial agent make rapport in which it include details communicated with distributor then copies of this rapport are sent to all departments of the firm.
- Heavy investments are spent in establishing and maintaining relationship with distributors to pursue the evolution of customers’ needs and competitors’ offer and strategies.
- The new product advantages and commercial politic are explained to the distributors for better customers’ satisfaction.

4.2 Weaknesses:

- The absence of market studies department, in fact marketing department holds responsibility of management of distributors’ knowledge identifying the new product idea, and then transfer it to the top manager and the concerning department.
- Despite the importance of DKSC as advocated by the firm, distributors are passively integrated without being directly involved as real participants in the innovation process by using active methods such as focus groups, meetings, conferences....
- Top manager centralizes the responsibility to accept or reject the adaptation of new innovation.
- The big number of distributors and their different locations lead the firm to neglect some relevant information and knowledge because it’s considered as specific and it just concentrate on the knowledge that can be generalized to different markets’ locations.
- Sometime, knowledge about competitors guides the firm to pursue imitation and not innovation.

5. Discussion and critics:

Through this case study we attempt to investigate the impact of exploiting distributor knowledge sharing competency (DKSC) on firm’s innovativeness by identifying its different steps. The case in hand is a good illustration of a firm that succeed to root an innovative culture that is enhanced further the exploitation of the distributors’ knowledge which occurs during interaction with them. The company recognizes the importance and the valuable role of DKSC in enhancing its innovativeness level that manifests in; product, process, behavioral, strategic and market innovativeness. As advocate on previous research findings, the case study demonstrate that DKSC reveals a process of three stages: (1) knowledge acquisition, (2) knowledge interpretation and (3) knowledge transfer and divided on two dimensions; the first is distributor’s
knowledge about customers and the second is distributor’s knowledge about the competitor (See figure 1). Two methods are used by the firm to transfer the distributor’s knowledge; through e-mails and further visits led by the Top manager or commercial agents. These methods generate valuable and update knowledge but if reinforced by other active methods and techniques such as meeting, focus group and conferences..., the firm can learn better from their distributors of the fact that he has a closer relationship with their customers as well as with their competitors. Thus, they will be actively involved as real participants in the innovation process and considered as co-producers and partners.

In fact, a global vision and the capability to elaborate, integrate and exploit multiple knowledge sources are required; in fact, Chesbrough, (2003), encourages the use of determined internal and external knowledge to accelerate, respectively, internal innovation and expand the markets for external use of innovation.

In addition, firm wonder to actively involve the distributors in innovation process due to the risk to disclosure its own information to competitors. In fact Top manager advocates: “we pay attention on dealing and communicating with our distributors. In fact, as they can provide us information about competitors’ strategies and orientation, they can disclosure our information to them. Indeed not all distributors respect and behave according to our ethical climate despite our company ethical clarity.” This problem is revealed by many scholars who focus on determining factors that can predict salesperson’s propensity to behave in an ethical way. For instance, providing information on competitor quotes, strategies…etc, are considered as ethically sensitive or questionable practices that are commonly associated with salesperson’s actions (Cooper et al., 2000). These practices didn’t receive equal attention by firms. In fact, some practices are likely to be explicitly prohibited by organization policy, others may be normatively permitted, and still others may have no normative or policy precedence. It is, therefore, important for the organization to take time to communicate with their distributors, evaluate their various activities and offer them general guidance to foster more ethical climate of decision making in order to encourage distributor behavior ethically permitted and to prohibit unethical practices. (Ross and Robertson, 2003).
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REGIONAL CONVERGENCE IN EUROPE: A HIERARCHICAL LINEAR MODEL

KAMEL GHADDAB

Abstract

The aim of this paper is to introduce a new empirical approach to test the neo-classical hypothesis of regional convergence. The introduced hierarchical approach consists of a linear mixed model of the convergence equation, in which the coefficients are modeled as random variables. The advantage of this empirical modeling is that it permits us to test econometrically one of most notorious stylized fact of the economic geography of European space, which defend that most of the observed disparity of the long run regional performances is explained by a disparity between factors relating to the European nations. The approach introduced in this paper allows a modeling of the quantitative equation of convergence under the assumption that the regions are nested in the various nations. Thus, it will be possible to introduce two important elements, which relate respectively to the heterogeneity of the convergence speed of regions of different countries, and the estimation of the effect of national factors in the process of differentiated regional convergence.

Key Words: Regional convergence, linear mixed models, spatial econometrics, hierarchical models, economic growth, and economic integration.

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1. Introduction
The problems of regional convergence constituted a broad field of theoretical controversies and empirical investigation. The gradual enlargement of the European Union to new countries reinforces fears about the question of regional convergence.

M. Fujita, P. Krugman and A. Venables [1999] note that this interrogation on the trade integration of the nations, and its geographical implications in terms of convergence, were the result of a whole of recent work which tried to highlight the effect of openness and liberalization on the geographical distribution of the economic activity within nations (pp. 329-330). The two most important essays are P. Krugman and G. Hanson [1993] and E.L. Ades and A.F. Glaeser [1997]. The first was focused on the correlation between the trade liberalization of the Mexican economy and the regional distribution of the economic activities, and this in the various phases of the trade liberalization process. The second was international comparisons on eighty-five country between the total population of the large cities and two variables relating to the trade liberalization of these countries (the share of the imports in the gross domestic product and an indicator of trade policy). The conclusion of this work is that there exists a strong relation between trade liberalization and the internal regional convergence.

In the case of Europe, a whole of policies was set up by the European Commission, and which aims at reducing the regional divergence of the economic performances and the standards of living. This set of policies defines, in fact, which is known as the European Regional Policy. It is primarily made up of Structural Funds and Cohesion Funds, which consist of a whole of transfers towards the underdeveloped regions. During the period 2002-2006, these funds constituted one third of the general budget of the European Commission, which is generally judged as significant proportion, which materializes the importance of the question of alleviation of the regional divergence phenomenon.

However, the effectiveness of these funds, in terms of their effect on the economic growth of the European regions, constituted a very controversial subject discussed between economists and political deciders. Several studies relativized the effectiveness of these policies. The problems of regional convergence should be thus studied in parallel with the institutional and economic structures of the macroeconomic aspects of nations, in order to rationalize the transfers of structural and cohesion funds.

2. The Problem of Regional Convergence in Europe
One of the most notorious aspects of the economic and social geography in Europe, in the last decades, is materialized by the phenomenon of the divergence of the standards of living between the European regions.

Statistically, P. Martin [2003] note that 20% of the European population live in regions being the subject of the primary goal of the assistances relating to the program of Structural Funds in Europe. Since the criterion of the primary goal is fixed at a threshold of 75% of the European average, in terms of the income per capita, it is easy to deduce that the fifth of the European population is below the third quartile in terms of the standard of living.

From this simple statistical fact, two essential elements can be released. The first is relating to the existence of a relatively important phenomenon of economic and social divergence between the European regions, which deserves to be studied and explained. The
second element is corollary with the first, since it places Structural Funds and those of Cohesion in the center of the concerns of the decision makers of the European Commission.

The width of this phenomenon is, in fact, exacerbated if one leads a comparative analysis of regional reality in Europe with that prevailing to the United States. In the same direction, P. Martin [2003] note that, if one applies the same criterion of assistance of Structural Funds to the American regions, only two regions will be the subject of these assistances. Although it will be necessary to relativize the direct and absolute comparisons between the two situations, it’s commonly accepted that the phenomenon of regional divergence is a characteristic of the European continent.

Several theoretical studies, like empirical ones, were undertaken within this framework, but a paradoxical feature remains to be cleared up, and which is that the economic activity is more concentrated in the United States than in Europe. Theoretically the explanation which was often presented and defended inserts in the logic of the theories of new economic geography. We privilege the dynamics of the migratory movements as being the factor inhibiting any tendency to the convergence of the standards of living between the European regions\(^2\).

Structural and Cohesion Funds come to concretize the whole of the European strategy of the struggle against the regional divergence problem. In statistical terms, it is slightly justifiable to doubt with an insufficiency of these funds, since they constitute one third of the general budget of the commission, and they are generally considered to be important on the macroeconomic level. This importance is notorious if we relativize the amount of these funds compared to the income of the country being the subject of these assistances.

The impact study of these funds is particularly delicate, in the direction where the effects are generally heterogeneous on the national and regional levels. In the same direction, and although the effects of these funds on the convergence of the European nations seem appreciably notorious, in the two last decades, the reality of the regions remains far from being solved, since the phenomenon of divergence is still statistically significant.

Within the framework of our research, we are interested to explain this paradoxical face between the trajectories of development of nations and reality of infra national regions. The motivation of this work comes owing to the fact that the process of regional convergence seems explained, in a different way, by the characteristics specific to the nation’s economies.

This phenomenon of the heterogeneous evolution of the European geography according to the spatial scale is strongly corroborated in the essay of J.A. Duro [2001]. In this study, we can release an important assessment, which shows that the divergence of the regions in Europe is ascribable, with half, with the divergence on the level of the nation’s members. The residual component is explained, consequently, by characteristics specific to the regions. Thus, it should be noted that the phenomenon of regional divergence should be studied side of its origins on the level of the nations.

From these trajectories observed on the level of the two last decades, we draw one from the commonly released stylized facts of the European geography. This fact indicates that this European geography has been characterized by a dual process of convergence between the nation’s members, accompanied by one tendency to the divergence of the regions within these nation's economies.

\(^2\)See P. Martin [2003] for an exhaustive theoretical synthesis on this question.
3. Traditional Approaches of Regional Convergence

The empirical problematic of convergence forms part of the line of empirical research derived from the neo-classic models of economic growth, in particular the referential essay of Solow-Swan [1956], and its theoretical extensions developed by D. Cass [1965] and T. Koopmans [1965].

By adopting the assumption of decreasing returns, and implicitly the decrease of the marginal productivities of factors, an inevitable consequence of the neo-classic model is materialized by the drying up of the long term growth of the product per capita. The reason is materialized by the tendency to the decrease of the marginal productivity of the capital, single reproducible factor. In the long run, the system will tend towards a stationary state, where the product per capita grows according to an exogenous progression dictated by technological progress. The level of long run income is given like function of the fundamental parameters of the economy such as technology, saving and the demographic growth.

Two hypothesis of economic convergence were released from this theoretical framework synthesized by the relation (1), and which are respectively the $\beta$-convergence hypothesis and that of $\sigma$-convergence hypothesis. The first materializes a phenomenon of mean reversion, i.e. the economies considered tend to converge towards a common level of income in the long run, implying a negative correlation between the income growth rate of the period and their initial levels of income per head. This diagram of convergence, known as “absolute”, is checked if we suppose homogeneity of the economies in terms of their technological, demographic and institutional parameters. This assumption constituted the base of the empirical research tasks on the regional convergence of R. Barro and X. Sala-I-Martin [1991, 1992 and 1995], X. Sala-I-Martin [1996], S. Durlauf and D. Quah [1999] and A. De la Fuente [2000]. Alternatively, convergence will be considered to be conditional, and in this case other variables must be integrated to play the role of conditionality factors of the convergence of the economies.

Several limits were discussed in connection with the models of regression based on cross-section $\beta$-convergence. Of these criticisms, we quote just the two most important ones. Initially, S. Magrini [2004] advances that although these empirical models are directly derived from the structural forms of the neo-classic models; they are far from being regarded as a direct empirical test of the validity of this model. The reason is that these models can be associated with various rival theoretical approaches.

The second reason is related to the informational contents of these empirical models, in particular the ignorance of the temporal dimension of the convergence process. This second limit justified the birth of a number of empirical tests using the panel structure of the data. These tests are generally legitimated by the fact that the specifications based on cross-section are subject of a problem of ignorance of the unobservable heterogeneity of the economies, which calls into question the statistical reliability of the estimates. The tests, in this empirical matter, were developed around several axes, from the method of dummy variables least squares, until the adoption of other methods statistically more robust. We can refer, in this case, with works of S. Lall and S. Yilmaz [2001], A. De la Fuente [2000], G. Tondl [1999, 2001] and M. Battisti and G. Di Vaio [2009]. The general structure of the convergence equation derived from these models is the following:
Logy_t = [Logy_0 - (Logy^* + LogA_0)]e^{-t} + [Logy^* + LogA_0 + t] \quad (1)

y_t and y_0 represent the levels, in T and at the initial date, of production per capita. A_0 is a scale factor.

The second line of research is focused on the dispersion of the economies in terms of growth rates. In this case, we study the evolution of the standard deviation of the income per head variable. We judge a situation of convergence if we observe a decreasing tendency of this standard variation in time. Although this distributional approach is regarded as a direct alternative and a violation of the approach based on β-convergence regression, the drawn conclusions of this approach are far from being generalizable. The reason is that the total distribution on cross-section of the standard deviation of per capita income variable does not inform us on all the sub-groups of the economies constituting the total sample. In addition, and as it was shown by S. Magrini [2004], the constancy of the standard deviation of the income per capita could correspond to several distributional configurations of the sample.

4. Spatial Approach of Regional Convergence

4.1 Integration of spatial dimension in convergence analysis

In this paragraph, we propose to highlight the spatial dimension of regional convergence. Indeed, it is a question of reproducing the basic structure of regional convergence, and to study the implications of the introduction of the spatial interdependence into the process of convergence. The specification of the quantitative convergence equation, with an explicit consideration of the spatial autocorrelation between the regions, can be formulated as follows:

(Log y_t - Log y_0)_{r_i} = \beta_0 + \beta_1 (Log y_0)_{r_i} + e(r_i) \quad (2)

e(r_i), is the error term for region i.

\sigma^2, the variance.

Cov (e(r_i), e(r_j)) = \sigma^2 e^{-[||s_i-s_j|| / \theta]} \quad (3)

y_t, is the gross domestic product per capita. y_0, its initial level.

In this formulation, we retain an exponential form for covariance between the errors of the regions. ||s_i - s_j||, represents the distance separating the two regions r_i and r_j, \theta, being the parameter of covariance. It is necessary to note, at this level, that the exponential specification retained for spatial covariance is generally adopted in geostatistics discipline, where the studied space units are often points in a continuous space. For our concerns, the space coordinates retained in this specification are characteristics of the polygons. The length, surface and volume play the part of geographical size of the regions.

The quantitative equation of convergence, given by the relation (2), is estimated by three concurrent methods. The data are relative to 246 regions NUTS 2 nested in 17 countries of the
European Union\(^3\). The values, final and initial, of the gross domestic product per capita are measured in real terms. In the first column of table (1), the estimation results are given for ordinary least squares, and by adopting the assumption of spatial independence between the European regions. The two last columns of the table are relating to the estimation of the convergence equation under the assumption of spatial correlation, but by adopting two alternative methods, which are respectively the complete and restricted forms of maximum likelihood.

The conclusion concerning the relative capacity of the model of spatial dependence compared to the simple form of the convergence equation remains preliminary. What we can advance is that the standard deviations of the coefficients with ordinary least squares and spatial independence are weaker than those released by the maximum likelihood and spatial correlation. We can deduce that the first traditional form of the model over-estimates the precision of the estimators.

<table>
<thead>
<tr>
<th>Model</th>
<th>OLS Model</th>
<th>REML Model</th>
<th>ML Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>Estimate</td>
<td>SE</td>
<td>Estimate</td>
</tr>
<tr>
<td>(\beta_0)</td>
<td>0.1131</td>
<td>0.0046</td>
<td>0.0825</td>
</tr>
<tr>
<td>(\beta_1)</td>
<td>-0.023</td>
<td>0.0011</td>
<td>-0.016</td>
</tr>
<tr>
<td>(\theta)</td>
<td>-</td>
<td>-</td>
<td>1.1024</td>
</tr>
<tr>
<td>(\sigma^2)</td>
<td>0.0000379</td>
<td>0.00000343</td>
<td>0.0000373</td>
</tr>
</tbody>
</table>

Let us note that this over-estimation is noted on the amplitude of the coefficients relating to the constant and the slope materializing a relative inflation of the coefficient of convergence for the European regions.

These reports are corroborated by the estimation relating to the parameter of covariance. Indeed, and by taking the traditional form of the equation of convergence like reference, we note that spatial covariance between the regions of Europe over the base period is statistically significant.

This comparative analysis of the model of spatial dependence compared to the traditional form of convergence remains preliminary. It requires, consequently, a formal statistical test for the relative quality of estimation. We use, within this framework, the LR test based on the likelihood function.

Table 2: Comparative analysis of explanatory power of the convergence equation

<table>
<thead>
<tr>
<th>Model Fit</th>
<th>Independent Model</th>
<th>Correlated Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-2LL) (ML Method)</td>
<td>-1808.54</td>
<td>-1877.25</td>
</tr>
<tr>
<td>(-2LL) (REML Method)</td>
<td>-1782.96</td>
<td>-1853.25</td>
</tr>
</tbody>
</table>

\(^3\)The data are collected EUROSTAT database.
\(^4\)The estimates were carried out on SAS 9.1.3. REML and ML respectively represent the results with the restricted and complete methods of the maximum likelihood.
The power of this test depends on the relation binding the two forms of the model (without and with spatial autocorrelation). The criterion of deviation, based on the value of the likelihood function (-2LL), is applicable only in the case of the nested models, i.e. that we can derive the traditional form (without spatial dependence) starting from the spatial form from the convergence equation.

More formally, is it possible to establish the aspatial form equation of convergence as a particular case of the spatial form, i.e. when \( \theta \to 0 \)? Indeed, when the parameter of spatial covariance \( \theta \) is null, the value of the likelihood function is unspecified, and it will not be possible to compare the two forms of the quantitative equation of convergence. O. Schabenberger and A.C. Gotway [2005] propose a transformation of the form of spatial covariance so that it allows a direct comparison of the two models. In fact, \( e^{-\|s_i-s_j\|/\theta} = \rho \|s_i-s_j\|^{\theta} \), with \( \rho = e^{-1/\theta} \). So, it’s a question of testing the null hypothesis \( H_0: \rho = 0 \).

Table (2) presents the results for this LR test. From this table, we calculate the likelihood ratio having a statistic value of about 58.03. The null hypothesis is rejected with a probability, \( p (X^2) > 0.0001 \). We conclude that taking account of the spatial nature of the correlation between the regions, in terms of their trajectories of growth over the period of analysis, is a statistically reliable assumption.

The same conclusion can be released if we suppose that the two forms of the quantitative equation of convergence are independent. In this case, one can use the two criteria of information of Akaike and Schwartz.

Another test is generally used to consider the potential presence of a phenomenon of spatial autocorrelation for a given specification. It is about the test of P. Moran [1950] specific to the regional data, i.e. where the space of the geographical units is discrete. The statistical logic of this test implicitly supposes a null assumption of absence of a phenomenon of space autocorrelation in a given sample. On the formal level, it is based on a statistics, noted by I and it’s given by \( \sum_{i=1}^{N} \sum_{j=1}^{N} w_{ij} \hat{e}_i \hat{e}_j / \sum_{i=1}^{N} \hat{e}_i^2 \) where \( N \) is the number of space units, \( w_{ij} \) is a matrix of spatial contiguity, \( \hat{e}_i \) is the error of the regression by the OLS and \( H \) a normalization factor.

In table (3), are summarized three alternative tests for the concurrent assumptions of the spatial dependence against the assumption of absence of spatial autocorrelation. The three tests are formal, and they indicate a refutation of the null assumption of our analysis, indicating that the regional data of Europe for period 1995-2005 are characterized by a strong correlation in space. This report thus joins the majority of the empirical tests in this matter, and makes the results relating to the traditional models of convergence slightly reliable on the statistical level.

### Table 3: Analysis of spatial dependence

<table>
<thead>
<tr>
<th>Model</th>
<th>Estimate</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spatial dependence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moran stat I</td>
<td>20.23</td>
<td>0.00</td>
</tr>
<tr>
<td>Alternative : Spatial Error Model</td>
<td>366.86</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>Spatial Lag Model</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LMT</td>
<td>63.07</td>
<td>0.00</td>
</tr>
</tbody>
</table>

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The phenomenon of the stochastic spatial dependence can be graphically studied. The graphic tool for this analysis is qualified by the semivariogram. It makes it possible to study the degree of the spatial structure of the units of the sample in question. The logic inherent in this tool is in the aforementioned “first geographical law” of Tobler, which states that all the phenomena are connected between them, but that this degree of dependence is more important for the relatively contiguous phenomena. Statistically, this tool is based on the function of covariance. Let the spatial process:

\[ C(s, h) = \text{Cov} (Z(s), Z(s + h)) \]  

\( s \), is the index of the studied geographical unit. \( h \), is the distance separating two spatial units.

The function of autocorrelation is given by:

\[ R(s, h) = \frac{C(h)}{\sqrt{\text{Var}(Z(h))\text{Var}(Z(s + h))}} \]  \( 4 \)

We derive as follows the function of the semivariogram:

\[ \gamma(s, h) = \frac{1}{2} \text{Var}[Z(s) - Z(s + h)] = \frac{1}{2} [\text{Var}Z(s) + \text{Var}(s + h) - 2\text{Cov}(Z(s), Z(s + h))] \]  \( 5 \)

In the case of a stationary spatial process of second order, the value of the function of the semivariogram will have the following value:

\[ \gamma(h) = \frac{1}{2} [2\sigma^2 - 2C(h)] = C(0) - C(h) \]  \( 6 \)

\( C(0) \), is the initial value of the autocorrelation function, i.e. when the distance is null. \( C(h) \), the value of this function at a certain distance, \( h \).

Graphically, the function of the semivariogram will have a concave form with respect to the distance axe. The asymptotic limit of its concavity defines what we describe as “Sill” given by the breaking value \( h^* \), to which the studied space units are correlated. Intuitively, this form reproduces the logic of the geographical law of Tobler, in which the degree of spatial dependence evolves disproportionally to the distance separating two space units.

The figure (1) makes it possible to visualize four forms of empirical semivariogram, estimated on the basis of four econometric methods. The first is that traditional, based on the residuals of least squares. The three other methods constitute a refinement of the treatment of the errors of the model, and they give qualitatively the same conclusions\(^5\).

\( ^5 \)See O. Schabenberger and A.C. Gotway [2005] for a detailed development of these statistical methods allowing establishing the estimated semivariogram.
All the graphs are revealing of a phenomenon of spatial autocorrelation of the units representing the European regions, in terms of their trajectories of growth in time. The reason is that the curve of the graphs indicates that the empirical semivariogram is concave, materializing the fact that the geographically contiguous regions interact between them, in terms of economic growth, and that the phenomenon of spatial dependence decrease with distance.

We deduce that a quantitative equation of convergence, which is based implicitly on the assumption of spatial independence, cannot be statistically reliable to study the variations of growth between the European regions.

The released reports of this tool of the semivariogram can be erroneous if the order of the regional units bias the function of spatial covariance. To avoid this bias, we can remake the estimation of the spatial function of covariance for a random permutation about the regional data. The figure (2) shows us that the global curve of semivariogram is unchanged for ten random permutations about the regions considered.

---

Figure 1: Estimated semivariogram of the convergence equation

6 These graphics were established with SAS 9.1.3. Certain programs were inspired from O. Schabenberger and C. A. Gotway [2005].
In order to make an explicit consideration of the spatial autocorrelation, we adopt the two specifications of reference of spatial econometrics, namely the model with spatial lag and that with spatial error.

The spatial lag model presents the following general form:

\[(\text{Log } y_t - \text{Log } y_0)_{r_i} = \rho W (\text{Log } y_t - \text{Log } y_0)_{r_i} + \beta_1 (\text{Log } y_0)_{r_i} + \varepsilon_{r_i} \quad (7)\]
With $\rho$, represents the coefficient of the spatial autoregressive process, materializing the spatial autocorrelation between regions. $W$, is the matrix of spatial contiguity of regions. $W(\log y_t - \log y_0)_{i1}$, play the role of a lagged dependent variable.

In comparative terms, it is a question of testing the implicit assumption $H_0: \rho = 0$ of spatial independence. In the case of a specification ignoring the phenomenon of spatial dependence of the regions, in terms of economic growth, the estimation of the convergence coefficient released will be biased. The reason is due to the omission of a relevant explanatory variable, materialized by the dependent variable, spatially lagged.

The alternative specification of the equation of spatial convergence is given by the spatial lag model. The general form of this model is given by:

$$
(Log y_t - \log y_0)_{i1} = \beta_0 + \beta_1 (\log y_0)_{i1} + \varepsilon_{i1} \\
\varepsilon_{i1} = \lambda W \varepsilon_{i1} + \nu_{i1}
$$

(8)

In this case, $W \varepsilon_{i1}$ represents the lagged value of the error $\lambda$, the coefficient of the spatial autoregressive process of the errors and $\nu_{i1}$, is a random variable materializing the error, and which is homoscedastic and independent.

In comparative terms, it is a question of testing the null hypothesis of independence of the errors $H_0: \lambda = 0$. This test is similar to a specification estimated with the presence of heteroscedasticity problem. In this case, and although the estimators remain without bias, the ignorance of the phenomenon of error dependence generates an inefficiency of the estimators. The statistical precision, based on the Student and Fisher tests, will not be reliable and the explanatory power of the specification will be erroneous.

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7This matrix $W$ represents information on the spatial adjacency of the studied units. If one models the space relation of (N) points (regions) and thus a matrix $n \times n$, we can define their adjacencies by the variable $C(i,j) = C(j,i) = 1$ which informs us thus that and only thus have a ratio of direct adjacency, and geographically close. If not, the variable takes value 0 (note that, by definition $C(i,i) = 0$) (see Haining [2004], pp. 81-83). On the practical level, and for the case of the regional data, this matrix was created in ArcView GIS 3.3 and GeoDa 0.95a, before being used in the estimates of SpaceStat 1.90 (see L. Anselin [1999] for details).
Table 5: Estimation of spatial specifications of the convergence equation

<table>
<thead>
<tr>
<th>Dependent Variable : GDP \text{growth} 1995-2005</th>
<th>Spatial Error Model</th>
<th>Spatial Lag Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>p-value</td>
</tr>
<tr>
<td>$\rho (W-Gdp_{growth})$</td>
<td>0.338</td>
<td>0.00</td>
</tr>
<tr>
<td>$\beta_0$</td>
<td>0.080</td>
<td>0.00</td>
</tr>
<tr>
<td>$\beta_1$</td>
<td>-0.016</td>
<td>0.00</td>
</tr>
<tr>
<td>$\lambda$</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Convergence speed</strong></td>
<td>0.000631</td>
<td></td>
</tr>
</tbody>
</table>

**Estimation Quality**

<table>
<thead>
<tr>
<th></th>
<th>$R^2$ squared</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Schwarz criterion</strong></td>
<td>-1843.73</td>
<td>-1933.90</td>
</tr>
</tbody>
</table>

**Heteroscedasticity Test**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breuch-Pagan</strong></td>
<td>0.162</td>
<td>0.686</td>
</tr>
<tr>
<td><strong>Spatial Dependence Analysis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LR Test</strong></td>
<td>51.72</td>
<td>0.00</td>
</tr>
<tr>
<td><strong>LM Test</strong></td>
<td>134.37</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Table (5) summarizes the estimation results of the quantitative equation of convergence, by adopting the method of the maximum likelihood for the two forms of the spatial autocorrelation between the European regions over the period 1995-2005. The results can be directly compared with those of table (4), which are relatives to an estimation of the traditional convergence equation by ordinary least squares. The respective coefficient with the GDP per capita variable is of theoretically predicted and statistically significant sign, materializing a phenomenon of mean reversion of the growth variable, or what one qualifies of the assumption of absolute convergence between regions. This convergence takes place with a relatively low speed of less than 1% annually. The dependent spatially lagged variable is statistically significant, materializing the presence of a phenomenon of spatial dependence between regions, in terms of the growth of the income per capita. The explanatory power of the specification is relatively important.

Alternatively, and with regard to the concurrent specification of spatial autocorrelation with spatial error dependence, the results are overall similar. The assumption of absolute convergence is statistically justified, and the speed of convergence is relatively more important than in the model with spatial lag.

Concerning the treatment of the heteroscedasticity problem, the Breuch-Pagan test, for the two specifications of the spatial autocorrelation, reject the null assumption indicating the absence of a phenomenon of heteroscedasticity for the regional data of the sample.

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The speed of convergence (noted Speed) is calculated as being $-\log(1 + \beta_1)/T$. 

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4.2 Spatial variability of coefficients and regional convergence in Europe

The specifications retained for the neo-classic equation of convergence, discussed and estimated in the preceding paragraphs, suppose a perfect spatial homogeneity of the variances, as well as the homogeneity or a stability of the coefficients in space.

On the theoretical level, these specifications are derived from the absolute form of convergence in the neo-classic model. The latter supposes that in the long run, the distribution of the per capita growth variable will be characterized by a concentration around a common value of the income per head of the regions considered. In addition, it supposes that the coefficient of mean reversion is perfectly uniform for all the studied economic units. However, and even in the conditional form of this convergence, the relieving of the assumption of the single level of the long run per capita income was not accompanied by an attempt to relativize the assumption of spatial stability of the coefficients.

The going beyond of these two last designs of neo-classic convergence has been reached by what’s qualified in the growth empirics by cluster convergence hypothesis. In this case, we suppose that the distribution of the per capita growth variable presents a localized aspect. In the long run, there will be clusters of concentration of economies with respect to different levels of income per capita. The differentiation between these clusters is defined by a set of conditionality variables. These variables are associated with the level of human capital, the stock of knowledge, the absorptive technological capacity of economies and social capability. Other variables can be used, whose choice is directly given by particular specification of the convergence equation.

The limit of this convergence approach is that the studied thresholds are generally of ad hoc nature. Indeed, the tree of decomposition of the total sample in subsamples is established on the basis of exploring descriptive analysis of sample specificities. In addition, the rejection of the assumption of stability of the coefficients is not generally followed by an explicit treatment of the localized nature of the spatial distribution of growth.

To test the assumption of spatial stability of the growth equation coefficients, we make generally resort to the introduction of dummy variables defining the studied spatial regimes. The individual tests on these dummy variables will enable us to consider the potential existence of heterogeneity problem of the coefficients for the studied spatial units.

In a first stage of our study, it will be a question of testing the assumption of spatial stability of the coefficients of the quantitative convergence equation. On the statistical level, it is a question of using the Chow test in its spatial version, which consists in considering the quantitative equation of convergence in a first stage, and then to resort to estimation, by layer, defined for all subsamples.9

To establish this test, we must define a variable which materialize the spatial regime of regional data. As it was already mentioned in the first paragraph, our objective will be to study the phenomenon of clustering by the national identification of the studied regions. We suppose thus that the phenomenon of regional convergence in Europe is characterized by a strong national dimension. Indeed, this dimension is unobservable within the framework of the specifications of convergence integrating only variables relating to regional dimension.

---

9See J. Arbia [2006] for a theoretical discussion on the application of the Chow tests within the framework of the spatial data.
Explicitly, the variable which will define the spatial regimes will be indicating of each European nation, within which a certain number of regions are nested. There will be 17 spatial regimes, materializing the fitment of 246 European regions NUTS 2°.

This test is established for the three specifications already studied in the preceding paragraphs, which are respectively spatial independence and the two forms of spatial correlation adopting the spatial lag and the spatial error. The results summarized in table (6) are affirmative, and they teach us a statistically significant presence of a problem of spatial heterogeneity of the coefficients of the quantitative equation of convergence, namely the constant and the coefficient of convergence.

Table 6 : Spatial heterogeneity of parameters in the convergence equation

<table>
<thead>
<tr>
<th></th>
<th>OLS Model</th>
<th>Spatial Error Model</th>
<th>Spatial Lag Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spatial Chow</strong></td>
<td>25.69</td>
<td>932.96</td>
<td>721.97</td>
</tr>
</tbody>
</table>

Estimations are established with SpaceStat191

Although the results of this test are strongly with the profit of a hierarchical structure of the European regions at the national level, this test is far from being regarded as an explicit study of the effects of the national membership on the process of regional convergence.

On the econometric level, the spatial effect could be materialized in the form of an interindividual heterogeneity of the coefficients. The latter can be comparable with that of the observed and unobserved heterogeneities in traditional models of panel data. In this case, L. Anselin, J. D. Gallo and H. Jayet [2008] explain why this heterogeneity will be described as of spatial nature, if it is generated by spatial variables such as those relating to the localization, the distance or the regional aspects (pp. 627-628). Two big families of modeling were followed. The first is relative to the discrete or qualitative spatial changes, and which are qualified spatial regime models. The Chow test, treated above, is an illustration of these changes. The second family is rather relating to the heterogeneity which materializes through the continuous changes. This line of modeling joined the family of the models with random coefficients.

5. Hierarchical Approach of Regional Convergence

The logic on the basis of the hierarchical approach consists with an estimation of two levels. In a first stage, we consider a traditional specification such as that given by the relation (8). On the base of this stage, we derive the coefficients from which we qualify as the fixed part of the model, made up of the parameters of the constant and the slopes associated with the explanatory variables of the first level of estimation. These coefficients will thus be supposed to be random, and they will play the role of the dependent variables to be explained in the second level of the regression. They compose the stochastic part of the specification. By combining the two levels of the specification, we derive what we qualify of the mixed linear form of the model.
given by the relation (12). It is described as mixed, in the sense that it permits to join the fixed and random parts of the model. The qualification of hierarchical is explained by the fact that the global population of regions is treated on a hierarchical basis in two layers. The regions constitute the units of the first level of the population, and the countries constitute the units of second level of this same population.

The general structure of the hierarchical form of the convergence equation is given by:

\[
(\log y_i - \log y_0)_{r_i} = \beta_{0r_i(n_j)} + \beta_{1r_i(n_j)} \left[(\log y_0)_{r_i(n_j)} - (\log y_0)_{n_j}\right] + \epsilon_{r_i(n_j)}
\]  

(9)

\[
\beta_{0r_i(n_j)} = \gamma_{00} + \gamma_{01}X_{1r_i(n_j)} + \cdots + \gamma_{0k}X_{kr_i(n_j)} + \mu_{0r_i(n_j)}
\]  

(10)

\[
\beta_{1r_i(n_j)} = \gamma_{10} + \mu_{1r_i(n_j)}
\]  

(11)

The index \(n_j\) is relative, in this case, with the nation \(X_{k,n_j}\), represents the explanatory variable, \(k\), which explains the constant specific to the region \(i\), \(\gamma_{01} \cdots \gamma_{0k}\), are the coefficients of the explanatory variables of the random constant of regions \(\gamma_{10}\), is the constant relating to the random slope \(\tau_{r_i(n_j)}\), is the term of error of region \(i\) in the country \(j\).

The substitution of the two equations, relating to the constant and the slope of the quantitative equation, gives what we qualify the mixed linear form of convergence:

\[
(\log y_i - \log y_0) = \\
\gamma_{00} + \gamma_{01}X_{1r_i(n_j)} + \cdots + X_{kr_i(n_j)} + \gamma_{10}[\log y_{0r_i(n_j)} - \log y_{0r_i(n_j)}] + \\
\epsilon_{r_i(n_j)} + \mu_{0r_i(n_j)} + \mu_{1r_i(n_j)}[\log y_{0r_i(n_j)} - \log y_{0r_i(n_j)}]
\]  

(12)

\(r_i\), is an index for region \(i\). \(n_j\), is an index for the country \(j\).

The general mixed linear form is made up of two parts. The first represents the fixed part of the specification, of which we consider the coefficients respective with the specific constant and each variable integrated into the first level. The second part is made up of the terms relating to the residuals of the first and the second level of the regression. In this case, the estimation does not relate on coefficients, but rather to the variance of the components of this random part, whose precision reflects the random nature of the coefficients of the specification.

In a first stage, and with the aim to estimate the degree of hierarchical nature of the total population of the studied regions, it will be a question of bringing back the variance specific to the units of second level \((\sigma_{00})\) compared to the total component of the variance \((\tau_{00} + \sigma^2)\). The ratio defines, in this case, which we qualify of the intra correlation coefficient. It informs us about the proportion of the ascribable variance to the units of second level of the regression.

To estimate this proportion, we must estimate the empty version of the model, i.e. without explanatory variables in the two levels. This estimation will permit to determine the hierarchical components of the variance. Formally, it is a question of estimating the form:

\[
(\log y_i - \log y_0)_{r_i} = \beta_{0r_i(n_j)} + \epsilon_{r_i(n_j)}
\]  

(13)

\(\beta_{0r_i(n_j)}\), is the constant relating to the region \(r_i\) belonging to the nation \(n_j\). \(r_{r_i(n_j)}\), is the error of the first level of the regression relating to region \(i\) of the nation \(j\).

\[
\beta_{0r_i(n_j)} = \gamma_{00} + \mu_{0r_i(n_j)}
\]
\( \gamma_{00} \), is the constant of the total population. \( u_{0,r(i)\gamma} \), is the random term relating to the constant.

In this case, the coefficient of intra correlation will be given by \( \rho = \tau_{00} / \tau_{00} + \sigma^2 \). Knowing that \( \sigma^2 \), represents the total variance independently of the membership of a region to a given country. From table (7), we note that 73% of the total variance of the regions is ascribed to an international heterogeneity. This amplitude can be judged as very important, insofar as the variables specific to the regions explain only the quarter of the dispersion of growth of the per capita income of the European regions.

We will point out that any specification being unaware of the hierarchical character of the European regions at the national level cannot release statistically reliable estimation. In other words, the perfect homogeneity, supposed on the level of the coefficients of convergence, is likely to generate a phenomenon described as \( \beta \)-inflation, i.e. an over-estimation of the coefficient of convergence of the regions.

Into a second phase, two mixed linear forms will be introduced. These forms are respectively associated with the specification with random constant and that with random coefficients. The first specification supposes heterogeneity only on the level of the constant, i.e. on the level of the average growth of the regions within a given nation. For an economic interpretation of the constant, we propose to center around the mean of the national group the variables of the regions. In this case, the constant \( \gamma_{00} \), represent the growth of the regions if the value of its per capita income is equal to the average of the national group.

In addition to its random nature, we integrate variables relating to nations, and which are supposed to explain the convergence of the regions. Two variables are proposed in this work, and which are respectively the growth of the per capita income at the national level and a dummy variable reflecting if a nation belongs to the group of the fifteen of Europe, or alternatively a new Member State. This last variable is integrated to study if the integration of new nation's economies makes it possible to support the homogeneity of the European regions, or alternatively a factor reinforcing the economic divergence.

Table (7) synthesizes the estimation results of the geographically hierarchical form of the convergence equation, and they enable us to release the following reports. From the empty model, we note that the average growth through the European countries is now synthesized by the constant, that is to say 2.14%. The component of the variance corresponding to the random constant is given by 0.0000731. Its estimated value is statistically significant, which implies that there exists a significant variability of the average growth of regions through the European countries.

The integration of an explanatory variable relating to the regional units of first level of the regression, and which corresponds at the initial level of the per capita income causes a decrease of the variance of the random constant. Its estimated value passes from 0.0000731 to 0.0000164, and it is statistically significant. We deduce that this variable improves the explanation of the dispersion of the economic growth of regions over the base period.

In order to study the effect of the enlargement of the European Union on the economic performances of the Member States, and more particularly on the process of regional convergence, we introduce a dummy variable, which takes the value one if the country in question is a member of the group of the fifteen. The results of the estimation of this specification for the quantitative equation of convergence are given in the third column of table (7). Of these results, we note that the average growth of regions of the group of the fifteen is
given by the constant, that is to say 3.22%. This value is interpreted as being the average growth of the regions of the Member States of the group of the fifteen, if their centered value of the per capita income is null. The fact that a region belongs to a country of this group is penalized in terms of growth of an order of 1.5%. We deduce, consequently, that the integration of new Member States could generate, by a mechanism of mean reversion, a less dispersion of growth. The integration of this variable allows a decrease of the variance of the random constant, but that the latter is always statistically significant reflecting the fact that the heterogeneity of the regions is still to be explained.

Into another stage, we introduce a national variable of the economic growth of the per capita income. The integration of this variable is justified by the fact that the growth of the European regions is, mainly, explained by national economic dispersions, in particular by the economic growth. The results are relatively the same ones as the preceding specification, and that in terms of the coefficient of convergence, but with an average growth of the regions of these countries which is less important. This last result is explained by the integration of an additional variable on the second level, which is likely to decrease the residual component of the growth. The coefficient relating to the variable national growth is statistically significant and relatively important in amplitude. Indeed, an increase of 1% of the growth at the national level makes it possible to stimulate the growth of the regions belonging to this country of about 0.3%. This report reinforces fears so that the divergence between the countries is an inhibiting factor of regional convergence in Europe.

In a last stage, and in the basis on the results of the preceding specification, we will retain a specification of the quantitative equation of convergence which supposes a random nature of the coefficient of convergence. The results are quantitatively the same ones as in the case of the preceding specification with random constant, except for the fact that regional convergence is not checked any more. The variance of the coefficient of convergence is statistically significant, implying that in addition to the heterogeneity of the constants, a variability of the coefficient of convergence of the regions remains to be explained, particularly at the national level. Lastly, we note that to judge the reliability of the integrated random effects, we use statistics of reliability introduced by A. Bryk and S.W. Raudenbush [1992]. The two last lines of table (7) show the value of these statistics. We note that the constant is reliable with the order of 96.5%, whereas the coefficient of convergence is reliable with the order of 66.4%. The amplitude of these values testifies to the reliability of the random effects materialized by the constant and the slope of the equation of convergence.

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11See Chapter 3 of R. Bryk and S.W. Raudenbush [1992] for a detailed analysis of the construction and the use of these statistics of reliability in the hierarchical models.
Table 7: Estimation of the hierarchical form of the regional convergence equation

<table>
<thead>
<tr>
<th></th>
<th>Empty Model</th>
<th>Random Constant Model I</th>
<th>Random Constant Model II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{11}$</td>
<td>$\gamma_{20}$</td>
</tr>
<tr>
<td>$p_{value}$</td>
<td>0.02141</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Fixed part of estimation (parameters)</td>
<td>0.00</td>
<td>-0.017</td>
<td>-0.017</td>
</tr>
<tr>
<td>Interactive part of estimation (parameters)</td>
<td>0.00</td>
<td>-0.0151</td>
<td>-0.0151</td>
</tr>
<tr>
<td>Random part of estimation (variance)</td>
<td>0.00008</td>
<td>0.00008</td>
<td>0.00008</td>
</tr>
<tr>
<td>Variance of level 1</td>
<td>0.00003</td>
<td>0.00001</td>
<td>0.00001</td>
</tr>
<tr>
<td>Deviation (-2LL)</td>
<td>1828.64</td>
<td>-1965.37</td>
<td>-1972.52</td>
</tr>
</tbody>
</table>

Table 7: Estimation of the hierarchical form of the regional convergence equation (continued)

<table>
<thead>
<tr>
<th></th>
<th>Random Constant Model III</th>
<th>Random Coefficients Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>$\gamma_{00}$</td>
<td>$\gamma_{11}$</td>
</tr>
<tr>
<td>$p_{value}$</td>
<td>0.0204</td>
<td>-0.017</td>
</tr>
<tr>
<td>Fixed part of estimation (parameters)</td>
<td>0.02</td>
<td>0.0025</td>
</tr>
<tr>
<td>Interactive part of estimation (parameters)</td>
<td>-0.017</td>
<td>-0.0104</td>
</tr>
<tr>
<td>Random part of estimation (variance)</td>
<td>0.00003</td>
<td>0.00003</td>
</tr>
<tr>
<td>Variance of level 1</td>
<td>0.00003</td>
<td>-</td>
</tr>
<tr>
<td>Deviation (-2LL)</td>
<td>1971.61</td>
<td>-2048.87</td>
</tr>
</tbody>
</table>

Estimation Quality

Random effect reliability (constant and coefficient)
6. Conclusion

The central objective of this paper was to introduce a hierarchical modeling of the problems of regional convergence. This test finds its justification in one of the more important stylized facts of the empirical literature about the question of convergence, and which is that most of the phenomenon of the regional divergence is explained by the strong disparity between the nations, to which these regions are nested. This stylized fact thus explains the nested character of regions, and the hierarchical nature of the population of these regions makes the traditional estimates of cross-section analysis or of the traditional spatial econometrics model biased.

In order to highlight the impotence of the traditional empirical approaches, we tried to carry out estimates of cross-section specification of the equation of convergence by ordinary least squares. In addition to the problem of ignorance of the temporal dimension of convergence, the principal limit of this approach is materialized through the statistical phenomenon of inflation, which appears through an over-estimation of the coefficient of convergence and the uniformity of this coefficient for all regions, whatever the nation to which they belong.

The explicit modeling of spatial dimension in the convergence equation made it possible certainly to establish an explicit modeling of various forms of spatial interdependence between the regions, but the question of the hierarchical nature of the regions remains unsolved. To overcome this indetermination, we tried to carry out a mixed modeling between the spatial dimension of convergence and the hierarchical nature of the regions in the nations. The results made it possible to give an account of the important amplitude of the dispersion of the coefficients of the convergence equation, and it is in terms of the constant which represents the average rate of the growth of the regions of the same nation or the coefficient of convergence, which in our approach is regarded as a random variable of the equation of convergence. The explicit modeling of the random nature of the coefficient of convergence enabled us to show how most of the divergence of the regions remains to be explained by the strong disparity of the nations within European space.

Within the framework of this test of spatial hierarchical modeling of regional convergence, we materialized the influence of the nations on the speed of convergence of the regions through the introduction of variables incorporated to the level of the nations into the equations relating to the estimation of the random coefficients of the regional convergence equation. These national variables made it possible to decrease the dispersion observed on the level of the coefficients of convergence, which are specific to the regions. Of these national variables, we specified that which materializes the integration of the European nations, in particular that the country is or not a country of Europe of the fifteen. The integration of this variable enabled us to study the way by which the European enlargement of the Community affects the process of regional convergence in Europe, and it is compared to the first nation’s members, or the new entrants, whose integration had constituted the most controversial debate in political decision.

The key question of our research was to revisit the internal effects of trade openness (approximated by economic integration) on the problems of regional development. The approach
selected was primarily animated by conclusion of studies in this matter, and which is that the
problems of regional convergence are, mainly, dependent on the variables appearing at the
aggregated geographically level, i.e. national. Within this framework, our test was to give in
obviousness this report, and to reopen the debate on the regional convergence, which will have to
take into account the national variables in the analysis of the regional trajectories of economic
growth. This conclusion would have been of much broader importance, if the empirical
framework was able to cover the regional data of the developing countries of other non-European
countries, but the limitation of the regional data in these countries prevented such specification.
The approximations led for the regionalized determination of the income data in these countries
would have relativized the statistical relevance of such an empirical framework.

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THE EFFECT OF INTANGIBLE RESOURCES ON THE ECONOMIC PERFORMANCE OF THE FIRM

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Abstract

With the new economic conditions, the intangible resources play an important role in the performance as well as in the survival of the modern firm. Therefore, the internal development of resources, mainly the intangible ones, is vital in the resources theory. Thus, this paper deals with the relationship between the intangible resources and the financial performance of the firm. Our empirical results have led to the theory validation. Based on the Tobin's Q as a measure of the intangible resources, our regression models have allowed confirming the positive contribution of the intangibles to the amelioration of the economic performance. In addition, these resources have an explicative and significant effect on the existence and the persistence of differences in the performance between the firms.

Keywords: Intangible resources, Tobin’s Q, Resource-based view, Performance, Specific profits.
INTRODUCTION

In our economy where the industrial era gave way to the era of information technology, knowledge, know-how, the firms can be created and disappeared on the basis of intangible elements such as qualification of the employees, research and development, dynamism of commercial circuit, the evolution of organizational structure. In other word, these elements, defined as intangibles resources, have become the fundamental characteristics of the present economy largely apparent in the developed countries. In fact, these resources are considered as principal factor of growth (Michalisin and al, 2000).

Its importance has been advocated by several economic theories (essentially the theories of new growth) under the framework of the strategic analysis of industries. The characteristics of the industry have been constituted the main factors which explain a superior performance. So, the strategic analysis is considered on the one hand as the identification of the industries and on other hand as the decrease of the pressure of competition taking into consideration the structure of the industry. Consequently and with the crucial position held by the firm in the economy, it has been developed a theory of resources or resource-based view which focuses on bridging the gap with the previous theories. This theory is interested in the strategic assets which allow the development of the performance and consider the industry only as a field of using these assets. Thus, the resource based view highlights the importance of the internal resources of the firm in the strategic reflexion and the achievement of a superior performance. Besides, it considers that the firm possesses a range of heterogeneous resources. The heterogeneity of the resources will be translated into a difference of competitive position and so a difference of performance (Roberts, 2001, Arrègle, 2006). In fact, the intangible resources can have the necessary characteristics (the non transparency, the non transferability) to develop and maintain a superior performance as well as a difference of performance between firms. The latter will reflect a competitive advantage defensible for a certain times in relation with the characteristics of these intangible resources.

The following paper is essentially based on the theory of resources and aims at studying the impact of intangibles on the economic performance of the firm. As a consequence, the purpose of this article is the empirical test of the relation between:

- the intangible resources and the economic performance in terms of the creation and amelioration of the profitability of the firm (Waring, 1996, Roberts, 2001);
- the intangible resources and the difference in performance between the firms in terms of the creation and the persistence of the specific profits. The importance of this empirical test is highly fundamental especially that it was not sufficiently dealt with (McGahan and Porter, 1999, 2003).

This paper is presented as follows: We are going to start with the literature review which focuses directly on this subject (section 1). Based on this review, we are going to build our hypotheses and methodology of research (section 2) which will be applied on a French sample. Finally, we are going to be interested in the interpretation of the empirical results (section 3) which will lead to the conclusion in the last part of this paper.

1- LITERATURE REVIEW

Actually, the firm can achieve crucial competitive advantages due to its intangible resources. In fact, the competitive advantage leads to the achievement of higher revenues compared to the competitors. Based essentially on the resource theory, several theoretical studies

These studies which are essentially theoretical studies have pointed out that this type of resources is a fundamental condition to obtain a tenable competitive advantage leading to a difference in the performance between the firms. However, they are insufficient since they should be approved by empirical researches. So, it is evident to examine the empirical studies which have treated this topic and determine the principal contributions as well as the gaps. But, it should be noted that the researches linking the economic performance (particularly the profitability) with the intangible resources and based on the resource theory are not abundant. In fact, the majority of empirical researches have focused mainly on a particular aspect of these resources. They have basically treated the effects of innovation and technology (Geroski and al, 1993, Vargas and al, 2003, Belkaoui, 2003, Gu, 2004, Lopez and al, 2005, Czarnitzki and Kraft, 2005) and, with less care, the reputation (Robert and Dowling, 2002). However, hardly can we find empirical researches that have treated the intangible resources in their totality.

Starting with innovation and technology, Geroski and al (1993) have made a very important research even though it is not recent. They tried to see whether the correlation between the outputs of innovation (in terms of new products or process) and the profitability reflect the permanent or transitory differences between the innovative and the non-innovative firms. Geroski and al (1993) measured innovation by the number of innovations achieved in a sample of British firms. They empirically approved that the innovative firms have higher profitability and a differential performance following to the introduction of the new specific innovations. They noticed that the number of innovations produced by the sample was declining during the study period. Moreover, if the product of the innovation is the only explanation of the innovation’s effect on the profitability, then, it is expected to have a very important difference in the profitability between the innovative and the non-innovative firms at the beginning of the period. However, they found that this difference is more accented toward the end of the period which is characterised by a recession in the Great Britain. This finding shows that the difference is deduced by a generic difference between the innovative and non-innovative firms caused by the innovation process. The latter has made the innovative firms more capable to face harmful economic conditions.

Despite the importance of empirical findings, this study is relative to the context in which it was carried out due to the specificity of the collected data about the innovation. The construction of these data depends on the productive institution and the industries decomposition.

Vargas and al (2003) concluded in their empirical study that the information technologies could considerably ameliorate the competitive position. Yet, this relation is strongly moderate due to the size effect of the firm. It is also conditioned by qualified human resources and by the nature of the competitive intensity that the firm should face. Thus, the researchers have indicated that the information technology is a necessary factor though is not enough for the improvement of the competitive position.

In the latter study carried out in a Spanish context, the measure of the competitive position was partly determined by a questionnaire measuring the opinion of the customers concerning the quality of the services offered by the firm. The technological variables were deduced also from a questionnaire filled out by the CEO, the direction of the available
technology and by the employees. In fact, these primary data may hedge the empirical results due to the possibility of the existence of a subjectivity bias or the risk of bad understanding of the items by the responders. Furthermore, the interpretations of results were based on the correlation analysis bringing up an exploratory relation of association between the variables rather than a relation of causality. In addition, these interpretations were concerned only with the pharmaceutical industry and they can be different for the other industries.

By emphasizing the usefulness of the intangible resources in a more general context, Belkaoui (2003) has studied the relationship between the performance of the firm and the intangible resources using a sample of American multinationals firms. He has shown that the transfer of capacities of patents, reputation, customers and other elements is easier and more fruitful inside the same groups of firms. This study presents a particular objective which resides in the fact of motivating the internationalization of intangible resources because of its crucial advantage in the achievement of high competitiveness. Moreover, it is more beneficial for the international firms to transfer an element of its intangible capital abroad through a subsidiary instead of selling or renting (like the patent) under the framework of this study, the performance was measured by the difference between the added value of the enterprise and the median value of the sample. This measure aims at distinguishing the enterprises in terms of the worth creation. The intangible resource was represented by the number of patent owned by the company. So, Belkaoui (2003) concluded that the intangibles resources allowed the multinational firms to maintain a higher differential performance during a period of five years and consequently can maintain their competitiveness. However, this study is limited to the multinational firms and to one type of intangible resources which is important but insufficient. So, this study presents the constraint of the generalization of the empirical results.

Concerning the effect of reputation, we distinguish the study of Robert and Dowling (2002). They have treated the impact of reputation on the economic performance of firms from American context. These searchers have empirically confirmed that the reputation of the firms has a positive and considerable impact on the persistence of profitability in the short term. These authors have measured the profitability by the performance of the asset returns of the firm and they have determined the reputation by using the “Fortune” data base. Nevertheless, the data about the reputation were collected from managers and financial analysts while there are potential groups of investors whose opinion about the performance is very important. Besides, there are other partners in the firm (such as the employees, the customers, the supplies) who have their own implications about the dynamism of the economic performance.

Finally, treating the subject in its totality, Villalonga (2004) tested directly the effect of the intangible resources of the firm on the tenability of its competitive advantage by using a sample of American firms. The intangible resources were firstly measured by the Tobin’ Q and secondly by the predicted value from a hedonic regression of Tobin’ Q on several accounting measures of intangibles (such as R&D expenditures). The sustainability was measured by the persistence of specific profits of the firm. The latter were determined by the difference between the operating income of the company and the average of its sector (same method of measuring differential performance as that of the study of Geroski and al (1993), Belkaoui (2003), Casta and Ramond (2005), etc.

Villalonga (2004) concluded that as much as the intangible resources are important, the persistence is high and the competitive advantage is sustained. Moreover, he noticed that the direct use of Tobin’s Q as an indicator of intangibility is more efficient than using the Tobin’s Q
estimated from the accounting measures. Therefore, he approved that the Tobin’s Q can be considered as an efficient captor of various intangibles aspects.

Casta and Ramond (2005) have made a more global study concerning the impact of the intangible investment on the competitive performance in the three different samples which are: French sample, Spanish sample and British sample. This study presents a particular interest because it tries to show if there is a difference in the effect of this investment according to the market and the study context.

The competitive performance has been defined as the strategic benefits measured by the ratio of revenues of the firm divided by the revenues of the sector. The intangible investment has been determined by the R&D expenditures, the variation of goodwill and the intangible assets recognised in the balance sheet. Furthermore, they introduced the number of employees as an explanatory variable of the competitive performance. The empirical results show that the number of employees has a positive impact on the competitive performance for the total sample. But, this variable may be considered also as an efficient proxy of the firm’s size which may improve its capacity to face the competitors and consequently the size may influence the competitive performance. Concerning the intangible investment, the empirical results indicate that they affect negatively the competitive performance of the French and Spanish firms. Nevertheless, this investment kind has a positive effect for the British firms.

Casta and Ramond (2005) have provided the following explanations:
- the competition is more sustained on the British market;
- the efficiency of the intangibles assets recognized in the balance sheet of the British firms is more important rather than of the French and Spanish firms.

However, these results may be attributed to the measure of the variable of the study. Firstly, the searchers have completed the missing observations of the R&D expenditures by an approximation. Also, the intangible resources and the goodwill may be not efficient to represent the intangible resources since their accounting treatment is determined by the manager’s decision. Secondly, the measure of competitive performance in terms of revenues without including the necessary expenses for the realization of these revenues may be insufficient to capture the real capability of profitability. Thus, we can conclude from this study that the effect of intangible resources on the competitive performance depends on the market characteristics then it is indispensable to provide more empirical evidence for this matter.

2- HYPOTHESES AND METHODOLOGY
2-1- HYPOTHESES

The change of the production’s process in favour of intangible investment involves its importance in the performance of the firm. Lev (2001) indicates that the intangible assets constitute for the majority of firms a determinant source of their growth and their wealth. Many searchers have suggested that a significant portion of the profits are not generated by tangible factor of production but by the intangible capital of the firm (Lev, 2001, 2004, Sullivan and Sullivan, 2000). Indeed, several empirical studies have shown the importance of intangible investment in the determination of economic performance of the firm. However, with regard to the literature review, these studies call for many critics. For example, scarce are the articles which are interested directly in the intangibles assets recognized in the financial reports and observing their impact on the wealth generation of the firm. In addition, the majority of papers have been limited to the study of the effect of one element of the intangible resources. Thus, it
will be useful to deal with these gaps in order to reinforce the resource based view which must be continually tested because it depends on the change of the importance of the production factors binding to the economic conditions. Consequently, we pose our first hypothesis H1:

**H1: More the degree of intangible resources is important, more the economic performance is important.**

If we verify this hypothesis, we can say that the intangible resource may be qualified as a strategic asset. In fact, the same asset may be considered by a firm as strategic asset but not with other firm. This can be explained by the strength of the competitive pressure in a particular industry. Therefore, it will be indispensable to examine also the industrial effect on this issue.

Our economy, which qualified as an economy of knowledge, is characterized by a continual increase of the portion of intangible capital in the firms since it is perceived as a solution in front to the concurrence. The resource-based view anticipates a positive contribution of the intangible asset as a strategic asset in the creation’s wealth and in the realization of competitive advantage involving differential performance between firms. But, we remark that empirical researches have given a modest attention in the relationship between intangible resources and competitive performance. Thus, we pose our second hypothesis H2:

**H2: More the degree of intangible resources is important, more the difference in the economic performance between firms is important.**

By this hypothesis we seek to test if the intangible resources permit to the firm to realize specific profits rather than other firms. But, in a dynamic environment it does not sufficient to create a competitive advantage permitting the realization of specific profits, then, it is indispensable to sustain this advantage. Therefore, we pose our final hypothesis H3:

**H3: More the degree of intangible resources is important, more the difference in the economic performance is sustained.**

We notice that the realization of a sustained competitive advantage by the firm does not depend only on the intangible resources which represent its competitive base but it depends also on the harmonization between these resources and the whole strategic factors of the industry.

### 2.2- Sample

Our sample is constituted by 365 quoted American companies and observed from 1994 to 2005. Then, this search yielded 4380 American firm-year observations from the database Compustat. The repartition of the firms is summarized in the table 1.

In the collection of our data, we choose the firms which have at least nine observations concerning the variable of the intangible assets recognized by the balance sheet because it is not evident to find automatically this variable in a continue way. This criterion of choice limited considerably the number of the observations in this study but it avoids at the same time the existence of a bias on the estimators of the variables.

The firms of the sample are partitioned into two groups in order to validate ours hypotheses. The first five sectors (SIC code 13, 20, 22, 47 and 51) are considered as traditional sectors which don't based essentially on intangible expenses and noted as "group 0". The others sectors (SIC code 28, 73, 35, 36) are considered as high technology sectors which requiring intensive intangible expenses and noted as “group 1”. The distinction between the traditional sectors and the sectors of high technologies was made on the basis of the previous empirical studies (Gu and Wang, 2003, Emad Mohd, 2005, Darrough and Ye, 2007).
The choice of the adopted classification was not made according to the intensity of intangible assets recognized in the financial reports such as many researches (Sougiannis, 1994, Rogers, 2002, Ballester and al, 2003) but it was made according to the nature of the industry. In this way, we may avoid a bias due to many problems concerning the accounting treatment of intangibles.

2-3- VARIABLES CHOICE

Economic performance: For measuring the economic performance, we have used the operating earnings indicated in the annual financial report which represent according to Lev (2004) the economic earnings of the enterprise. In fact, the notion of economic performance of a company reflects its capacity to create some economic value.

Tangible capital: Since the tangible is considered as a factor of production, it is indispensable to see its contribution in the wealth's generation in the new economic conditions. For the measure of this variable, we have taken the accounting value of tangible assets. Lev (2001, 2004) considers that the enterprise generates economic earnings due to two components: tangible capital and intangible capital.

Intangible capital: The measure of intangible resources poses a problem relative to its specific character and the difference in the accounting normalization of intangibles. For dealing with this problem, we have taken two measures:

- An accounting measure: We have taken the accounting value of intangible assets recognized in the balance sheet.
- An approximate measure: Taken into account the critics concerning the intangible assets recognized in the financial reports, an alternative way to measure these assets consists in the Tobin's Q. This proxy is defined as the report of the value of the firm to the replacement value of its assets. This measure is used as an efficient indicator of the intangible capital of the firm (Lindeberg and Ross, 1981, Megna and Klock, 1993, 2000, Skinner, 1993, Jannine, 2003, Villalonga, 2004, Merino and al, 2006). The calculation of the Tobin’s Q is presented as follow:

$$ Q = \frac{\text{Total Market value of the firm}}{\text{Economic value (replacement cost) of assets}} $$
2-4- STATISTIC TOOLS AND MODELS

For the test of the hypotheses H1, H2 and H3, we have used the multivariate regressive models as will describe below:

\[
RC_{it} = \alpha_i + \alpha_1 Q_{it} + \alpha_2 I_{-INTG_{it}} + \alpha_3 I_{-TANG_{it}} + \epsilon_{it} \quad \text{Model 1}
\]
\[
D_{-RC_{it}} = \beta_i D_{-RE_{-t-1}} + \beta_2 Q_{it} + \beta_3 Q_{it} * D_{-RE_{it-1}} + \epsilon_{it} \quad \text{Model 2}
\]

- \(RC_{it}\): Operating earnings divided by the total assets of the firm i during the period t;
- \(D_{-RE_{it}}\): The difference between the operating earnings of the firm i and the mean of the operating earnings of the sample during the period t divided by the total assets. This variable indicates also the specific profits of the firm;
- \(Q_{it}\): Tobin’s Q of the firm i during the period t representing not recognized intangible resources;
- \(I_{-INTG_{it}}\): Intangible assets recognized in the financial reports divided by the total assets of the firm i during the period t;
- \(I_{-TANG_{it}}\): Tangible assets divided by the total assets of the firm i during the period t;
- \(Q_{it} * D_{-RE_{it-1}}\): The interaction between the intangible resources and the specific profits of the previous period \((t - 1)\).

3- INTERPRETATION OF EMPIRICAL RESULTS

3-1- DESCRIPTIVE ANALYSIS

The results presented in the table 2 (panel A and panel B), were realized on the basis of the raw variables and the deflated variables and we have got the same interpretations and conclusions.

On the basis of the deflated variables, the average of the tangible assets (0.228) over the period of the study is raised generally much more than that of the intangible assets (0.117). This does not mean that the level of the tangible investment is more important in the process of production and in the creation of wealth than the intangible investment. This difference in the average can reflect a problem in the accounting treatment of intangible investments.

In spite of the importance of the tangible assets than the intangible assets, we notice an annual continuous growth of the ratio “intangible assets / tangible assets” as shows it the graph.

By dividing the sample between the firms of traditional sectors (the group 0) and the firms of high technologies, we notice that Tobin’s Q is more raised for the group 1 (2.669) than for the group 0 (1.650). Only, the average of the intangible assets in the group 1 is less important (0.108) than in the group 0 (0.142). Thus, we can say that the companies of high technologies do not recognize the totality of their intangible assets especially those which are created inside the company.

By examining the standard deviation, we notice that the tangible assets are more scattered than the intangible assets. This can explain by the fact that all the tangible assets are recorded in the balance sheet and amortized while the policy of recording of the intangible is still in the phase of theoretical development and practical development. So, the part of the intangible taken into account is limited what limits their dispersal. Besides, the intra group dispersion of the
intangible assets is more important than for the inter groups reflecting an important dispersion in
the accounting practice essentially for the companies of high technologies.
In fact, companies which capitalize their immaterial expenditures will have more intangible
assets than the companies which do not opt for the capitalization while the real level of the
investment can be the same. Consequently, we will have an increase in the difference of the
value of the intangible assets between the firms due to the accounting mode of record. Besides,
the characteristics of the intangible can create some difference. Every firm can have its own
intangible assets which are not available on the other firms as far as there isn’t an organized
market for the intangible assets as for the physical assets.
In the care of these first descriptive analyses, we conclude that the phenomenon of
dematerialization, which leads to an intensification of the knowledge and the know-how in the
processes of production, is a global and remarkable phenomenon.

3.2- ANALYSIS OF THE RESULTS OF THE REGRESSION MODELS
3.2.1- THE IMPACT OF THE INTANGIBLE RESOURCES ON THE IMPROVEMENT
OF THE ECONOMIC PERFORMANCE

In the case of the panel data, we must firstly examine the existence of the specific effects.
The Fisher test informs us about the existence of a joint significativity of the introduced fixed
effects ($F(353, 3837) = 1.19$ with a probability $> F = 0.000$). Then, we proceeded to an
estimation in random effects. After this last estimation, we proceed to a Breusch-Pagan test
which examines the significativity of the random effects. The probability of the statistics of the
Breusch-Pagan test is globally significant at the level of 1 % ($\chi^2(1) = 753.61$ with a
Probability $> \chi^2 = 0.000$). We then passed to the test of Hausman specification to be able to
decide what model is suited to the data which we have.

The probability given by the test ($\chi^2(1) = 57.23$ with a probability $> \chi^2 = 0.000$) is
lower than 1 %. This implies that the model with fixed effects is preferable in the model with
random effects. When the probability of the test is superior at the level of 10 %, the Hausman
test does not allow differentiating the model with fixed effects of the model with random effects.
In that case, the choice of the one or the other model must be strictly justified and it depends on
the conviction of every author on the relevance of a model than the other one. At this level and
on the basis of the made tests, we make our analysis on the basis of a model for fixed effects.

Before proceeding to an analysis of the results given by STATA, it is to note that we
made, on the chosen model, another test of Ramsey Reset available on this software which
allows testing the possibility of an omission of a relevant explanatory variable or a bad
specification of the model. So, we obtained a probability of test of Fisher superior to 10 % ($F
(3,971) = 1.85$ with Probability $> F = 0.1372$), thus we cannot throw reject the hypothesis of a
good specification. Consequently, this test allows us to make sure of the efficiency of the model
adopted within the framework of this analysis.

It is to note that every time we try to estimate a simple or multivariate model and we
follow systematically these various stages.

The table 3 summarizes the empirical findings shown by STATA on the simple
regression after the correction of the heteroscedasticity by the method of White to determine an
average behaviour of the companies of the sample.
We notice that adjusted R² is for 89, 73 % and consequently the model have an explanatory important power for the total sample. Besides, Fisher’s F, which measures the global significativity of the model, is 39, 57 and statistically significant at the level of 1 %.

The coefficient of Tobin’s Q (2,135) is significant at the level of 1 % and it is positive what implies the confirmation of the hypothesis H1 relative to the existence of a positive relation between the intangible resources of the company and the economic performance measured by the operating profit. So, following resources-based view, the introduction of the intangible resources in the process of production as strategic assets is indispensable in the creation and the improvement of the economic performance of the company in our actual environment. This finding confirms also several empirical studies (Robert and Dowling, 2002, Belkaoui, 2003). But, the majority of these studies focused the interest on a particular aspect of the intangible (such as the number of patents). The fact of treating a single aspect can neglect the effect of the other elements and their interaction and so we can lose a considerable volume of information and bias, afterward, the empirical results.

To more confirm our empirical findings, we divided, on one hand, the total sample between the high-technology firms (group 1) and the firms of traditional sectors (group 0) to know if the composition of the total sample influences the empirical results. According to the panel B of the table 3, the model remains strong for both groups as far as the adjusted R² is of the order of 57 % for the group 0 and of 89 % for the group 1. Besides, the coefficient of Tobin’s Q for each group is very close.

On the other hand, we divided the sample between the profitable firms and the deficit firms. We considered a firm as being profitable if it realized, at least, over seven years (more than half of the period of the study) a positive accounting earnings. This distinction did not change the significativity of Tobin’s Q in the explanation of the economic performance. Only, the coefficient of this last one is much more important for the profitable firms (2,179) than for the deficit firms (0,766). These empirical findings can show that the profitable companies are more capable, on one hand, of developing strategic intangible resources and, on the other hand, of exploiting suitably these resources.

It is to indicate that the introduction of variables relative to the intangible and tangible assets recognized by the balance sheet in the model of simple regression did not increase its explanatory power global as shown in the table 4 (panel A). Only, the introduction of the effect of sectors increased the explanatory power of the model of 1,08 % (4, panel B).

All the sectors constituting our sample present a positive and significant effect of the intangible resources on the economic performance of companies but with a difference at the level of the importance of the coefficient.

The software sector presents a less important coefficient (1,236) than the biological and pharmaceutical sector (2,228) and the sector of industrial machinery and computer equipment (2,182). This can be explained by the fact that the first sector is more sensitive to the competition and more exposed to the risk of imitation of products. Consequently, the effect of its intangible resources will be more limited than the effect of a sector which is more protected by barriers in the entrance.

Besides, we notice that the coefficient of the Tobin’s Q is considerable (2,587) for the traditional sectors. This confirms the importance of the intangible resources in the activity of the
company whatever the nature of its sector. So, we confirm the observation Brynjolfsson and Yang (2000) who indicated that the intangible investments characterize “the new economy”.

Concerning the recognized assets in the balance sheet, the tangible or physical assets have a positive effect (1.135) and significant at the level of 1%. While, the recognized intangible assets have a negative effect (0.378) and significant at the level of 5%. This does not mean that this type of asset is not productive. It can be that the published amount is widely insufficient than its reality to reflect their real potential in the creation of wealth. In fact, the recognized assets are generally acquired from the outside and were not created inside as far as accounting standards forbid the activation the intangible assets created by the company. Consequently, this variable does not reflect all intangible resources.

It is to remind that we have introduced the variable I_INTG to check the effect of intangible assets recognized in the balance sheet on the generation of profits. Because this last variable can miss the reliability of measure and can reflect several problems of accounting treatment, we have already considered that our variable of interest is Tobin’s Q which is chosen as an effective indicator of the intangible resources.

In summary, this multivariate analysis confirmed the essential importance of the intangible resources measured by it Tobin’s Q in the improvement of the economic performance measured by the operating profit. This positive and significant relation limits itself not only to the companies of the new economy but it extends to the traditional sectors, thus the necessity of the specific, idiosyncratic and immaterial assets for the survival of the modern companies.


Within the framework of this analysis, the regression model 2 allows to verify, on one hand, the hypothesis H2 relative to the positive relation between the intangible resources and the difference of economic performance between companies and, on the other hand, the hypothesis H3 relative to the sustainability of this difference due to these resources.

Before beginning our analysis of the empirical findings, we remind that we measured the difference of performance between companies by the realized specific profits. These last ones, representing our variable to be explained, are determined by the difference between the average of the operating profits of the sample and the operating profit of the company. Indeed, it was confirmed in the literature that when the firm is more capable of realizing specific profits than the other firms, it has inevitably a competitive advantage which allows making these profits (Amit and Schoemker, 1993, Peteraf, 1993).

✓ THE IMPACT OF THE INTANGIBLE RESOURCES ON THE CREATION OF THE DIFFERENCE OF ECONOMIC PERFORMANCE BETWEEN FIRMS

In the previous part, we have confirmed the capacity of the intangible resources in the improvement of the economic performance of the company. Only, this is not sufficient in a competitive environment. In fact, it is necessary to have a different offer with regard to the others on the market of products and services. As it was pronounced in theory, more the company is based on specific and immaterial resources, more it is different than the other firms and more it is capable to realize more important profits on the market. In this sense, the company can even
change the tastes and create new needs at the customers and consequently it attracts them towards its products due to its brand image, to the quality of the services assured by its human resources.

The adopted model is a dynamic model because it contains a delay of the dependent variable as an explanatory variable (the specific profit of the period t-1). So, by applying the GMM, it is necessary to proceed to two tests which are: the test of Sargan / Hansen which allows testing the validity of delayed variables as instruments, and the test of autocorrelation of Arellano and Bond where the hypothesis is the absence of the errors autocorrelation (second order) of the equation in difference.

According to the table 5 and for the total sample (panel A), we notice that the test of Hansen (p = 0,318) does not allow the reject of the hypothesis of validity of delayed variables in level and in differences as instruments and that the autocorrelation test (second order) of Arellano and Bond (p = 0,179) does not allow the reject of the hypothesis of the absence of second order autocorrelation. Consequently, we approve the validity of our model.

On the basis of the empirical findings, we notice that the coefficient of our explanatory variable of interest, Q of Tobin, is widely significant (at the level of 1 %) and positive (0,871). Thus, we confirm the hypothesis H2 relative to the existence of a positive and significant relation between the intangible resources and the specific profits. Consequently, the intangible resources increase the capacity of the company to extract specific profits and so these last ones can create a difference of economic performance between companies operating in the same sector.

The same empirical findings were found by the study of Villalonga (2004) which made appeal to the same measure of the intangible resources (Tobin’s Q) and in a sample of American companies. However, Casta and Ramond (2005) did not confirm this result by using a sample of French and Spanish companies and another measure of the intangible resources. This last one was essentially established on accounting measure.

The distinction between the nature of sectors changed the significativity (at the level of 1 %) of the variable Tobin’s Q in the explanation of the difference of performance between companies but without changing the sign of its coefficient. For the high technology firms, the coefficient of Tobin’s Q (1,924) remains significant and by the same importance (0,882) as the total sample (0,871). For the group 0 of the traditional sectors, this coefficient is positive (0,648) but not significant. So, we can conclude, firstly, that the awareness concerning the necessity of the intangible resources is a general phenomenon (that is for the total sample) but the degree of the necessity differs according to the nature of sector. Secondly, we consider that the weight, which is more important and considerable of the participation of the intangible resources in the creation of the discrimination between the companies of high technologies than those relative to the traditional sectors, can reflect widely the fact that the intangible resources of the high-technology companies perform better the criteria of strategic asset. Besides, the effort and the experience of these last ones in the acquisition of these resources are more important and more extensive to fight against the competition. Consequently, this type of resources has the capacity to create a competitive advantage to the company.

The fact of generating a competitive advantage is not sufficient but it is necessary to support it. In other words, it is not enough to realize a performance more raised than the other firms but it is necessary to maintain it at least for a short-term. Thus, it would be useful to know if these intangible resources are capable to assure this role.
THE IMPACT OF THE INTANGIBLE RESOURCES ON THE SUSTAINABILITY OF THE DIFFERENCE OF ECONOMIC PERFORMANCE BETWEEN COMPANIES

After the confirmation of the direct relation between the intangible resources and the creation of difference of economic performance between companies, we should test, in this part, their effect on the persistence of this differentiation. In fact, firms can realize specific profits. But, the competitive strength can make this high profitability as a transitory phenomenon. Thus, we must test the potential of the intangible resources in the preservation of the specific profits.

At this part, our variable of interest is represented by the interaction between Tobin’s Q and the specific profits of the previous period (Qit * D.REit-1). In other words, we should test the effect of the intangible resources of the current period on the sustainability of the specific profits of the previous period.

According to the empirical examination of the effect of the interaction, we notice that the coefficient is significant (at the level of 1 %) and positive (0,121) on the whole sample. Generally, we conclude that the intangible resources contribute to the persistence of the difference of economic performance between companies and, consequently, sustainability of the competitive advantage whatever is the nature of the activity. In the light of this result, we confirm the hypothesis H3 according to which there is a positive relation between the intangible resources and the sustainability of difference of performance between companies. This relation was essentially verified by the study of Villalonga (2004) on a sample of American companies.

The empirical findings show also that there is an effect concerning the sector. In this way, we notice that, for the group 0 of the companies of the traditional sectors, this coefficient remains significant at the level of 1 % and positive (0,044). Only, it is more important (0,122) for the group 1 of the high technology companies. This result confirms more that the intangible resources of the high technologies sectors are much more qualified than the intangible resources of the traditional sectors. Consequently, we can say that the effect of the intangible resources depends on their characteristics. Considering their activity based essentially on the knowledge, the companies of high technologies may assure these fundamental characteristics of the intangible strategic resources and exploit them in their favour.

4- CONCLUSION

Recently, the investment contents carried out by the modern firms have largely changed. Furthermore the physical investment, it is developed immaterial investments in order to increase the wealth and competitive potential of the firm. The importance of intangible resource as strategic resource is justified by the resource-based view and has been verified in our sample. Our analysis is based on the Tobin’s Q as an indicator of intangible resources of the firm. The intangible assets recognized in the financial report can’t provide significant information which can be explained by the problems in their accounting treatment or by the fact that managers look for preserving the confidentiality of their intangibles.

Firstly we have confirmed the significant and positive contribution of intangible resource on the amelioration of the economic performance whatever is the nature of the activity of companies and the level of their performance (profitable or deficit). So, we strengthen their
impact on the whole economy which is oriented more and more to the knowledge, the information technology, the services, etc. In fact, the necessity and the importance of this process of dematerialization, which led to an intensification of the knowledge within companies, vary according to the nature of the activity.

Furthermore, we have found that these resources have more effect on the high technology firms rather than the traditional sector firms. Indeed, the intangible resources are the result of flows and efforts allocated by the firms in the previous periods following to an accumulation process of resources.

Secondly, we have confirmed the significant and positive contribution of intangibles in the creation of the economic performance difference between firms and consequently in the creation of competitive advantage. These differences reinforce the competitive position of the firm and increase its specific profits essentially for the firms operating in the high technology. In these sectors, the intangible resources are more specific and idiosyncratic. This heterogeneity of the firms is coming from the originality of their resources particularly the immaterial resources which are largely heterogeneous.

Finally, we have shown a positive effect of these resources on the persistence of the difference among firms essentially in the high technology. So, the intangible resources allow not only creating more successful companies than the others but also to sustain this advantage at least in short-term.

Generally, our empirical results carry on with the resource-based view by using the Tobin's Q since many empirical studies have approved its efficiency in the measure of the intangible resources of the firm. This efficiency has been verified also by this paper in a French era. However, the intangible assets recognized in the financial reports have not an explanatory power similar Tobin’s Q. Indeed, the intangibles mentioned in the financial reports may largely enter a bias in the empirical result because of, on one hand, a deficiency on the accounting standards and, on other hand, a possibility of discretionary manipulation by the managers.

REFERENCES


APPENDIX

Graph: annual Evolution of the ratio $I_{\text{INTG}} / I_{\text{TANG}}$

![Graph showing the annual Evolution of the ratio $I_{\text{INTG}} / I_{\text{TANG}}$ from 1994 to 2005. The ratio starts at around 0.2 in 1994 and increases steadily over the years, peaking at around 0.7 in 2005.](image-url)
### Table 1

#### Sample distribution

<table>
<thead>
<tr>
<th>SIC code</th>
<th>Sectors</th>
<th>Number of firms</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Oil and gas field services</td>
<td>27</td>
<td>7%</td>
</tr>
<tr>
<td>20</td>
<td>Foods</td>
<td>14</td>
<td>4%</td>
</tr>
<tr>
<td>22</td>
<td>Textile products</td>
<td>31</td>
<td>8.5%</td>
</tr>
<tr>
<td>47</td>
<td>Transportation services</td>
<td>7</td>
<td>2%</td>
</tr>
<tr>
<td>51</td>
<td>Wholesales</td>
<td>27</td>
<td>7.5%</td>
</tr>
<tr>
<td>73</td>
<td>Software</td>
<td>91</td>
<td>25%</td>
</tr>
<tr>
<td>28</td>
<td>Pharmaceuticals and biotech</td>
<td>50</td>
<td>14%</td>
</tr>
<tr>
<td>35</td>
<td>Industrial machinery and computer equipment</td>
<td>55</td>
<td>15%</td>
</tr>
<tr>
<td>36</td>
<td>Electronics and Electrical</td>
<td>63</td>
<td>17%</td>
</tr>
</tbody>
</table>

**Total** | **365**                             | **100%**        |
Table 2
Statistical descriptive data

Panel A: Statistical data on the variables not deflated for the total sample (In million Dollars)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall</td>
<td>Between</td>
</tr>
<tr>
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<td>Q</td>
<td>2.386</td>
<td>1.779</td>
</tr>
<tr>
<td>RC</td>
<td>675.726</td>
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</tr>
</tbody>
</table>

Panel B: Statistical data on the deflated variables for the total sample (In million Dollars)

<table>
<thead>
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<th>Variables</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall</td>
<td>Between</td>
</tr>
<tr>
<td>I_TA,NG</td>
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<td>0.190</td>
</tr>
<tr>
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<tr>
<td>Q</td>
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<td>1.779</td>
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<tr>
<td>RC</td>
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<td>4.925</td>
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</tbody>
</table>

Panel C: Statistical data on the deflated variables for the firms of traditional sectors (Group 0: 1213 observations)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall</td>
<td>Between</td>
</tr>
<tr>
<td>I_TA,NG</td>
<td>0.353</td>
<td>0.239</td>
</tr>
<tr>
<td>I_IN,NTG</td>
<td>0.142</td>
<td>0.154</td>
</tr>
<tr>
<td>Q</td>
<td>1.650</td>
<td>0.866</td>
</tr>
<tr>
<td>RC</td>
<td>0.330</td>
<td>0.552</td>
</tr>
</tbody>
</table>

Panel D: Statistical data on the deflated variables for the high-technology firms (Group 1: 3153 observations)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Overall</td>
<td>Between</td>
</tr>
<tr>
<td>I_TA,NG</td>
<td>0.180</td>
<td>0.141</td>
</tr>
</tbody>
</table>
I\textsubscript{TANG} : Tangible assets divided on the total assets ; I\textsubscript{INTG} : Intangibles assets divided on the total assets ; Q : Tobin's Q; RC : Operating earnings divided on the total assets

Table 3

Simple regression of the economic performance

\[ RC_{it} = \alpha_0 + \alpha_1 Q_{it} + e_{it} \]

Panel A : Total sample

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Group 0</th>
<th>Group 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficients</td>
<td>T</td>
</tr>
<tr>
<td>( Q )</td>
<td>2.930</td>
<td>2.21</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.296</td>
<td>0.296</td>
</tr>
<tr>
<td>adjusted ( R^2 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( F )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( N )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Panel B: Distinction between the group 0 and the group 1

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Group 0</th>
<th>Group 1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficients</td>
<td>T</td>
</tr>
<tr>
<td>( Q )</td>
<td>2.135</td>
<td>2.135</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.392</td>
<td>0.392</td>
</tr>
<tr>
<td>adjusted ( R^2 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( F )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>( N )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Panel C: Distinction between the profitable firms and the deficit firms

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Profitable firms</th>
<th>Deficit firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficients</td>
<td>T</td>
</tr>
<tr>
<td>( Q )</td>
<td>2.179</td>
<td>5.92</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.363</td>
<td>27.51</td>
</tr>
</tbody>
</table>
Table 4

Multivariate regression of the economic performance

Panel A: \[ RC_{it} = \alpha_i + \alpha_1 Q_{it} + \alpha_2 I \_ INTG _{it} + \alpha_3 I \_ TANG _{it} + e_{it} \]

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Coefficients</th>
<th>T</th>
<th>Signif</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>2.135</td>
<td>6.28</td>
<td>0.000***</td>
</tr>
<tr>
<td>I_INTG</td>
<td>0.376</td>
<td>0.93</td>
<td>0.351 ns</td>
</tr>
<tr>
<td>I_TANG</td>
<td>0.752</td>
<td>2.75</td>
<td>0.006***</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.174</td>
<td>1.92</td>
<td>0.055*</td>
</tr>
<tr>
<td>Adjusted R^2</td>
<td>0.897</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>45.25***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>4104</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Panel B:

\[ RC_{it} = \alpha_i + \alpha_1 Q_{it} \ast INF + \alpha_2 Q_{it} \ast BIO + \alpha_3 Q_{it} \ast MACH + \alpha_4 Q_{it} \ast ELECT + \alpha_5 Q_{it} \ast AUTRES + \alpha_6 I \_ INTG _{it} + \alpha_7 I \_ TANG _{it} + e_{it} \]

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Coefficients</th>
<th>T</th>
<th>Signif</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q-INF</td>
<td>1.236</td>
<td>2.89</td>
<td>0.004***</td>
</tr>
<tr>
<td>Q-BIO</td>
<td>2.228</td>
<td>6.73</td>
<td>0.000***</td>
</tr>
<tr>
<td>Q-MACH</td>
<td>2.182</td>
<td>5.89</td>
<td>0.000***</td>
</tr>
<tr>
<td>Q-ELECT</td>
<td>0.851</td>
<td>2.9</td>
<td>0.004***</td>
</tr>
<tr>
<td>Q-AUTRES</td>
<td>2.587</td>
<td>2.08</td>
<td>0.038**</td>
</tr>
<tr>
<td>I_INTG</td>
<td>-0.378</td>
<td>-2.51</td>
<td>0.012**</td>
</tr>
<tr>
<td>I_TANG</td>
<td>1.135</td>
<td>5.56</td>
<td>0.000***</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.236</td>
<td>4.28</td>
<td>0.000***</td>
</tr>
<tr>
<td>Adjusted R^2</td>
<td>0.908</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>26.71***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>4104</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

RC: Operating earnings divided on the total assets; Q: Tobin’s Q; N: Number of observations; T: Student Test for each variable explanatory variable; F: Fisher Test for the whole variables.
I_TANG : Tangible assets divided on the total assets ; I_INTG : Intangible assets divided on the total assets ; Q : Tobin’ Q ; RC : Operating earnings divided on the total assets; INF : Dummy variable equals 1 if the firm belongs to the software sector and equals zero otherwise ; BIO : equals 1 if the firm belongs to pharmaceuticals and biotech sector and equals zero otherwise ; MACH : equals 1 if the firm belongs to industrial machinery and computer equipment sector and equals zero otherwise ; ELECT : equals 1 if the firm belongs to electronics and electrical sector and equals zero otherwise ; AUTRES : equals 1 if the firm belongs to the traditional sectors; N : Number of observations; T : Student Test for each variable explanatory variable ; F : Fisher Test for the whole variables.

Table 5
Multivariate regression of the difference of economic performance between companies according to the method of GMM

\[ D_{-RE_{it}} = b_1 + \beta_1 D_{-RC_{i(t-1)}} + \beta_2 Q_{it} + \beta_3 Q_{it} \ast D_{-RC_{i(t-1)}} + \epsilon_{it} \]

Panel A : Total sample

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Coefficients</th>
<th>T</th>
<th>Significativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>( D_{-RC_{i(t-1)}} )</td>
<td>1,876</td>
<td>25,38</td>
<td>0,000 ***</td>
</tr>
<tr>
<td>( Q_{it} )</td>
<td>0,871</td>
<td>2,89</td>
<td>0,004 ***</td>
</tr>
<tr>
<td>( Q_{it} \ast D_{RC_{i(t-1)}} )</td>
<td>0,121</td>
<td>5,74</td>
<td>0,000 ***</td>
</tr>
<tr>
<td>Intercept</td>
<td>13,806</td>
<td>1,75</td>
<td>0,082 *</td>
</tr>
</tbody>
</table>

Arrellano-Bond Test for AR (1) : z = -1,02 Prob > z = 0,310
Arrellano-Bond Test for AR (2) : z = -1,34 Prob > z = 0,179
Sargan Test : chi2 (3) = 0,78 Prob > chi2 = 0,854
Hansen Test : chi2 (3) = 3,52 Prob > chi2 = 0,318

Panel B: Group 0 of the firms of traditional sectors

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Coefficients</th>
<th>T</th>
<th>Significativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>( D_{-RC_{i(t-1)}} )</td>
<td>1,361</td>
<td>2,98</td>
<td>0,004 ***</td>
</tr>
<tr>
<td>( Q_{it} )</td>
<td>0,648</td>
<td>1,40</td>
<td>0,163 ns</td>
</tr>
<tr>
<td>( Q_{it} \ast D_{RC_{i(t-1)}} )</td>
<td>0,044</td>
<td>2,65</td>
<td>0,009 ***</td>
</tr>
<tr>
<td>Intercept</td>
<td>0,337</td>
<td>0,77</td>
<td>0,440 ns</td>
</tr>
</tbody>
</table>
Table 5
Multivariate regression of the difference of economic performance between firms according to the method of GMM (continued)

Panel C: Group 1 of the firms of high technologies

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Coefficients</th>
<th>T</th>
<th>Significativity</th>
</tr>
</thead>
<tbody>
<tr>
<td>( D_{RC} ) (_{i(t-1)} )</td>
<td>1,882</td>
<td>25,19</td>
<td>0,000 ***</td>
</tr>
<tr>
<td>( Q_{it} )</td>
<td>0,881</td>
<td>2,93</td>
<td>0,004 ***</td>
</tr>
<tr>
<td>( Q_{it} ) * ( D_{RC} ) (_{i(t-1)} )</td>
<td>0,122</td>
<td>5,74</td>
<td>0,000 ***</td>
</tr>
<tr>
<td>Intercept</td>
<td>7,195</td>
<td>1,26</td>
<td>0,210 ns</td>
</tr>
</tbody>
</table>

Arrellano-Bond Test for AR (1) : \( z = -1,02 \)  Prob > \( z = 0,309 \)
Arrellano-Bond Test for AR (2) : \( z = -1,34 \)  Prob > \( z = 0,181 \)
Sargan Test : chi2 (3) = 0,56  Prob > chi2 = 0,907
Hansen Test : chi2 (3) = 3,24  Prob > chi2 = 0,356

***: significant at the level of 1%; **: significant at the level of 5%;
*: significant at the level of 10%; (ns): not significant at the level of 10%.

\( D_{RC} \) : It is the difference between the operating profits of the firm \( i \) and the average of the operating profits of the sample during period \( t \) divided on the total assets: the specific profit of period \( t; \)
\( D_{RC} \) \(_{i(t-1)} \) : The specific profit of period \( t-1; Q_{it} \) : Tobin’s Q of the firm \( i \) during the end of period \( t; T \) : Student Test for every explanatory variable.
THE IMPACT OF INTERNATIONAL PRUDENTIAL REGULATIONS ON BANKING STRATEGIES: THE CASE OF EMERGING COUNTRIES

Karim Haj Ayed*
Mohamed Frioui**

*,** Research Unit:
General Management Studies (GEMAS)
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Abstract:

In recent decades, banking systems have had several critical moments, which urged international banking regulatory authorities (Basel Committee) to develop prudential standards and align them globally. This has had an impact on banking strategic orientations. Hence, this paper is aimed at studying the impact of international prudential regulations, namely the Cooke and McDonough ratios, on these orientations. In this context, an investigation into the literature and an empirical validation have been carried out. The conceptual framework has revealed this regulation does have an impact on banking strategies and international practice shows a tendency towards diversification and mergers and acquisitions. As for the empirical analysis performed on our sample of Tunisian banks, the results show that both ratios impose diversification, a policy dictated by the need to seek resources able to meet the requirements in terms of equities and promote other strategies. So, the international prudential regulation dictates and guides international banking strategies.

Keywords: International prudential regulation, Basel I, Basel II, banking strategies, diversification.
INTRODUCTION:

The financial system in general and the banking system in particular are able to show, by their roles and vocations, reliable indications if an economy is healthy or not. They can even enable investors and stakeholders to anticipate their actions and manage the movement of their capital, hence the importance of banks in the economy and the great interest they are granted by public authorities. These authorities cannot be indifferent to the major role that banks play in the economy and the difficulties they may face. Thus, they have been faced with an urgent need to organize the sector and intervene in the banking business through a specific regulation: "the prudential banking regulation," which is interpreted by banks as a set of constraints that are undoubtedly necessary though heavy to bear. In fact, establishing an adequate banking supervision is a challenge for any economy, no matter how developed, emerging or even poor, in an environment characterized by globalization, the emergence of new information and communication technologies (NICT) and deregulation which have led to a wider range of activities offered by banks. Over time, this regulation has taken an international dimension through the Bank for International Settlements (BIS), particularly the Basel Committee, which is the source of international prudential regulations, by publishing its two famous provisions (Cooke and McDonough ratios) while seeking a harmonization of prudential standards and financial strength globally. Furthermore, the evolution of financial markets has deeply changed the nature and structure of the financial services sector. Thus, the survival of banks and their development depend on reaching a competitiveness that can meet this objective. To achieve this, banks have to adopt strategies that require an optimal resource allocation and a better monitoring of environmental changes. Changes in banking behavior have been manifested and strategic choices have taken an important place in banks. As a result, and to cope with developments in a changing environment, choosing the right strategy is of paramount importance. We have so far focused on two key concepts: the international prudential regulation, which stands as a constraint though necessary for the control of financial institutions, and the importance of banks and their strategic choices. In fact, the confrontation between the banking activity’s external constraints and the bank’s internal organization is permanent and these two elements appear to be inseparable. This raises the question of how to consider the nature of the relationship environment / bank, or more precisely, international prudential regulation versus banking strategy?

The aim of this paper is to determine the impact of prudential regulations on the international banking strategy and its implications.

I. INTERNATIONAL PRUDENTIAL REGULATIONS:

Since the mid-1970s, the prudential regulation has been a key concern for authorities in developed countries. In general, such a regulation can be justified by the need to protect depositors.

Indeed, as the banking system plays a central role in payments transactions and savings mobilization, an effective control of financial institutions is essential. Depositor protection is often implemented through a limited or full deposit insurance system which compensates depositors who have "lost" their deposits after a bank bankruptcy.
1. History of the international banking regulation:

A number of serious financial crises such as the 1982 Mexican debt crisis, the bankruptcy of the American savings banks and especially the 1987 stock market crash have prompted the need for measures to ensure the security of banking systems and prevent a wave of bankruptcies whose consequences would be significant for the global economy. In this context, a harmonization of prudential standards was the course to be followed: the Cooke ratio of the Basel Committee (or Basel 1).

As highlighted by Servigny Arnaud (2001), "The 1988 Basel Agreement, which took effect in 1992, is an important turning point in terms of international prudential regulation. Following the 1990s great international financial system crises, the limits of the Basel Agreement were determined, which led authorities to consider new rules. Hence, the appearance of a new agreement known as Basel II or "McDonough" ratio.

Since 1998, the Basel Committee has launched the Basel II reform to overcome the weaknesses of the Cooke ratio. In June 1999 and January 2001, this reform was initiated by the publication of "consultative papers", documents extensively discussed by representatives of the banking profession. In October and December 2002, a "Quantitative Impact Study" was launched with the participation of 250 banks in order to enable the Basel Committee regulators to define the weights of the new ratio. In 2003, a third consultative document was published. The publication of the final agreement was completed in June 2004. During the first half of 2006, the two computing systems (McDonough and Cooke ratios) coexisted to achieve a full implementation of the new ratio for late 2006.

Basel II will be an epistemological break from the 1988 Basel Agreement. The simple and restrictive regulations were in fact substituted by a more open approach consisting of alternative menus and relying on the qualitative assessment of national regulatory bodies.

It should be noted that international regulators have always sought a way to achieve a more effective and a better harmonized banking system, hence the improvements and the development of these guidelines will continue until one day a new Basel III agreement is achieved. Given these considerations, Basel II should be considered as an important step towards a more effective regulation and a better harmonized financial system rather than the conclusion of a long process. Though the history of prudential regulation was greatly accelerated with Basel II, the latter is by no means complete and should continue to adapt to the constant movement of innovation and change in the banking system.

Some authors (Wenger.T, 2004) state that: “The improvement and development of these guidelines will continue until one day a Basel III Agreement is born. Hopefully, there will be then enough room for the fundamental reflections notably related to the objectives and the most

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This is a committee that operates under the Bank for International Settlements (BIS). Indeed, the Basel Committee was established in late 1974, under the name of the Committee on Banking Supervision by the Central Bank governors of the Group of Ten, following the serious disturbances affecting international banking and monetary markets (notably Herstatt Bank bankruptcy in West Germany). The members first met in February 1975 and have regularly organized three or four annual meetings ever since.
appropriate tools to achieve them, as well as a wise increase in the financial organizations involved and subject to regulation outside the banking system”.

2. Reasons for the international banking regulation:

J. Soubeyran (2004) states that “The term "prudential supervision" refers to all the frameworks implemented by the banking and financial supervisory authorities of the sector (central banks, regulatory and control bodies, international cooperation and consultation bodies) in order to maintain the latter’s stability”.

Instability is inherent in the banking activity in addition to some price volatility that characterizes the normal functioning of financial markets. But in case of excess, banking and financial crises are triggered, threatening the functioning of the whole financial system. This is referred to as systemic crises. The justifications of this prudential (and mainly international) regulation are now widely accepted. Promoting the introduction of international prudential regulation has been prompted by the following reasons:

- The need to ensure that the banking activity is conducted in a healthy and prudent way to successfully protect the depositors. Indeed, “Deposit insurance provides a safety net for many creditors, thereby enhancing public confidence in banks and stabilizing the financial system”. J. Prefontaine and A. Thibeault (1991) state that “the regulatory effort is aimed at determining the assets ratio to the adequate capital to protect depositors and shareholders”.

- The need to preserve the stability of the banking system leading to financial security and building confidence, i.e. preventing systemic risk. J. Soubeyran (2004) adds: “It is also the prevention of systemic risk that may bring the regulator to make use of the "too big to fail" principle (literally meaning "too big to go bankrupt"), that is to say to be more concerned about the fate of large institutions to the detriment of the smaller ones since the formers' collapse could affect the whole sector, especially when these are highly centered (when a few institutions are sharing the market)”.

In addition to the two above mentioned principles, a recently stated reason is:

- Market imperfection which is another new incentive leading to the necessity of setting up rules governing the banking activity in order to promote transparency and encourage banks to disclose pertinent information. "The Basel Committee (1998) considers transparency as a key element in a banking system that is safe, sound and subject to effective control”. Furthermore, H. Hannoun (2000), “The third pillar, finally recognizes market discipline as a major contribution to this regulatory practice”. C. Noyer (2004) states: “The third pillar of Basel II aims at improving information disclosed to the market by banks ....”

3. International prudential regulation:

Basel I & Basel II
"While Basel I defines a flat coverage of credit risks to companies by equity, Basel II provides for differentiated requirements according to risks." (Eugen H, 2003)

The Basel Committees have made great progress in setting up international standards for prudential supervision of banks and the enhancement of payment systems that link the financial markets together. In recent years, the banking and market prudential authorities have increased their concentration at the international level to cope with problems that go beyond a single jurisdiction. Nevertheless, the changing structure of global finance and the emergence of new actors and new markets require a continuous adaptation of prudential supervision, especially at the level of cooperation.

a. The rules of equity:

The Basel Committee proposes two tiers that make up equity and are included in the calculation of solvency ratios:

- **The core**: It is also known as core capital. This Tier includes the social capital and reserves. It should be noted that the Basel Committee integrates disclosed reserves and rejects the hidden ones.
- **Additional equities**: these consist of provisions and subordinated notes.

A condition in this case must be respected: **Tier 1 should always be ≥ Tier 2.**

b. The Cooke ratio:

Wenger.T (2004) state that Basel I has been incorporated into the legislation of more than one hundred countries after undergoing some modifications to meet national needs and can be considered a success. Though simple, the Cooke ratio is very certain. A bank must comply at all times with a minimum ratio between the level of its liabilities and that of its equities. The bank must, in fact, maintain a minimum 8% ratio between its equities and its weighted liabilities.

i. **General principle of calculation:**

- **Ratio numerator**, the bank’s equities:

  As already discussed, the ratio distinguishes between "capital equity" (also called "Tier 1"): equity and reserve funds which must represent at least 4% of weighted liabilities, capital-like funds (or "tier 2") : reserves not allocated to a particular risk and equity shares that are intermediate between stocks and bonds, revaluation reserves (e.g buildings ... )

- **Ratio Denominator**: weighted liabilities:

  Some bank liabilities are taken into account only partially because they are considered less risky, or even not considered at all as they are considered safe (0% weighting).

  - **0%**: Cash on hand, legal reserves and liabilities on the states or those guaranteed by them.
- 20%: less than one-year dues from banks on local communities.
- 50%: Mortgage loans.
- 100%: business loans, sovereign debt.

Initially, the Cooke ratio concerned only bank loans. Since 1996, it has also been involved in market risks, i.e., the securities held by credit institutions. However, the Cooke ratio excludes the so-called operational risk, that is to say losses due to internal problems at the bank, such as improper recording of transactions or errors in a hedging strategy of markets derivatives.

![Diagram of the Cooke ratio]

**Fig.1: Calculation base of the Cooke ratio; Source: Authors.**

### ii. Weaknesses of Basel 1:

Despite the positive points accomplished by the new international prudential regulation, this ratio has some weaknesses that have drawn the attention of financial and banking organizations.

Indeed, several authors have emphasized on the following shortcomings:

- Rigid solvency weights that do not take into account the actual quality of balance sheet assets or credits.
- Very limited consideration of safety and guarantees.
- No consideration of new techniques for reducing credit risks (eg. credit risk derivatives, balance sheet netting arrangements, credit securitization and security-related conventions).
- No consideration of terms.
- No consideration of portfolio diversification.
- According to regulators, banking risks are not adequately and comprehensively taken into account, ie only credit and market risks are taken into account but not the operational ones for example.
Combined, these weaknesses have resulted in an inconsistent relationship between regulatory net capital and risk management undertaken by banks or the level of required net capital.

c. The "McDonough" ratio

Basel II is mainly aimed at strengthening the banking system stability. The revision that started five years ago was intended only to overcome the weaknesses in Basel I and adapt the guidelines to the new context. The main objective was to abandon the lump sum cover system imposed on banks in order to adopt a minimum net capital regulation that better takes into account risks. The profound changes occurring in banking and financial markets in recent years have allowed financial institutions to improve solvency assessment and risk management. Basel II provisions should take these parameters into consideration. They seek to further harmonize banking supervision standards and reporting requirements between different countries. It is therefore hoped that a better risk management will be achieved while maintaining the same net capital level in the entire banking system. Just like Basel I, the new guidelines on net capitals are recommendations that individual states will have to adapt to their domestic legislation.

i. Basel II structure

Basel II rests on three complementary pillars. The first pillar, which incorporates Basel I provisions, is related to minimum net capital requirements. The second pillar sets the control process of risk management and capital coverage by the national supervisory authorities. The third one is related to reporting requirements imposed on banks.

- **Pillar 1. Capital minimum requirements:**

  The previous capital minimum ratio covered only two types of risks in defining weighted assets, credit and market risks. Basel II has included some significant changes in treating credit risk, maintaining unchanged the 1996 framework in market risk and the explicit introduction of operational risk which has led to the inclusion of this risk measurement in a bank’s capital ratio denominator. The inclusion of operational risk is one of Basel II major innovations. It refers to all losses that the bank might incur as a result of a malfunction of its internal management processes, human errors or computer problems, or even purely external events such as a fire or flood.

- **Pillar 2. Prudential supervision:**

  Nathalie, G (2006), the main objective of Pillar 2 is to ensure that banks better assess their capital against their adequacy with regard to their risk profile. It has a number of guiding principles that regulatory authorities should follow in bank supervision such as risk sharing ratios set for the banks, risk management on derivative markets, or crisis management. It enables these authorities to build up equities that exceed those provided for by the first pillar, especially in crisis situations. Andrew P(2004) find that there is no doubt that if all countries adopted Basel II, Pillar 2, a truly significant advance in the quality of banking supervision across the globe.
would be achieved. In conclusion, this pillar shows the national regulatory bodies how to effectively monitor compliance with Basel requirements.

- **Pillar 3. Market discipline:**

Basel Committee has sought to encourage market discipline by developing a set of requirements for reporting information that enable market participants to assess with transparency the main data related to the risk profile of a bank and its level of capitalization. These data include information pertaining to internal control information implemented by banks for credit, market and operational risks. Financial communication is thus an instrument of choice in market discipline found Dominique L.L (2005). The objective is to reach a kind of self-discipline by encouraging banks to provide financial markets with relevant information. Therefore, financial markets would spontaneously promote financial institutions whose behaviors are the most virtuous, and in particular those with the most relevant risk control procedures (Pierre-Yves Chanu, 2004).

Basel II stands as a radical reform of banking regulations. The new provisions on capital will have a lasting impact on the financial sector where risk management by banks is not yet well developed. The general orientation of this review, namely a capital that is better suited to risks, should be welcomed. It will support or enhance the efforts of banks and companies to further develop risk management and take into account ratings and solvency. By the time a third agreement, (Basel III) is set up, there is no doubt that the new plan’s flexibility and incentives for adoption by the largest possible number of banks, better risk management practices will have strongly contributed to strengthen the robustness of institutions, the soundness of banking systems and thereby financial stability (Christian Noyer, 2004). These results remain to be proved in the coming years especially after the 2007 financial crisis. Thus, one may wonder about the interaction between this crisis and Basel II: What role did this regulatory framework play in the international financial crisis? The process of improving and strengthening the international prudential regulation will continue through the emergence of other ratios according to future conditions and it is up to managers and banking professionals to manifest their ideas.

<table>
<thead>
<tr>
<th>RPI / TRIAD</th>
<th>Europe</th>
<th>United States</th>
<th>Japan</th>
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</table>

*Tab.1: The prudential banking regulation and its implementation at the TRIAD level; Source: authors*

**II. BANKING STRATEGIES:**

In an attempt to redefine the concept of strategy as a clearly identified subject research, some proposals and ways of thinking are presented. The strategy implemented by the strategic processes puts into practice the finalized intentions. The strategic processes create values and aim at amending the conditions of bank insertion in its environment by exploiting the resources
and skills which, under certain conditions, are likely to generate sustainable competitive advantages.

1. Definitions: "Panorama from military origin to the company’s life"

Over time, several definitions of strategy have been developed. They have emanated from a military origin and were transposed into business life. Linguistically, a strategy is the art of organizing and coordinating a series of operations to achieve a goal. As indicated by P. Lorino and Tarondeau JC (2006) and inspired by military strategies and the principles of war, a company’s or a bank’s strategy was first defined as "the art of fighting on the Field competition." For Andrews: "The general strategy is the combination of decisions in a company that determines and reveals its objectives and goals, produces the general policy and plans to achieve them, defines the scope of its targeted activities, the type of organization it intends to adopt and the nature of contributions, economic or non-economic, it tries to provide for its shareholders, employees, customers and other interest communities ". Chandler (1962) states that "a strategy consists in holding the long term goals and objectives in a business, adopting policy instruments and allocating the necessary resources to achieve those objectives." According to Ansoff (1986), "a strategy is the design that the firm undertakes when conducting its activities, specifying the progress rate, the fields of its expansion and divisions, the major forces to exploit and the profit to be made". Gelinier provides that: “a strategy has always been the art of winning a war. It can apply to a company since this latter is waging a war against its competitors to ensure its survival”. Ansoff states that “a strategy is not essentially focused on internal business but rather on a company’s external affairs and more precisely on the choice of the products it will make and the markets where these products will be sold”. As for Michael Porter, he considers a strategy as the art of building long-term defensible competitive advantages. From the above definitions, especially those of military origin, it can be concluded that:

- The strategy is considered as an art rather than a science and as such the artist’s talent (the strategist) is much more important than the technique used.
- Without neglecting the role of the environment, the strategy is an optimal combination of means that can bring out the bank to achieve its objectives.

Thus, it can be concluded that being a strategist is "to plan a well-defined approach that assumes knowledge of the situation (the enemy), seeking the benefits that can create value and the selection of short and long term targets. This requires the adoption of a set of techniques and analytical methods specific to this approach and a certain state of mind as well as a willingness to act".

2. Generic strategies in the banking and financial sector:

In banking, the quest for a competitive advantage does no longer adopt the same way followed a few years ago. It now rests on the pursuit of new strategies. In other words, two main generic strategies can be distinguished.

a. The two main strategic orientations:
i. Exploiting the benefits of the customer relationships bank:

It is a traditional strategy in the banking industry. It consists in providing differentiated services that are well-adapted to customers’ needs. The offers are thus based on exploiting relationships between the bank and its customers. This strategy should rather be implemented at a decentralized level and on neighboring markets. To achieve this end, the banker should deal with information that is qualitative in nature (soft information). This approach is relatively costly because it does not benefit from increasing returns to scale. Moreover, it assumes that the bank is responsible for the pooled credit risks. The revenues provided by this strategy primarily come from interest margins on deposits or loans.

ii. Exploiting the economies of scale and scope:

The second strategy is a more recent one in the banking sector. It reflects the rise of the above mentioned distribution function and it is based on the transaction bank model. It consists in exploiting the economies of scale and scope in production, marketing and distribution of credit and other standardized products such as consumer or housing credits. Thus, it requires a centralized organization to minimize the products’ unit costs. According to Mr. Dietsch (2005), in Europe, the development of this strategy has no doubt been encouraged by the introduction of a universal banking model which has widened the scope of activities open to banks (second EU directive) and the creation of a single market for banking and financial services. Another development support for this model is the harmonization of prudential rules with Basel I and today with Basel II. These two great strategies summarize the multiple generic strategies that dominate the banking sector. In the next section, we will attempt to examine them and formulate a clear idea.

b. Possible strategic options for banks:

Different strategic analysis concepts allow a better understanding of the positions that should be adopted depending on the scope of considered actions. The first ones are based on the results of the company analysis, in terms of strengths and weaknesses, and its environment in terms of opportunities and threats. A second type of concept resumes the framework of Porter generic strategies (1982).

i. SWOT analysis strategies:

In the framework of a SWOT matrix, a company’s objectives in a strategic field must stem from the knowledge of the competitive position occupied at a given time and that of its market share. This diagnosis in terms of “strengths and weaknesses” is to be juxtaposed with the “opportunities and threats” resulting from a changing environment.

• Conquest strategies:

---

2 SWOT: Strenghts, Weaknesses, Opportunities and Threats.
These are offensive strategies that express a will to power embodied in time. Conquest strategies have been expressed in different areas: the conquest of individuals and professionals, companies and market activities. According to M. Zollinger (1999), "a conquest strategy is demanding." Indeed, a good foundation in the country and home markets, a good knowledge of its skills, and the ability to operate them elsewhere are prerequisites for success.

- **Reorientation strategies:**

Like any business, the bank evolves according to cycles and meets at certain stages of development critical times that require some changes without putting at risk its survival. The objective in this case is clear. It aims to restore a certain leeway and a range of possibilities. This could be achieved only financially: the sale of equity investments, disinvestments, elimination of failing in sectors...

- **Consolidation strategies:**

The last component may arise as the result of a major downside that makes renewal a necessary requirement. The priority remains to reinforce and solidify the strengths of the bank, to halt decline and try to preserve the independence of the institution. Over a short period, a list of decisions that meet these changes should be drawn up and the structure reflecting the new trend should be defined. In conclusion, the various strategies outlined in the SWOT matrix have regulated the development of banks over the past twenty years and fueled the traditional debate between diversification and specialization strategies: These strategies are based on variables defining their fields, namely customers, product, technology and geographical area.

ii. **Strategies stemming from customer-product and geographical area variables:**

Beyond the constraints and expectations of the environment, the customer-product technology and geographical area variables are the key dimensions that determine the generic strategies in the banking sector. These dimensions allow banks to adopt any combination of the following five types of strategies:

- **Differentiation strategies:**

The differentiation strategy is to seek a competitive advantage built around the authenticity of the offer that is perceived by the customer. This authenticity must make difficult any imitation or substitution by competitors. The bank should therefore fight against its competitors by implementing means, other than price, so that its consumers see their product as unique, which would possibly make consumers accept a price that is actually higher than that offered by competitors.

- **Large-scale geographical strategies:**

This is known as internationalization strategy. It can also be defined as "the large scale or extensive geographical strategy of related activities providing the company with synergies..."
for a profitability that is higher than competitors’ : shared patents, reputation and image effect, a common information system, skills in human resources or management, .... " The alternatives followed to materialize this strategy are essentially partnerships and cooperation.

- **Segmentation strategies:**

The segmentation strategy is to divide the market into distinct subsets of customers and focus activity on these groups by offering products and services specific to each target. M. Zollinger (1999) states that "experience shows that focusing on a limited number of segments leads to a better follow up and risk monitoring."

- **Diversification strategies:**

Diversification consists in broadening the bank’s sphere of actions and imposing the use of a new set of know-how skills required in the new competitive environment in which the bank operates. The latter should also be involved in new activities (insurance, brokerage ...) that correspond to new products and new markets. Furthermore, the bank should conquer other business sectors through internal growth (launching a new type of financial product) or through external growth (acquisition of a company that is already offering such products). Monique Z. (1999) states that diversification is based on the modification of the definition of strategic scope by institutions in terms of products, customers, technology or geographical area. Within the banking sector as a whole, a trend towards diversification has shown up and targeted individuals and companies. This movement was accompanied by a proliferation of offered services (cash management, factoring, etc.) and has resulted in the presentation of a variety of products covering a wide range of needs. Further activities targeting individuals or companies help the bank offer a well diversified range of products and services.

- **Focus strategies:**

When evolving within a focus strategy framework, the company chooses to target a specific segment of customers. Its development strategy represents an innovation in its offer of products/services that is adjusted to the changing needs of targeted members. Thus, a bank that promotes such a development strategy proceeds to a selection of its users (M-C. Malo et M. Vézina, 2003). From this analysis, it can be concluded that the strategies stemming from customer-product - geographical area variables can be simplified into diversification and specialization strategies.

b. **Consequences of the banking strategy, " Activity Restructuring "**

Given the importance allocated to banking professions and the evolution of the banking image (financial innovation, deregulation, globalization, competition, etc...), banks have changed their assessments of the opportunities they are offered and the threats they face. These factors
will undoubtedly change the banks’ roles and image. Indeed, they are required to incorporate new professions (e.g. financial engineering), reposition themselves to face banking environmental changes and finally choose between a universal bank and a specialized one.

i. **Financial engineering:**

Following the changes that the banking sector has undergone, the banking profession has changed accordingly and is now expected to be innovative. Every bank is now compelled to develop financial engineering capabilities. The term “financial engineering” refers to the adoption of a research activity aimed at finding an authentic product to offer in order to target the right customers and build customer loyalty. The banking strategies based on new professions have given great importance to financial engineering which has become a crucial activity and a means to satisfy customers’ needs. Today, any banking activity has, in fact, to revolve around these needs.

ii. **Bank repositioning to cope with the new changes:**

Banks are facing remarkably similar threats and must organize to respond to opportunities that are also more or less the same for all. Therefore, banks have no choice but to follow these changes and new trends. However, the key to a better future is to find out whether they have to reposition themselves by broadening the range of their products or reduce it through specialization. This is, in fact, the strategic choice banks are faced with. So every bank is required to review its strategy and reorient it so that it is primarily aimed at building customer loyalty, and the challenge is to opt for the right strategy.

iii. **The dilemma of universal versus specialized Bank**

In order to increase their services, some banks have turned to "universal" or "general" bank model or "financial supermarkets". This trend appeared interesting for most important financial institutions. Such a strategy may prove beneficial in markets with no legal or administrative barriers. Other banks have chosen a strategy called "shop". It aims to exploit the comparative advantage of the bank in a single or limited number of segments, offering quality products that meet the specific needs of demanding customers. This strategy can lead either to lower costs or differentiation. Moreover, the bank may, accordingly, serve the customer better than competitors. These two choices have marked the banking strategies in recent years as far as competition and the skills available within the bank are concerned. In fact, "Under the effect of increasing competition, all banking groups have undertaken a major effort to rationalize. In terms of structure, this action has taken several forms: seeking to specialize in certain types of activities, some institutions have sold their operation portfolios and associated means in areas where they no longer wished to intervene. Conversely, some groups have sought to strengthen their presence in their core businesses or expand their services to their traditional customers. For example, they started the acquisition of existing institutions” (E. Fournier, 2001).

<table>
<thead>
<tr>
<th>Strategy / TRIAD</th>
<th>Europe</th>
<th>United States</th>
<th>Japan</th>
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III. THE IMPACT OF INTERNATIONAL PRUDENTIAL REGULATIONS ON BANKING STRATEGY: "THEORETICAL FINDINGS"

The performed analysis allowed us to detect a dependency relationship between international prudential regulation and banking strategy. Indeed, the regulation was found to have a significant weight on the behavior of bankers and to dictate their policy choices.

1. Basel I and banking strategies:

The implementation of Basel I led banks to adopt different strategies according to the constraints and the spheres developed. Thus, the agreement has prompted banks to select customers and seek activities that are little-demanding in terms of equity in order to meet prudential requirements, especially a minimum Cooke ratio of 8%. In this regard, banks have converged towards specialization on customers and activities presenting high incomes and requiring little capital. Thus, segmentation and focus strategies have been observed. Furthermore, banks have sought to add products and services to the existing range in order to reward prudential standards and present ratios that meet and exceed the regulatory minimum, which can help build a competitive advantage differentiating them from their competitors. To achieve all this, banks have tried to diversify by developing mergers and acquisitions. These allowed better cross-border transactions between banks of different nationalities. Therefore, these trends have led to the diversification at the level of products and geographical areas, which gave rise to the universal bank model in the global banking sector providing an opportunity for equities that can attract customers at the heart of any strategic direction in recent years. It has been noticed that many banking giants have emerged to meet prudential regulatory provisions.

2. Basel II and banking strategies:

Basel II will continue the development of mergers and acquisitions as it is up to this agreement to overcome the constraints imposed by the new international prudential regulations and to establish holding companies that are able to cope with competition. Indeed, large banks are better prepared to handle new regulatory requirements: "big is beautiful". Furthermore, we
will witness the emergence of organizations which are specialized in certain products or services that allow them to meet prudential standards and regulatory requirements. These trends will take place within the same financial conglomerate, i.e. the bank will be in the form of a diversified financial unit involved in numerous action spheres, and every domain will be run by the two specialized units. This banking model is described by L. Bryan as "the broken up the bank". According to several authors, Basel II would be a major conductor of the banking strategy for an extended period: specialized banks will turn to diversification and diversified banks will change the combination of business, and all will act likewise to meet the regulatory framework and maintain or build their reputations. This obviously requires a change in the overall strategy. Basel II may also encourage banks to give up certain activities or geographical areas that require more capital to pay for equities that are able to cover the risks, which is a way towards focus strategy: niche strategy. Risk assessment homogeneity required by Basel II Agreement may facilitate international mergers- acquisitions operations, which promotes strategies on a large geographical scale. So far, only the theoretical impact of these two prudential standards has been dealt with. Now, these will be empirically analyzed in order to validate or overrule them. The international prudential regulation, whether Basel I or Basel II, has prompted banks to adopt some strategic orientations following the imposed constraints and the developed fields. Indeed, following the genesis of these two global standards, several strategies have emerged and expanded significantly. Worldwide, these orientations are dominated by a strategy of diversification that increases the number of domestic and international mergers and acquisitions in order to create universal banks that meet the objective: "one stop shopping."

![Diagram](image-url)

**Fig.3: Theoretical impact of Basel I and Basel II on banking strategies; Source: Authors**

**Empirical framework:**

I. **The impact of international prudential regulation on banking strategies, "empirical Findings"**

Our article has so far been based on the study of the relationship between international prudential regulation and banking strategies at the level of both the state of the art and international practice. A further research would be interesting to perform on the banks of emerging countries including those we have studied, namely the Tunisian ones. It should be noted that the evolution of the Tunisian banking and financial environment has also been accompanied by a dynamic banking system owing to the prudential regulation in force. A follow up of these developments could enrich our study and bring about a series of answers to our
problems. For this objective to be achieved, we decided to carry out a survey about Tunisian banks.

1. **Samples:**

The studied sample included 15 Tunisian banks and, for more relevance and variety of responses, banks were provided with two or three questionnaires according to the position of the respondent holds. Overall, the sample consisted of 35 people. In addition, our analysis was based on the operation of three different periods that had marked the Tunisian banking system and especially its prudential regulation, i.e., before 1986, between 1986 and 1992 and after 1992. In order to study the current relationship between banking prudential regulation and the bank’s strategy as well as the variables affecting these two elements, accurate and direct questions were included to come up with the necessary and useful information.

2. **Empirical results:**

To investigate the relationship between the different variables of our empirical research, these were analyzed through the SPSS.10 software to consider the following results:

- R1: the IPR factor of certain banking strategies.
- R2: IPR inhibits other banking strategies.
- R3: The IPR is neutral with regard to the banking strategy.

An analysis of the impact of international prudential regulations on the banking strategy is conducted while testing the following hypotheses:

- H1: the IPR imposes some strategic choices to the bank.
- H2: The IPR favors certain banking strategies.
- H3: the IPR ensures that the bank does not follow certain strategic choices.
- H4: the IPR does not have any effect on the strategic orientation.

a. **The Tunisian Prudential regulation (TPR) and International Standards:**

The field studies have shown the importance the Tunisian prudential regulation (TPR) has acquired especially after 1992 when the Tunisian regulatory reform took place and integration into the harmonization of the international framework was undertaken. 76.7% bankers consider that domestic rules comply with international ones.

However, the TPR developed very slowly compared to international regulations\(^3\) which was normal for an emerging country. The interviewees relate this finding to the lack of pertinent financial crises, which has reduced the need for prudential standards. This is also due to the available infrastructure at banks in emerging countries and the characteristics of the national banking system. Indeed, authorities in emerging markets have to be involved in the international

\(^3\) 56.7% have mentioned that the procedure is slow.
harmonization process of prudential regulation, but they should also take time to find a mechanism that is well adapted to the specificities of their national banking systems. This explains the Cooke ratio implementation after a certain time with a minimum rate of 5% below the Basel Committee’s 8% rate.

As for Basel II, 73.3% of executives reported the need for its implementation in the Tunisian context but with some modifications according to its characteristics. In short, it can be said that implementing this new agreement in emerging countries while complying with the latters’ needs raises many problems such as:

- Difficulty in implementing the internal ratings approach (IRB).
- Costly implementation: information technologies (IT) costs and staff training expenses.
- The standardized approach and the problem of credit external rating: the low coverage of emerging regions by credit rating agencies.

However, the implementation of this new prudential standard is still in a preparatory phase in Tunisia. Indeed, Tunisian authorities are trying to implement Basel II Agreement through newsletters reflecting the three pillars of this framework. Here we can cite a regulatory provision referred to by the majority of Tunisian bankers, namely the credit institutions newsletter n° 2006-19 released by the Central Bank, which came into force in 2008 and aimed at internal control.

We have checked whether this regulation has sought to promote within the Tunisian banks the management and especially the measurement of credit, market and operational risks mentioned by Basel II and pertaining to McDonough ratio calculation (preparation for the adaptation of this ratio). In addition, we noted convergence towards Pillars 2 and 3 through exposing the banking supervisory authorities and encouraging the publication of reliable information through market discipline. These regulatory texts, which adopted Basel II principles, were mainly concerned with the introduction of market and operational risks, internal rating systems, enhanced security and transparency of financial relations, strengthening the accountability of control and decision-making organizations, strengthening prudential ratios, internal control and risk supervision...

In this context, Tunisian bankers insist on the satisfaction of certain conditions for a successful implementation of Basel II in their country:

- The overhaul of information systems and risk management in light of new regulatory reforms in order to comply with Basel II standards.
- The development and implementation of a scoring and internal rating system within the Basel II framework while initializing a competence center to ensure monitoring, the project's sustainability and its integration in the bank’s information system.
- The importance of both financial transparency and good governance in the implementation of the rules.
- Banks are required to adjust their management styles, particularly in terms of risk.
- Adaptation of the current accounting framework to Basel II objectives.
To sum up, three actors are essentially concerned with the implementation of the new framework:

- **Banks:** the overhaul of their systems of information, identification, monitoring, control of various risks and internal control strengthening.
- **Monetary authorities:** a stronger role in the supervision and control of banks.
- **The financial market:** should ensure the reliability and transparency of financial reporting.

As for the implementation timing of Basel II in Tunisia, though nothing has been officially done, banking professionals have been made to understand that the year 2012 may be the year when the sector will shift to Basel II. Prudential regulation in emerging markets is characterized by flexibility with respect to international markets (as mentioned by 46.7% of the respondents). This specificity can be explained by the fact that the TPR is an emerging country’s regulation and some sort of flexibility has to be incorporated in order to encourage banks to comply with this framework (5%, for example, were for the Cooke ratio). Furthermore, this regulation is said to be both accurate\(^4\) (easy to interpret) and binding\(^5\) for banking activities (e.g. ignore high-risk credits risk).

### b. Banking Strategies:

Empirical studies have shown that the strategic attitude has changed from a *random* and *adventurous state* before 1986 to a prudent state after 1992. This is most probably due to the evolution that the TPR has witnessed between these two periods. The rates went from 30% for risky strategies to 86.7% for prudent strategies during the analyzed third period. The bivariate analysis between the importance of prudential regulation and banking behavior supports our findings. Indeed, it can be stated that almost have approved of all interviewees (86.2%) have opted for a prudent behavior.

The evolution of the prudential regulation over time has played a great role in promoting a prudent banking behavior

Tunisian banks stipulate that, before 1986, the establishment of their strategies was carried out in a random (voluntarist) manner (as reported by 50% by respondents) according to the existing situation between 1986 and 1992 and even later (73.3% and 63.3%) and especially to its spontaneous establishment after 1992 (23.3%). This appears as a consequence of the TPR evolution throughout the studied period.

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<thead>
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<tbody>
<tr>
<td>Diversification</td>
<td>46.7%</td>
<td>53.3%</td>
<td>70%</td>
</tr>
<tr>
<td>Internationalization</td>
<td>0%</td>
<td>0%</td>
<td>6.7%</td>
</tr>
<tr>
<td>Specialization</td>
<td>40%</td>
<td>23.3%</td>
<td>10%</td>
</tr>
</tbody>
</table>

\(^4\) 66.7% of visited banking staff say the TPR is accurate.

\(^5\) 43.3% of visited banking staff say the TPR is restrictive.
The setting up of a strategy has evolved from a deliberate procedure to an emerging one which takes into consideration the conditions of the banking environment. These different procedures have oriented banking specialization and diversification throughout the first period to a dominance of diversification after 1992 (up to 70%). This result is supported by the fact that the diversification strategy was set up to find the appropriate resources to confront the constraints imposed by the Tunisian banking environment, in particular the minimum regulatory solvency ratio. A cross analysis of changes in the TPR and banking strategies after 1992 showed a cause and effect relationship between the evolution of the TPR (transposition of the Cooke ratio) and a tendency towards diversification, and that is essentially to provide sources of income which allow banks to comply with international prudential standards and thereby integrate into the international context. Therefore, there is a relationship between the evolution of this framework and the strategy elaboration. In fact, increasing the minimum statutory ratio from 5% to 8% has prompted banks to find other sources of income to meet this standard, hence a tendency towards diversification.

![The changes in the TPR have had a great impact on strategic choices and prompted banks turn to diversification.](image)

This summary is approved if we further suggest that the basic choice of a strategy is made at 80% through restructuring according to the prudential regulation after 1992. The role of the 2001 Banking Act, which deals with the diversification of the Tunisian banks, should not be overlooked. The cause and effect bivariate analysis between the strategy and bankers’ behavior according to the prudential regulation over the three covered periods confirms this finding. After 1992, this variable witnessed a dramatic increase. In fact, 76.2% of those responding favourably to restructuring in accordance with prudential laws turned to diversification. This finding further confirms previous results that the development of a diversification strategy was a consequence to the emergence of TPR and its convergence towards internationalization. The major influence of the Tunisian prudential regulation in the choice of the diversification strategy is clear. Indeed, 81% of those who have adopted a diversification strategy mentioned the important impact of prudential standards on making such a choice. The increasing influence of prudential standards on strategic choice has prompted banks to turn to diversification with its various forms.

c. The impact of Basel I:

The implications of the Cooke ratio on banking strategies revealed by the analyses performed on Tunisian banks yielded the following results:

<table>
<thead>
<tr>
<th>Strategy / IPR</th>
<th>Basel I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mergers and acquisitions</td>
<td>3.3%</td>
</tr>
<tr>
<td>Others</td>
<td>0%</td>
</tr>
</tbody>
</table>

6 81% of those who approved a real change in the solvency ratio after 1992 reported that their strategy was actually one of diversification.

7 Currently, diversification refers to a bank that can perform any activity (universal bank). It is mentioned by the Banking Act of July 10th, 2001, which prompted banks to diversify.
Indeed, 46.7% of interviewees stated that this ratio had imposed the diversification strategy and this was for the same reasons above mentioned, i.e. to diversify in order to find resources that can meet regulatory requirements. In fact, the first Basel framework urged banks to turn to little demanding activities that require little capital such as market activities, financial engineering and insurance. With regard to other strategies, this ratio plays a supporting role. Bank officials have, with different rates, indicated that the Cooke ratio favors the last three strategies:

50% reported that it promotes specialization: Basel I set up a constraint by imposing compliance with the minimum level of equity, which has led banks to select clients with a low risk weighting and seek activities that are less capital-consuming. These trends have led some banks to specialize. 40% said it promotes internationalization: The application of the Cooke ratio at the international level has prompted banks to internationalize. It is harmonization of this ratio at the global level that has favored such a strategy. 63.3% stipulated that it promotes mergers and acquisitions strategies: a tendency towards these operations to expand activities providing resources and ensuring compliance with a minimum of 8% and even more in a context where this has become a competitive advantage: grow to become stronger in an international banking environment characterized by high-intensity competition.

**d. The impact of Basel II:**

The impact of Basel Agreement on Banking Strategies is shown in its three pillars:

<table>
<thead>
<tr>
<th>Strategy / IPR</th>
<th>Basel II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pillar 1</td>
</tr>
<tr>
<td></td>
<td>I</td>
</tr>
<tr>
<td>Diversification</td>
<td>50</td>
</tr>
<tr>
<td>Specialization</td>
<td>20</td>
</tr>
<tr>
<td>Internationalization</td>
<td>23.3</td>
</tr>
<tr>
<td>Merger &amp; Acquisition</td>
<td>36.7</td>
</tr>
</tbody>
</table>

**Tab.5: Impact of Basel I on banking strategies; Source: SPSS.10 software results**

• The table is expressed in percentage.

Pillar 1 is comparable to the Cooke ratio. In fact it has the same impact: 50% of respondents felt that it would impose diversification. Taking into account the three risks (credit, market and operational risks) would encourage banks to change their business portfolio, thereby further diversifying.

Pillar 2 (supervision by public authorities) is characterized by the fact that it will promote all studied strategies. Those who stated this were as follows: 63.3% for diversification (a more sustained and regular communication between authorities and banks could also encourage the latter to turn to diversification if they provided strong prudential ratios), 36.7% for specialization, 30% for internationalization and 50% for mergers and acquisitions.

Pillar 3 (transparency and market discipline) has the same impact as the previous one. In fact, it favours the four above mentioned strategies with respective rates of 56.7% for diversification, 40% for specialization, 46.7% for internationalization and 50% for merger operations.

In conclusion, it has been found that, whether it is the Cooke or the McDonough ratio, these two international prudential frameworks impose diversification strategies on banks in order to meet the required conditions and the regulatory minima. Furthermore, as mentioned by Tunisian bankers, pillars 2 and 3 of Basel II will always tend to favour all strategies but with different degrees. However, the impact of Basel II is to be confirmed because the results are estimates of a future impact, since Tunisia is currently preparing for a total implantation of this framework. Thus, these results could be improved after a full implementation of Basel II is undertaken. But what we have just presented can be added to the studies related to the impact Basel II that are being exploited in the banking system by the Central Bank and its "Committee on Basel II. These studies are involved in credits, the internal organization of banks...In summary:

<table>
<thead>
<tr>
<th>Baseline II (ratio McDonough)</th>
<th>Pillar 1</th>
<th>Pillar 2</th>
<th>Pillar 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diversification</strong></td>
<td>Imposes at 50%</td>
<td>Favours at 63.3%</td>
<td>Favours at 56.7%</td>
</tr>
<tr>
<td><strong>Specialization</strong></td>
<td>Favours at 50%</td>
<td>Favours at 36.7%</td>
<td>Favours at 40%</td>
</tr>
<tr>
<td><strong>Internationalization</strong></td>
<td>Favours at 63.3%</td>
<td>Favours at 30%</td>
<td>Favours at 46.7%</td>
</tr>
<tr>
<td><strong>Merger and Acquisition</strong></td>
<td>Favours at 50%</td>
<td>Favours at 50%</td>
<td>Favours at 50%</td>
</tr>
</tbody>
</table>

Tab. 6: Impact of Basel II on banking strategies; Source: Authors.

Basel II
• Pillar 1 imposes diversification and favours the choice of other banking strategies.
• Pillar 2 favours all banking strategies.
Conclusion:

At the end of this article, we tried to highlight the impact of international prudential regulations on banking strategies, while studying the resulting impact. Theoretical and international studies seem to have embraced the logic stipulating the existence of an impact between prudential regulation and the banking strategy. However, each research line has been characterized by well-defined and specific reflections. This impact characterizing the regulation and the strategy was expressed in several ways. Some authors have mentioned the important influence of regulation on strategic orientations. Others have suggested that it is only secondarily that the regulation determines the strategy and dictates its choice. However, other authors have focused on the development of certain forms of interaction between these two variables. In the context of this alternative, the ambition of this research was to determine the impact of international prudential regulations on banking strategies, and attempt to clarify the results. Now that these various investigations have been carried out, we have found that, empirically, hypothesis 1 of our study, which stipulates that the prudential regulation imposes strategic choices on banks, was validated especially after 1992 when diversification was imposed. Hypothesis 2 can be easily checked with other strategies regardless of the prudential regulation dealt with. The last two hypotheses were not validated by the two ratios. Whatever the nature of the presented scenarios, we managed to show the impact of the international prudential regulation on banking strategies. In fact, whether Basel I or II, the international prudential regulation guides banks’ strategic choices by imposing diversification and encouraging other types of strategies.

Though it may be useful in some respects, this study of the impact of international prudential regulation on banking strategies is not sufficient. Undoubtedly, a more detailed analysis based on the consideration of another line of thought would allow a better understanding of the pertinence of this impact and the probable changes it will bring about. An extension of this study can be carried out especially after a full implantation of Basel II to validate or overrule the results revealed by this investigation. In addition, the echoes of a new tendency towards a new agreement, or Basel III, the increasing number of banks mergers we have recently witnessed, the tendency towards the development of universal banking and particularly the repercussions of the 2007 financial crisis, whose impact is still felt in 2010, are all interesting indicators as they may pave the way for further investigations and provide some continuity for the present study. The concern to increase the size of banks and the future evolution of international prudential regulations towards a possible reform of Basel II may clash, especially with the lack of prudential regulations for banking giants resulting from mergers. It appears therefore interesting to study the impact that may result from the reform of international prudential regulations on
mergers-acquisitions strategies in the context of such a volatile international financial environment.
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A NEW FORMATIVE MEASURE OF BRAND EQUITY

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Abstract: This study examines a new measure of brand equity. Brand equity is the added emotional and financial value that a brand brings to a product. We put forward a new measure of brand equity that remains on a formative approach. We aim at exploring the combined effect of the force and the valence of associations is the best measure of the value of the brand. For that purpose, we build a path analysis model of the relationship including two antecedents of brand equity (attention and familiarity with the brand) and three consequences (general attitude towards the brand, intention of purchase and fidelity). This model was empirically tested using survey data collected from 609 women aged 18 to 45 years. Data are analyzed through Amos. Findings suggest that our new measure was well predicted by antecedents concerning the consequences of brand equity much more better than the three other measures.

Keywords: Formative approach, Attention, Attitude, Brand equity, Path analysis, Familiarity, Fidelity, Purchase intention, Valence
INTRODUCTION

The brands are an emotional and financial value source. The measure of this value is called the brand equity. The consumer-based brand equity is defined as the added value that a brand brings to a product. It is about an additional effect, beyond the product itself and its attributes, the knowledge of the brand adds to the consumer's answer (Farquhar 1990, Aaker 1991, Keller 1993). This additional effect of the brand corresponds ideally to the comparison of the same consumer reaction towards the competitor’s product without brand or having a fictional brand. For a firm, it is important to have a valid and reliable measure of the brand equity in order to exploit and to preserve its value. There are two approaches for measuring the brand equity (Lay 2005). The perceptual approach founded on the awareness and the image. It combines spontaneous or brand recall measures with those of strength or intensity relating associations to the brand. The behavior approach of the brand equity puts in relation the preference for the branded product and the preference expected value with a multi-attribute model.

In the present research, we will present a model that allows measuring the brand equity, while joining it to its antecedents and to its consequences. To this subject, our problematic is at the same time theoretical and practical. We will try notably to clarify the content of the brand equity, considered as a formative index, to compare different brand equity measures, then to deduct the measure that allows the best adjustment of our model, that means the measure which permits the best previsions of the consequences resulting from exalted brand equity.

We have chosen a perceptual approach of the brand equity. Although most researches on the brand equity measure adopt a reflective approach, we propose a new measure that remains on the formative approach. We consider the brand equity as a formative index, therefore an aggregated variable and non latent. No investigation, for our knowledge, has modeled until now the brand equity as a formative index.

After explaining details of the differences between the reflective and the formative approaches of the brand equity measure, we will present our research model that sets in competition, on a same database, four measures of the brand equity. Our target is to test a new method of brand equity measure based on the formative approach. Then, we discuss the methods that we have adopted to generate and to analyze the associations of three cosmetic brands. Overall, the findings suggest important implications for both researchers and managerial practices.

CONCEPTUAL CONTEXT

After our review of the literature around the brand equity measure, we take as a basis the criteria established by Jarvis, MacKenzie and Podsakoff (2003). The study of these successful authors led a list of four qualitative criteria that facilitate the qualification of a measure model as reflective or formative. We present these criteria below in the table, as applying them to our goal of the brand equity measure.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Reflective Model</th>
<th>Formative Model</th>
<th>Our Model</th>
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</thead>
<tbody>
<tr>
<td>1. Direction of causality</td>
<td>The direction of causality goes from construct to the items.</td>
<td>The direction of causality goes from the items to the construct</td>
<td>The associations are the reasons of the brand equity</td>
</tr>
<tr>
<td>Are the indicators defining characteristics or manifestations of the construct?</td>
<td>The indicators are demonstrations of the construct.</td>
<td>The indicators are characteristics of definition construct.</td>
<td>The brand equity is built by the strong associations linked to the brand.</td>
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</tr>
<tr>
<td>Do changes in the indicators cause some changes in the construct?</td>
<td>The changes in indicators don't cause any changes in the construct.</td>
<td>The changes in indicators cause some changes in the construct.</td>
<td>The Brand Equity = Strength x Valence of the associations, therefore all change of FxV have repercussions.</td>
</tr>
<tr>
<td>Are the changes in the construct cause some changes in the indicators?</td>
<td>The changes in the construct cause some changes in the indicators.</td>
<td>The changes in the construct don't cause any changes in the indicators.</td>
<td>The company cannot change its BE without changing the associations (their strengths and valences) in the consumer's mind.</td>
</tr>
</tbody>
</table>

2. *Interchangeability of the indicators / items*

**Must the indicators have a similar content? Do the indicators share a common theme?**

- The indicators must be interchangeable
- The indicators must have a similar content. They must share a common theme.
- To drop one of the indicators must not change the conceptual domain of the construct.

**Does dropping one of the indicators change the conceptual domain of constructs it?**

- The indicators are not interchangeable
- The indicators don't need to have a similar content. They must not share a common theme.
- To drop one of the indicators may change the conceptual domain of the construct.

**The associations are not interchangeable, their valences differ.**

**The associations are not factory-made: they don't have the same content.**

**An association can be unique to a brand.**

3. *Co variation between the indicators*

**Does a change in one of the indicators must to be associated to changes in the other indicators?**

- The indicators are supposed to co-vary one another
- Yes

**It is not necessary that the indicators co-vary one another**

- Not necessarily

**A change in strength or the valence of association "Beauty" can change strength and / or the valence of the association "Elegance / Chic" but not necessarily those of the associations "Golden" or "Large choice of color".**
4. Nomo-logical Network of the indicators of the construct

Are the indicators supposed to have the same antecedents and consequences?

The nomo-logical network of the indicators must not differ. It is necessary that the indicators have the same antecedents and consequences.

The nomo-logical network of the indicators can differ. It is not necessary that the indicators have the same antecedents and consequences.

The attention and the familiarity are the antecedents of the BE. They can be relative to the supports of communication, retail outlets, groups of reference etc. therefore the associations can have various antecedents.

The originality of our formative index resides in taking into consideration simultaneous the strength and the valence of the associations. It is calculated by the sum of strengths multiplied by the valences of all associations.

Our model refers to the Keller theory (1993) and is inspired of the Cobb-Walgren model, Ruble and Donthu (1995) as well as of the Korchia model (2001). We construct a causality paths model containing two brand equity antecedents (attention to the brand and familiarity with the brand) and three consequences (general attitude towards the brand, purchase intention and brand loyalty). We suppose that the brand equity mediates the relation between the antecedents and the consequences but, we also preserve the direct relations between the antecedents and the consequences. This is the proposed model:

**Conceptual model of brand equity**

![Conceptual model of brand equity diagram]

According to the above conceptual model, it is preferable to specify, from a theoretical discussion, the different facets and links of the studied concept. For this, we take every relation of our model and we formulate it into research hypothesis. Thus, this study proposed the following hypothesis:
A- Strength and valence of the associations components the brand equity index

All researches agree to consider the associations to the brand as the main brand equity indicator, knowing that the points of view diverge on characteristics and categorization of these associations. Our measure model postulates that the associations, beyond a simple indicator (y), are the source of the brand value. We consider that they are the brand equity constituent elements. Precisely, it is the simultaneous effect of the strength and the valence of the associations that constitute the brand value for the consumer. Indeed, when we consider the brand like a social representation, we deduce that the brand equity is set up in the consumer's mind from the network of associations that he connects to the brand.

According to Abric (1994), the brand, as social representation, assures an identity function through which the individual (the consumer) expresses his identity and confirms his membership to the social group (the brand consumers) in which the representation (the brand) occurred. This identity function is assured by the heaviest constituent elements of the representation. According to Abric (1987), for all representation, "its internal structure, the level-headedness of the elements that constitutes it permits to know or to approach characteristics of the group to which it refers ". Therefore, the brand value comes from the associations that are most connected to it, not only among those existing in the consumer's mind, but also from those judged compatible with the value's system and norms of the consumer and his social group. That is why, we tend to analyse in relation to the multiplication of strength by the valence (Strength x Valence). It is the effect combined of the strength AND the valence of the associations that create the value to the brand in the consumer's mind.

The brand value can be positive or negative, strong or weak. To benefit from strong brand equity, it is not enough that the brand has strong associations; But it is necessary that they are discerned positively. On the contrary case (negative associations), these associations decrease the brand value for its consumers. Consequently, the measure of our brand equity reflects the brand value and emphasizes the superiority of a particular brand to another one. We take in consideration positive and negative associations. Besides, the proposed measure must serve to better predict the purchase behavior and to detect the changes to bring to the brand positioning, essentially in comparison with the brands competitors. For this reason, we integrate all associations for their strengths of attachment to the brands. Unlike the existing models, we didn't scrape the associations weakly connected to the brand. These are as beneficial as the others. Indeed, if an association weakly linked to a brand (but greatly attached to another) is discerned positively, then its identification allows the brand to strengthen the link with this association to avoid being overcome by the competition.

In fact, in our measure, we introduce the association valence in order to subtract to the brand equity the negative associations that decrease its value. We propose a compensatory measure of the brand equity, which we can get by multiplying the strength by the valence of the associations and while preserving all associations. Of the way, the level-headedness of the association strength by the association valence will allow us to cover all sources of brand values. So, our measurement equation of the brand equity can be written as follows:

\[
BE_i = \sum V_{ij} F_{ij} + \delta
\]

BE\(_i\) is the brand equity of the i brand
F\(_{ij}\) is the attachment strength of the j association to the i brand, active j of 1 to k
V_{ij} is the valence of the j association when it is linked to the j brand 
\delta is a mistake term.

In the present research, one can be asked to test the relevance of this measure while comparing it to the other three:

1. First measure: it is about the classic additional measure (Aaker 1991, Changeur 1999,….) that keeps only the strong associations. It is most often measured while only keeping the associations that their strength is superior to the mean. The other associations are not taken into consideration. The brand equity is equal to the sum of the strong association strengths.

2. Second measure: we propose to measure the brand equity while preserving all associations, even though they are lower to the mean. The brand equity is calculated then by the sum of the strengths of all associations.

3. Third measure: we introduce the valence of the associations in order to subtract to the brand equity the negative associations that reduce the brand equity. For that, we multiply the strength by the valence and we preserve all associations. This measure corresponds to our compensatory definition of the brand equity measure.

4. Fourth measure: we suggest measuring the brand equity while only keeping the associations whose strength is superior to 3 on a scale of 1 to 5 and the valence is positive.

To this effect, we formulate the following hypotheses:

H1: the compensatory brand equity measure is better than the additional measure.
H1-2: the associations strengths pondered by their valences discriminate better between the brands.
H1-3: the association strengths weighted by their valences permit to predict better the brand equity consequences.

B- Attention and familiarity as brand equity antecedents

All researches agree that a condition of birth of the associations is the attention and the familiarity to the brand. In fact, the model takes these two variables as the two brand equity antecedents. Indeed, the first component of the “brand” representation in the consumer's mind is information, which can be either objective or subjective (Abric 1994). To this topic, Keller (1993) concludes so that an individual has a brand representation (a knot) in his mind, it must have some brand awareness, without which the associations cannot appear. Added to this, we suppose a direct effect of the attention on the brand equity consequences (the attitude, the purchase intention and the brand loyalty). In this subject, Changeur and Dano (1998) noted that "the attention partially translates the value of the brand: the choice of the product can be determined by the simple emergence in memory of the name of the brand, and the knowledge stored on a brand can encourage the recall and the choice of this brand particularly in a given purchase situation". Then, our second hypothesis is:

H2: the attention is a brand equity antecedent.
H2-1: the brand equity is explained by the attention to the brand.
H2-2: the attention to the brand has a positive direct effect on the brand equity.
H2-3: the attention has a positive direct effect on the general attitude towards the brand.
H2-4: the attention has a positive direct effect on the brand purchase intention.
H2-5: the attention has a positive direct effect on the brand loyalty.

However, in order for a "brand" representation to be born in memory, the attention is not enough. The consumer must be familiar with the brand (Krishnan, 1996, Korchia, 2000). It is why our model puts a causal relation between the familiarity and the brand equity. We also suppose that the familiarity has a direct effect on the brand equity consequences.

H3: the familiarity is a brand equity antecedent.
H3-1: the brand equity is explained by the familiarity to the brand.
H3-2: The familiarity to the brand has a positive direct effect on the brand equity.
H3-3: The familiarity has a positive direct effect on the general attitude towards the brand.
H3-4: The familiarity has a positive direct effect on the brand purchase intention.
H3-5: The familiarity has a positive direct effect on the brand loyalty.

C - Relationship Brand equity / Attitude

The attitudes express a positive or negative position towards the object. Several authors consider that the strong, positive and unique association existence in the consumer's mind is susceptible to influence the existence of a positive general attitude towards the brand (Aaker 1991, Keller 1993, Park & Srinivasan 1994, Krishnan 1996, Changeur and Dano 1998). In fact, the information and the acquired experiences are the origin of the individual beliefs about a given object. These beliefs are merely the attitude cognitive dimension. However, to have some beliefs about a brand comes back to dig in the "brand" representation in the consumer's mind, in order to recover the information and the interpretations given to this brand. Once the beliefs are formed, their relative importances give an attitude orientation toward the positive, the neutral or the negative. Therefore, we estimate that the position hold (positive, neutral or negative) depends on the strength of the associations to the brand existing in the consumer's mind, and on the valence of these associations.

In this topic, Changer and Dano (1998) proved the significant relation existence between the strong, positive and unique associations, on the one hand and, the general attitude on the other hand. While this research suggests to verify the existence of an explanatory relation between the brand equity and the general attitude. Then, our hypothesis is:

H4: The general attitude towards a brand results from its brand equity
H4-1: The brand equity has a direct and positive effect on the general attitude toward a brand.
H4-2: The brand equity allows predicting the general attitude towards a brand.

D - Relationships Brand equity / Purchase intention and Brand loyalty

All social representation assures an orientation function (Abric, 1994). Indeed, on the one hand, the representation (the brand) is bearer of sense, and then it can decide the necessary cognitive activity to the realization of a task or particular activity. On the other hand, since the social representation reflects the links and the norms governing the social group in which it’s formed, it becomes, sometimes, the practices and conducts advisor for the persons or his social group. This is how the brand can orient and can generate some consumer behaviors.
Several researches carrying on the brand equity consider that the strong, positive and unique association existence in the consumer's mind is susceptible to increase the probability of brand choice (Aaker 1991, Keller 1993, Park & Srinivasan 1994, Krishnan 1996, Changer and Dano 1998). As for our model, it tempts to explain the purchase intention and the brand loyalty.

H5: The brand purchase intention results from the brand equity,
H5-1: The brand equity has a direct and positive effect on the brand purchase intention.
H5-2: The brand equity allows predicting the brand purchase intention.

Several brand consequences are counted by the researchers. The brand loyalty is one of the consequences noted by many authors of which Keller (1998), Korchia (2000) and Czellar S. and Dennis J.E (2002). However, the empiric researches on the brand equity consequences defect. In the setting of this research, we suggest to verify the following hypothesis:

H6: The brand loyalty results from the brand equity,
H6-1: The brand equity has a direct and positive effect on the brand loyalty.
H6-2: The brand equity allows predicting the brand loyalty.

METHODOLOGY RESEARCH

For the realization of our empiric research, we kept three cosmetic product brands, which are Lella (Tunisian brand), Bourjois, and Guerlain.

Qualitative research: identification of the associations
In order to dread the brand significance for a consumer, Aaker (1991) suggests asking the open questions having for objective the enumeration of the associations to the brand present in the consumers’ mind. Consequently, to generate the associations linked to each of the kept brands, we combined the direct citation method and the semi directive interview. These associations are the basis of our principal investigation. The direct citation method permitted us to identify the associations related to the three retained brands in the preliminary research.

However, spontaneously, the individual mentions only the primary associations of the semantic network (top of the mind) of the examined brand. From where, the number of the associations generated by the direct citation is limited. Moreover, and because of the same weakness of this method, Aaker (1991), Blackston (1993), Park and Srinivasan (1994) estimate that not only the number of associations generated is restricted but also their types. These same authors recommend the recourse to the individual interview semi directifs in order to remedy the weakness of the direct citation method. Thus, the in depth interview permits not only the generation of the associations but also the research of their significances. This method permits to go back up, farther than the primary memory, to the secondary memory of the individual. It offers all odds to dig more deeply to make emerge the most abstract associations. To constitute the final list, we kept the short associations (a word or short expression), cited at least two times by the 65 interrogated people. We obtained a list of 14 associations, classified below in the table:
Methodology of the main research

We chose to collect the data by the method of investigation by poll. To this effect, a questionnaire has been elaborated. 609 questionnaires have been managed by only one interviewer in order to avoid the slanted and/or generally inevitable gaps when the investigation is led at a time by several people.

Sampling plan

For reasons of cost, we limited ourselves to the region of the Big Tunis. Our answering is described by their ages and incomes. We chose them by the method of sampling by quotas of age and income. The quota of age refers to statistics of the I.N.S (National Institute of the Statistics), for the women living in the region of the Big Tunis. In the absence of statistics on the distribution of the Tunisian population by level of income, we tried to have some proportions nearly equal by level of income. Finally, the last sample selection criterion is the knowledge of the retained brands in our research. Of the way, our sample is constituted of 609 women aged of 18 to 45 years, having different levels of income and more or less familiar to at least two brands of cosmetic products among the three proposed.

Results: Comparison of 4 measures of the brand equity

We opted for second generation statistical analyses. While applying the same causality path model, we valued the four brand equity measures, for three cosmetic brands, Bourjois, Lella and Guerlain. We are in the setting of measures repeated, every answering having valued the three brands. We will keep the brand equity measure that permits the best model adjustment to the empiric data, which means the measure that joins better the antecedents of the brand equity to its consequences and that discriminates better between the three brands. We use six global adjustment indicators as well as the signification degree of the links between constructs, in order to choose the best brand equity measure among the four proposed.
The new compensatory measure that we propose (M3), that multiplies the strength of all associations by their valences, gets the best global adjustment for each of the three brands analyzed. As for the significance of the relations, the compensatory model proposed M3 proves to be better than the three other. For the brand Bourjois, it validates all the causality paths to the threshold of risk of 1 for one thousand. For the brand Lella, it validates all the causality paths to the threshold of risk lower or equal to 3 percent. For the brand Guerlain, it validates all the causality paths to the threshold of risk lower or equal to 2 for one thousand.

**Significance of the relations by brand and for the four brand equity measures**

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**DISCUSSION OF THE RESULTS**

All the causality path analyses, achieved for three cosmetic product brands, permitted us to confirm the superiority of the third measure in relation to the three other measures. This measure translates our proposition of compensatory brand equity measure that is the conjugated effect of the associations strengths weighted by the valences. Then, our first hypothesis is confirmed. On the one hand, the hold in consideration of the association’s valence, precisely the level-
headedness of the strength’s associations by the respective valences, and the use of all associations (what are strong or weak) on the other hand, conducts to a better model adjustment to the empirical data. This conclusion is verified for the three brands.

The causality paths analyses method permitted us to verify several elements as for the validity of our model. In a first time, and in accordance with the adjustment generally admitted norms (Evrard and al., 2003), we can conclude a good adequacy between the observed data in our sample and the postulated theoretical model.

In a second time, the model test, relation by relation, permitted us to verify the causality relations between the different variables. A major benefit of the causality paths analysis is to be able to test all relations simultaneously. We conducted an ANOVA test that appeared to be significant. On the whole, the 13 causalities relations are significant for each of the 3 brands and each of the 4 brand equity measures to the doorstep of risk of 5%. For the brand equity measure that we recommend, the 13 relations are significant to the doorstep of risk of at least 3% for the 3 brands, what proves the superiority of this measure. We only observe an exception, the relation between brand equity and purchase intention is not well significant for the Lella brand with the measures M1, M2 and M4, but it is significant for the measure M3 that we recommend. It is an indicator of the Lella weakness brand equity.

In last time, not only, we validated the relations existence between the brand equity and its antecedents and between the brand equity and its consequences, but also we validated the explanatory nature of these relations. As for the direct relation existence between the brand equity antecedents and its consequences, they are only partially verified. Thus, the direct relation between familiarity and general attitude is not significant for Bourjois and the familiarity never has an effect on the three brands loyalty. As for the attention, the results prove that it exercises a direct and positive effect on the perception of the general quality. On the other hand, the effect of the attention on the brand loyalty is only validated for the Bourjois brand. As for the familiarity, the results reveal that this one has a direct and positive effect on the purchase intention and a positive effect on the general attitude (safe for Bourjois). On the other hand, the familiarity doesn't have an effect on the brand loyalty intention. Of the way, we confirmed the hypotheses H2-3 and H2-4, but we only confirmed partially the hypothesis H2-5.

Let's note that most studies (Changeur and Dano 1998, Changeur 2001, Korchia 2001, Czellar S. and Dennis J. -E., 2002) confirm the assumptions of Keller (1993, 1998) according to which strength, valence and uniqueness associations strengthen the consumer’s brand equity more that the cohesion, the number or the origin of the associations. It incited the searchers to preserve only the strong, positive and unique associations in their measure models. Our research shows that it agrees to not restrict to the strong and positive associations. When the measure integrates the weak associations and the negative or neutral associations while multiplying strength by the valence, we get a better brand equity measure.

The brand equity considered, by the previous works (Jourdan 2002, Changeur 2001, Yoo and Donthu 2001, Guyon 2005), as latent variable measured through reflective indicators, is measured in the present investigation by a formative index. The proposition of Géraldine Michel (1999) to consider the social representation as a new theoretical setting adapted to the brand study, permits to go back up to the formation sources of this representation in the consumer's mind. More that of the indicators, our model considers the associations as the brand equity components. Precisely, it is the simultaneous effect of strength’s and the valence’s associations...
that permit to measure the brand equity. This is calculated by the sum of the strength multiplies by the valence of the associations attached to the brand.

Of this fact, we place our research of the side of the works of Aaker (1991, 1994) for that the brand equity is defined like "a set of brand assets and liabilities linked to a brand, its name, and symbol that add to or subtract from the value provided by a product or service to a firm and/or to that firm's customers". Therefore, the brand equity can be positive or negative. Consequently, measuring brand equity solely through the strong and positive associations doesn't cover the whole brand value. To this subject, and in relation to the research of Changeur and Dano (1998), a major difference is at the level of their data analysis method limited to the Chi2 test between the associations (association by association and global) and respectively the attitude and the purchase intention. On the other hand, we validated the whole of our causality paths model, containing two brand equity antecedents (attention to the brand and familiarity with the brand) and three consequences (attitude, intention purchase and brand loyalty). All adjustment indicatory to the empiric data proved to be satisfying, confirming the hypothesis of a positive effect of the brand equity and of its antecedents on the attitude, the purchase intention and the brand loyalty, but permit to predict these three variables also. Let's emphasize that this result has been validated for the three retained brands in the present research. Finally, the results of our research corroborate those of Guyon (2005) but contradict those of Yoo and Donthu (2001) that consider the discerned quality (expressing the general attitude) and the brand loyalty as the brand equity antecedents.

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EXAMINING THE DETERMINANTS OF RISK-TAKING IN EUROPEAN BANKS

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Abstract

This study examines the factors that explain the bank risk-taking in the case of European commercial banks. Based on a sample of 31 listed banks, covering the period from 2004 through 2009, we find that the size of the board of directors, the percentage of outside directors, the capital concentration and the franchise value influence positively and significantly on the credit risk. In contrast, the CEO POWER and the level of capital affect significantly and negatively the credit risk.

Keywords: Bank Risk-taking, Credit risk, Bank Governance, Ownership, Board of directors.

JEL Classification: C33, G21, G32, G34.

1. INTRODUCTION

Over the last 20 years, financial system has known a recurrence of financial crises (the Enron financial scandal (2001), WorldCom (2002) and recently the subprime crisis (2007)) due to the weakness of monitoring system in financial institution in particular the banks. Indeed, the banks are the key element of financial system. They are considered the principal source of finance. They play a crucial role in the functioning of economic system. Have an effective system of governance has become a necessity to create value and ensure long-term performance of a bank.

Basel committee has emphasized the importance of corporate governance of banking industry in controlling the bank risk and resolving the agency problems between stakeholders. It encourages banks to enhance their governance system to guarantee the stability of financial system. According to its definition the “Corporate governance involves the manner in which the business and affairs of individual institutions are governed by their board of directors and senior management, which affects how banks set corporate objectives (including generating returns to owners), run day-to-day operations of the business, meet the obligation of accountability to their shareholders and take into account the interests of other recognized stakeholders” (Note 1)

Ensuring sound corporate governance of banks can reinforce the corporate governance of others firms. So that, it is important to have good bank governance in order to reduce the risks and to develop the economy.
Banks have special characteristics that give their system of governance specificity compared to a non-financial company. We cite for example: the balance sheet structure, an opaque and unregulated activity (Levine 2004), deposit insurance (Merton (1977), Demirguc-Kunt and Edward (2002), risk management and capital structure (Macey and O'Hara (2003)).

The bankruptcy of a bank can affect the overall economy due to its various cross-relationships with multiple partners (stakeholders, creditors, government, outside...). This leads to systematic risks pushing the entire system to a global financial crisis. This slump is due mainly to excessive risk-taking by shareholders and bank executives. On the one hand, shareholders exploit the resources collected from creditors mainly depositors to finance risky projects and maximize their wealth. To maintain their confidence, banks have introduced a system of deposit insurance to protect their activities. While this system reduces the risk of bank runs, in return it increases moral hazard in the agency relationship shareholder-depositor. On the other hand, the managers choose investments which behaviors are not observable to prevent shareholders controlling. The latter will bear the cost of poor management, but generally they are unable to handle this situation. This requires government intervention to help banks that have financial difficulties creating a moral hazard further. Thus, strengthening the control of bank risk-taking is necessary to mitigate the moral hazard exists in the relationship of bank.

Our objective is to study the determinants of European bank risk-taking. The relationship between ownership structure, franchise value and the level of capital with the risk has been extensively studied in financial literature. However, the study of the relationship between the board and risk has been the object of only one study, Pathan 2009. Our aim is to deepen this literature and identify factors that explain the risk-taking for the case of listed commercial banks in Europe (15 pays).

The paper is organized as follows. The second section presents the literature review examining the relationship between different factors of governance and risk. The third section presents the methodology adopted to assess this relationship. The regression results and their analysis are discussed in section 4. Finally, Section 5 contains the conclusion.

2. LITERATURE REVIEW

2.1 The relationship between ownership structure and risk

The effectiveness of the control system through the ownership structure implies the presence of two components, namely the ownership concentration and the nature of shareholders, in particular the role of institutional investors.

2.1.1 The impact of ownership concentration on the risk

The presence of large shareholders in banking governance is considered an important mechanism that can influence the bank risk-taking. On the one hand, it can negatively influence the risk. Indeed, to maximize their wealth, the large shareholders are encouraged to review the operations of their businesses. Demsetz (1983), Shleifer and Vishny (1986) and Agrawal and Mandelker (1990) suggest that the capital concentration helps to ensure effective monitoring of managers. On the other hand, the large shareholders are regarded as players of risk. Their presence can positively influence the risk. Empirically, this relationship has been verified by Kim et al (2007) based on a sample of 146 banks for the period 1986-1988.

We assume our first hypothesis:

**Hypothesis 1:** The capital concentration has a positive influence on the credit risk.
2.1.2 The impact of institutional investors on the risk

The institutional shareholders play a crucial role in corporate governance. They have an important capital and privileged access to information about the company allowing them to effectively monitor the management of the firm ((Agrawal and Mandelker (1992), Alexander and Paquerot (2000)). Knopf and Teall (1996) find that the percentage of equity held by institutional investors is negatively and significantly related to risk over the period 1990-1992. Also, Barry et al (2008), based on a sample of 249 European banks for the period 1999-2005, report a significant negative relationship between the proportion of capital held by institutional investors and the risk measured by Z-score. The negative relationship shows the important role of such investors in monitoring managers.

Based in this literature, we formulate our second hypothesis:

**Hypothesis 2:** The presence of institutional investors influences negatively the credit risk.

2.2 The relationship between the board of directors and Risk

The board of directors is the most important organ in the company. It determines the strategies and trends of its activities while ensuring their implementation in a good environment. It specifies the duties and rights of each member. It plays an effective role in bank governance. The financial literature has enormously studied the impact of the board of directors on bank performance (Lipton and Lorsch (1992), Jensen (1993), Busta (2007), Adams and Mehran (2005), Staikouras et al. (2007), Pi and Timme (1993)). However, the relationship between board of directors and the risk has received very limited attention.

The first study was carried out by Pathan (2009) that examined the relationship between the structure of the board and risk-taking based on a sample of 212 bank holding company during 1997-2004. The results of this study argue that there is a significant negative relationship between the size of the board and all the risk measures used: The measures of market risk (total risk, idiosyncratic risk and systematic risk) and hybrid measures (risk of return on assets and the insolvency risk). This implies that when the size increases, the risk diminishes.

Also, the percentage of independent directors can influence bank risk-taking. Independent directors are those who have no family or business relationship with internal members of the company (Pablo et al (2005)). Pathan (2009) reveals that the percentage of independent directors has a negative and significant impact on all risk measures except for the insolvency risk.

The CEOPOWER can also influence banking risk. Pathan (2009) argues that there is a significant negative relationship between the CEOPOWER and total risk, specific risk and insolvency risk but not significant with the systematic risk and the risk of return on assets. Thus, we formulate the following three hypotheses:

**Hypothesis 3:** The size of the board of directors has a negative relationship with the credit risk.

**Hypothesis 4:** The independent directors have a negative relationship with the credit risk.

**Hypothesis 5:** The CEOPOWER has a negative influence on credit risk.

2.3 The relationship between the level of capital and risk

Banks are very risky financial institutions compared to non-financial institutions. This is due to the complexity of their operations and their diversified relations with the external environment. To minimize their exposure to various risks, banks must establish a level of capital sufficient to absorb any losses caused by poor risk management.
The relationship between the level of risk and capital has been empirically verified by a limited number of studies saying two contradictory results. The first group finds a positive relationship between the level of capital and risk. Indeed, Bichsel and Blum (2004) find a positive relationship between changes in capital and risk in a sample of 19 Swiss banks over the period 1990-2002. Similarly, Godlewski (2005) examines the relationship between capital and bank credit risk on a sample of 30 developing countries during the period 1996-2001. This regression was estimated through the simultaneous equation system. He finds a positive influence between capital and risk. Recently, Pathan (2009) finds a significant positive relationship between capital and risk assets return, but not significantly with the total risk and systematic risk.

The second group finds a negative relationship between the level of capital and risk. The study of Bouaiss (2008), based on a sample of banks in the EU-15 over the period 1996 to 2003 showed a negative relationship between the simultaneous level of capital and risk. Also, the empirical validation of Pathan (2009), applied to 1534 observations from 1997-2004, reports a negative and not significant relationship between the capital and the specific risk. This implies that when capital is important, the risk diminishes.

Thus, through an econometric regression, we test the following hypothesis:

Hypothesis 6: The level of capital influences negatively on the credit risk.

2.4 The relationship between Franchise value and risk

Demsetz et al (1997) define the franchise value as "the present value of firm’s future economic as a going concern". It is considered as a growth opportunity that can be negatively influenced when the probability of default increased (Galloway et al (1997)).

Anderson Fraser (2000) reveals that the franchise value, measured by Keeley'Q is negatively related and statistically significant with the risk. This study was realized on 450 observations for the period 1987-1989. In the same frame of reasoning, Konishi and Yasuda (2004) find a significant negative relationship between franchise value and risk. They argue that the negative correlation between these two variables reflects the important role of franchise value in reducing excessive risk taking by commercial banks. However, Pathan (2009) finds a positive and significant relationship between franchise value and all measures of risk unless the risk of insolvency.

Thus, we propose to empirically test the following hypothesis:

Hypothesis 7: Franchise value and risk are inversely related.

2.5 The relationship between the size of the bank and risk

The bank size is an important factor that can affect bank risk-taking. The large banks have a high systematic risk generating a crisis for the entire financial system. This phenomenon is known as "Too big to fail". The amount of their commitments is very high, sometimes requiring the intervention of the State in order to keep the stability of the economy. Also, large banks have a very strong asymmetry of information due to poor coordination among stakeholders. Their activities are more complex and difficult to manage. Marco et al (2008) argue that firms with small sizes are less likely than firms to large sizes. However, small banks can not resist during the financial crisis because their capital is low. In contrast, the large banks are more rigid and more resistant to crises and this is due to the effect of the diversification of their portfolios.

The relationship between the size of the bank and the risk has been less discussed in the banking sector. Indeed, Pathan (2009) studies empirically the relationship between size and risk
on a sample of 212 Bank Holding Company (BHC). He finds that the size of bank influence positively and significantly on systematic risk, but negatively on the total risk, specific risk and the risk of asset returns. On the other hand, the empirical results of Godlewski (2005) and Bouaissi (2008) show a significant negative relationship between risk and the size of the bank measured by the logarithm of total assets: As the size of the firm is greater, the risk is low. Thus, we empirically verify the following hypothesis:

**Hypothesis 8:** There is a negative relationship between bank size and risk.

### 3. METHODOLOGY

#### 3.1 Data source

We constructed a sample of 31 European commercial listed banks during the period 2004-2009. Data are collected from three databases. The first base Fitch IBCA Bankscope, enabled us to collect the Consolidated Balance Sheets (denoted C2) and income statements of banks. For banks with non-consolidated balance sheets, the second type of balance Sheet (consolidated) is collected from their website. The second basis Thomson Financial One Banker ownership was used to collect data on institutional administrators. Finally, the third base DataStream has allowed us to collect market data to calculate the control variable (Tobin’s Q).

#### 3.2 The econometric model

The aim of this paper is to identify factors that explain the risk-taking by commercial banks in Europe. The relationship between these factors and the risk can be represented by the following econometric model:

\[
\text{RISK}_{it} = \beta_0 + \beta_1 \text{Concentration}_{it} + \beta_2 \text{INSTITUTION}_{it} + \beta_3 \text{BS}_{it} + \beta_4 \text{INDIR}_{it} + \beta_5 \text{CEOPOWER}_{it} + \beta_6 \text{CAP}_{it} + \beta_7 \text{CV}_{it} + \beta_8 \text{LNTA}_{it} + \varepsilon_{it} (1)
\]

#### 3.2.1 Dependant variables

Several measures of risk were used in the financial literature. The choice between these measures depends on the characteristics of the sample being studied. Esty (1997) proposed the standard deviation of daily returns of the banks. The ratio of nonperforming loans to total loans was used by Salas and Saurian (2002), Nier and Baumann (2002), Barth et al (2004) and Ganzalez (2005). Covitz et al (2004) estimated the risk by the yield spread of subordinated debt. Volatility of stock returns has been used by Saunders et al (1990) and Esty (1998). The advantage of this measure is that it is based on market data and not accounting data. Saunders et al (1990) argue the effectiveness of this measure for commercial banks. Marco et al (2008) adopted the Value-at-Risk philosophy in order to assess the degree of exposure to the insolvency risk. The disadvantage of this method is that it may bias our sample because the banks consider it differently. Blasko and Sinkey (2006), Laeven and Levine (2009) used the Z-Score as a risk measurement. It measures the degree of stability of banks.

*Z-Score:

The Z-Score measure the insolvency risk. It shows the number of standard deviation of the bank when the profitability of its assets (ROA) falls below its expected value and before its capital decreases (Laeven and Levine (2009)). A Z-Score indicates that the high bank is very stable. Where this risk measure has a high degree of skeweness, one must use its natural logarithm to be normally distributed. (Source: Bankscope).
Where ROA\textsubscript{it} is the Return On Assets of bank I in period t, E\textsubscript{t}(ROA\textsubscript{it}) is the expected value, \( \sigma_{t}(\text{ROA}_{it}) \) indicates the standard deviation and CAR\textsubscript{it} indicates the Capital-Asset-Ratio measured by the ratio of Equity to total assets.

* The ratio of nonperforming loans (RNPL)

The ratio of nonperforming loans (RNPL) is an ex-post measure of credit risk. It is given by Salas and Saurian (2002), Nier and Baumann (2003), Barth et al (2004) and Gonzalez (2005). It is the ratio between non-performing loans to total loans. It measures the degree of credit risk taken by the bank in the past. Source: Bankscope.

* The Loan Loss Provisions (RLLP)

The ratio of Loan Loss Provisions is measured by Loan Loss Provisions to total loans. It represents the value of reserves set up by banks in case of loss to cover the new non-performing loans (Miller and Noul (1997), Nier and Baumann (2003), Staikouras et al (2007), Source: Bankscope.

3.2.2 Independent variables

- The Capital Concentration

We measure the capital concentration by the percentage of large Shareholders used by Shleifer and Vishny (1986). Large shareholders are those who have the higher percentage of capital. (Source: Annual report of banks (ownership structure)).

- The presence of institutional investors

The presence of institutional investors is measured by the percentage of capital held by these investors adopted by Knopf and Teall (1996), Agrawal and Mandelker (1992). Source: Thomson Financial.

- The Board Size

The size of the board of directors is measured by the total number of directors on the board at the end of each financial year. This measure was used by Pearce and Zahra (1992), Goodstein et al (1994), Yermack (1996), Pablo et al (2005). (Source: Annual reports of banks).

- The percentage of independent directors

Independent directors are considered administrators who have no family ties, business or shareholder with the company (Pablo et al (2005)). They are regarded as non-executive directors and have no particular interest with business partners. (Source: Annual reports of banks).

- The CEO POWER

The Chief Executive Officer (CEO) power is a dummy variable that takes the value 1 if the chairman holds the same position as CEO, 0 if not. (Pi and Timme (1993), Pathan (2009)). (Source: Annual reports of banks).
- The level of the capital

The level of the capital is measured by the ratio between equity and total assets (Nier and Baumann (2003), Godlowski (2005), Pathan (2009)). Source: Bankscope.

3.3 Control variables

- **Charter Value**: It is measured by Tobin’s Q used by Anderson and Fraser (2000) and Konishi and Yasuda (2004). (Source: Datastream).

\[
\text{Tobin’s Q} = \frac{\text{Market Value of equity} + \text{the book value of liabilities}}{\text{Book value of assets}}
\]

- **The size of the bank**: It is measured by the natural logarithm of the book value of total assets (LNTA) at the end of each year (Godlewski (2005)). Source: (Bankscope).

4. EMPIRICAL RESULTS

4.1 Descriptive analysis

Table 1 presents the descriptive statistics of the various factors that influence bank risk-taking. These factors are represented by the capital concentration, the presence of institutional investors, the percentage of independent directors, the size of the board, the CEO POWER, franchise value, capital level and the size of the bank. Credit risk is measured by three ratios: Ratio of loan loss provision, non-performing loan ratio and the insolvency risk.

The observation of Table 1 shows that the ratio of insolvency as measured by Z-score reveals an average equal to 0.023 less than that reported by Marco et al (2008) (0.042). The ratio of nonperforming loans has an average of 0.017 (median 0.012). Finally, the ratio of loan loss provision reported an average equal to 0.006 well below that of Nier and Baumann (2003) (0.012) and Staikouras et al (2007) (0.67).

The structure of the board shows that its size is on average equal to 15 members with a maximum of 33 members and a minimum of 6 members. It is superior to that reported by Pathan (2009) (an average of 12 members). The average percentage of outside directors is 59.09% (median 60%).

At it concerns the ownership structure of banks, we find that the capital concentration tells us an average of 49.455% and a median of 50%. The percentage of institutional directors on average equal to 49.79% (median 48.09%), much higher than revealed by Barry et al (2008) (average 7.81%).

Table 1 also reveals that the capital has an average equal to 6.062% (median 5.575%) significantly lower than the average reported by Nier and Baumann (2003) (10.45%) and Pathan (2009) (9.26%). The franchise value has an average value of 1.101 (median 1.029), it is equal to that found by Pathan (2009) (average 1.1) and higher than the average found by Anderson (2000) (1.008) median (1.007). For the size of the bank, it has an average equal to 10.960, median (11.133), lower than that found by Godlowski (2005), 13, 36 average (median 13.14).

Table 2 presents the correlation matrix between variables. There are a significant positive correlation between institutional investors and concentration (0.521). Also, we observe a
significant negative correlation between the logarithm of total assets and the level of the capital (-0.637). To drop one of these variables is necessary to avoid possible multicollinearity.

4.2 Regression analysis

Table 3 presents the linear regression of an unbalanced panel (model (1)) to examine the impact of internal mechanisms of governance, franchise value, capital and size on the credit risk measured by three ratios: The insolvency risk (Zscore), the ratio of nonperforming loans (RNPLS) and the ratio of Loan Loss Provisions (RLLP). The regression of the first two measures of risk with the independent variables is a fixed effect regression estimated by Ordinary Least Squares method transform (Least Squares Dummy Variable). While the regression of RLLP was estimated by the Cross Section Generalized Least Squares (GLS).

The empirical regression of the model (1), shown in Table 3, reveals the existence of a positive and significant relationship at 1% between the capital concentration and the insolvency risk. This result confirms that reported by Kim et al (2007). The positive relationship implies that when the capital concentration increases, the credit risk increases. The large shareholders are encouraged to take excessive risk in order to increase their wealth. We also observe a negative and not significant relationship between the capital concentration and the risk of non-performing loans, but positively with the ratio of loan loss provisions.

On the other hand, the percentage of institutional directors is negatively related but not significant with the ratio of nonperforming loans (RNPLS). Knopf and Teal (1996) and Barry et al (2008) have also found the same result. However, it is positive and not significantly with other measures of risk.

The composition of the Board of Directors has also influenced bank risk-taking. Contrary to Pathan (2009), the size of the board of directors reveals a positive and significant influence on the risk of insolvency at the 5%. Our result implies that when the number of directors increases, the risk increases. This can be explained by the poor coordination of views of different members of the board of directors. We also found a negative but not significant relationship between the board size and the ratio of loan loss provisions. However, it is positive and not significant with the ratio of nonperforming loans. At it concerns the second component of the board of directors, the relationship between the percentage of outside directors and the risk is positive and significant with RLLP but not significant with Z-score and RNPLS. Our results do not corroborate those found by Pathan (2009).

We also observe that the CEOPOWER has a negative and significant impact on the credit risk measured by the ratio of nonperforming loans, but not significantly with other measures of risk. Pathan (2009) found similar results. Thus, the occupation of the CEO in the same position as Chairman of the Board of Directors to better control the banking business and reduce risk. Table 3 also reveals a positive and statistically significant relationship between franchise value and the ratio of loan loss provisions but not significantly with the Z-score and the ratio of nonperforming loans. This implies that when the franchise value is high, the credit risk increases. This result does not corroborate those reported by Anderson and Fraser (2000) and Konishi and Yasuda (2004).
We also note that capital influence negatively and significantly on the Z-score at 1% and the ratio of loan loss provisions at 10% but positively on the ratio of nonperforming loans. The same result was presented by Bouaissi (2008) and Pathan (2009).

Finally, we consider a negative impact but not significant between the size of the bank and the ratio of loan loss provisions but positive on the other measures of risk. Godlewski (2005) find a significant negative relationship between the size of the bank and risk. This negative relationship contradicts the phenomenon "Too big to fail". The large banks have significant capacity to manage their risk through diversification effect.

5. CONCLUSION

The purpose of this article is to examine the relationship between risk and some quantifiable factors that may affect bank risk-taking through a review of theoretical and empirical finance literature. Based on a sample of 31 commercial banks in Europe (15 pays) during the period 2004-2009, we conclude that our overall results corroborate those reported by financial literature.

The first hypothesis examining the relationship between the capital concentration and the risk has been validated in our sample only to the insolvency risk. This implies that the presence of large shareholders increases the risk. They take more risk in order to maximize their profit. The second hypothesis examining the relationship between the percentage of institutional investors and the risk has been validated only with the ratio of nonperforming loans but not significant. The board size and the percentage of independent directors have a positive and significant influence respectively on the insolvency risk and the ratio of loan loss provisions. The fifth hypothesis stating the existence of a negative relationship between CEOPOWER and the risk has been checked with all measures of risk. The franchise value influence positively and significantly on the ratio of loan loss provisions. The seventh hypothesis (capital/risk) has been verified only with the insolvency risk revealing a negative and significant relationship at 1%. For the size of the bank, we find controversies effects.

Thus, factors that mitigate the excessive risk-taking for the case of our sample are the CEOPOWER and the level of capital. Banks must review their ownership structure, in particular the capital concentration and the composition of their boards in order to protect the continuity of their activities.

In conclusion, the main objective of our study is to integrate the structure of the board as a determinant of Risk-taking with the ownership structure and franchise value that has been extensively discussed in financial literature. Like all research, our study has some limitations related mainly to the low number of observations. This is due to the unavailability of information on the nonperforming loans, the loan loss provisions and the structure of the board for all European banks.

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**NOTE:**


**Table 1: Descriptive Statistics (2004-2009)**

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<tr>
<td>RNPLS</td>
<td>0.017</td>
<td>0.012</td>
<td>0.280</td>
<td>-0.015</td>
<td>0.031</td>
<td>4.445</td>
<td>35,385</td>
<td>160</td>
</tr>
<tr>
<td>RLLP</td>
<td>0.006</td>
<td>0.005</td>
<td>0.052</td>
<td>-0.011</td>
<td>0.007</td>
<td>2.330</td>
<td>13,544</td>
<td>185</td>
</tr>
<tr>
<td>INDIR (%)</td>
<td>59.091</td>
<td>60.000</td>
<td>100.000</td>
<td>0.000</td>
<td>20.090</td>
<td>-0.567</td>
<td>3.419</td>
<td>186</td>
</tr>
<tr>
<td>BS</td>
<td>15,118</td>
<td>14,000</td>
<td>33,000</td>
<td>6,000</td>
<td>5,625</td>
<td>1.232</td>
<td>4,013</td>
<td>186</td>
</tr>
<tr>
<td>INSTITUT (%)</td>
<td>49,792</td>
<td>48,090</td>
<td>98,650</td>
<td>0.000</td>
<td>26,164</td>
<td>0.023</td>
<td>1,999</td>
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<tr>
<td>Concentration (%)</td>
<td>49,455</td>
<td>50,000</td>
<td>99,000</td>
<td>0.170</td>
<td>25,268</td>
<td>-0.288</td>
<td>2.071</td>
<td>186</td>
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<tr>
<td>CAP (%)</td>
<td>6,062</td>
<td>5,575</td>
<td>20,820</td>
<td>-1,860</td>
<td>3,504</td>
<td>2,072</td>
<td>8,799</td>
<td>186</td>
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<tr>
<td>LNTA</td>
<td>10,960</td>
<td>11,133</td>
<td>15,081</td>
<td>6,232</td>
<td>2,098</td>
<td>-0.278</td>
<td>2,652</td>
<td>186</td>
</tr>
<tr>
<td>CV</td>
<td>1,101</td>
<td>1,029</td>
<td>11,342</td>
<td>0.106</td>
<td>0.768</td>
<td>12,868</td>
<td>171,899</td>
<td>186</td>
</tr>
</tbody>
</table>

Source: Annual Reports of Banks (for the structure of board of directors and the capital concentration), Thomson Financial (for the institutional investors), Datastream (Charter Value) and Fitch-IBCA Bankscope (for the other variables).

**ZSCORE**: Insolvency Risk. **RNPLS**: Ratio of nonperforming loans. **RLLP**: Ratio of loan loss provisions. **INDIR**: The percentage of total directors who are independents. **BS**: Board Size. **INSTITUT**: the percentage of capital held by the institutional investors. **Concentration**: Capital concentration. **CAP**: Level of the capital (Equities/total assets). **LNTA**: The size of the bank (Log (Total assets)). **CV**: Charter Value ((Book Value of liabilities + Market Value of Equities)/Book Value of total assets).

**Table 2: Correlation Matrix (2004-2009)**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<td>Z-SCORE</td>
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<tr>
<td>RNPLS</td>
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<td>1.000</td>
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<tr>
<td>RLLP</td>
<td>0.175</td>
<td>0.313</td>
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</tr>
<tr>
<td>BS</td>
<td>0.071</td>
<td>0.085</td>
<td>0.031</td>
<td>1.000</td>
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<td></td>
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</tr>
<tr>
<td>INDIR</td>
<td>0.070</td>
<td>0.042</td>
<td>0.249</td>
<td>-0.152</td>
<td>1.000</td>
<td></td>
<td></td>
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<tr>
<td>CEOPOWER</td>
<td>-0.001</td>
<td>-0.012</td>
<td>-0.050</td>
<td>-0.050</td>
<td>0.056</td>
<td>1.000</td>
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<tr>
<td>Concentration</td>
<td>0.120</td>
<td>0.374</td>
<td>0.051</td>
<td>0.226</td>
<td>-0.218</td>
<td>0.241</td>
<td>1.000</td>
<td></td>
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Table 3: Regression results

Fixed effect (FE) regression results of bank risk (Zscore and RNPLS)

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Z-score (fixed effect)</th>
<th>RNPLS (fixed effect)</th>
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<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>T-ratio</td>
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<tr>
<td>Constant</td>
<td>-0.3682918</td>
<td>-0.78</td>
</tr>
<tr>
<td>BS</td>
<td>0.0134745***</td>
<td>2.03</td>
</tr>
<tr>
<td>INDIR</td>
<td>0.0010458</td>
<td>0.67</td>
</tr>
<tr>
<td>CEOPOWER</td>
<td>-0.1146821</td>
<td>-1.42</td>
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<tr>
<td>Concentration</td>
<td>0.005644***</td>
<td>3.04</td>
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<tr>
<td>INSTITUT</td>
<td>0.0004689</td>
<td>0.38</td>
</tr>
<tr>
<td>CAP</td>
<td>-0.0504248***</td>
<td>-3.70</td>
</tr>
<tr>
<td>LNTA</td>
<td>0.0133791</td>
<td>0.34</td>
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<tr>
<td>CV</td>
<td>0.0055738</td>
<td>0.30</td>
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<tr>
<td></td>
<td>Number of observation</td>
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<tr>
<td></td>
<td>F-stat</td>
<td>4.09</td>
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<tr>
<td></td>
<td>R²-adj</td>
<td>0.4100</td>
</tr>
</tbody>
</table>

See legend of table 1. ***, **, * indicate parameter significance at the 1, 5 and 10% significance levels, respectively.

Cross section GLS regression results of RLLP

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>RLLP (GLS)</th>
</tr>
</thead>
<tbody>
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<td></td>
<td>Coefficient</td>
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<tr>
<td>Constant</td>
<td>0.0024548</td>
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<td>BS</td>
<td>-0.0000117</td>
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<tr>
<td>INDIR</td>
<td>0.0000934***</td>
</tr>
<tr>
<td>CEOPOWER</td>
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</tr>
<tr>
<td>Concentration</td>
<td>0.0000288</td>
</tr>
<tr>
<td>INSTITUT</td>
<td>0.0000109</td>
</tr>
<tr>
<td>CAP</td>
<td>-0.0003309*</td>
</tr>
<tr>
<td>LNTA</td>
<td>-0.0002988</td>
</tr>
<tr>
<td>CV</td>
<td>0.0013473**</td>
</tr>
<tr>
<td></td>
<td>Number of observation</td>
</tr>
<tr>
<td></td>
<td>Wald chi2(8)</td>
</tr>
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</table>

See legend of table 1. ***, **, * indicate parameter significance at the 1, 5 and 10% significance levels, respectively.
## Appendix

**Table A: Name of Banks in samples**

<table>
<thead>
<tr>
<th>France</th>
<th>Spain</th>
<th>Greece</th>
<th>Ireland</th>
<th>Germany</th>
<th>Sweden</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Banque de la Réunion</td>
<td>BNP Paribas</td>
<td>Agriculture of</td>
<td>Allied Irish</td>
<td>Alpha Banks</td>
<td>EFG</td>
<td>Banca IFIS</td>
</tr>
<tr>
<td>(France)</td>
<td>Boursorama</td>
<td>Greece</td>
<td>(Ireland)</td>
<td>(Greece)</td>
<td>(Greece)</td>
<td>(Italy)</td>
</tr>
<tr>
<td>Banque Crédit Foncier</td>
<td>Boursorama</td>
<td>Agric.</td>
<td>Banca IFIS</td>
<td>Banca IFIS</td>
<td>EFG</td>
<td>JSKE</td>
</tr>
<tr>
<td>et Communal d’Alsace</td>
<td>(France)</td>
<td>Life</td>
<td>(Italy)</td>
<td>(Italy)</td>
<td>(Denmark)</td>
<td>(Denmark)</td>
</tr>
<tr>
<td>Banque Crédit Industriel</td>
<td>(France)</td>
<td>Allied Irish</td>
<td>Banca IFIS</td>
<td>Banca IFIS</td>
<td>EFG</td>
<td>(Denmark)</td>
</tr>
<tr>
<td>Commercial</td>
<td>Natixis</td>
<td>Life</td>
<td>(Italy)</td>
<td>Banca IFIS</td>
<td>EFG</td>
<td>(Denmark)</td>
</tr>
<tr>
<td>(France)</td>
<td>Société Générale</td>
<td>(Ireland)</td>
<td>Banco Popular</td>
<td>Banco Pastor</td>
<td>EFG</td>
<td>(Denmark)</td>
</tr>
<tr>
<td>Banque Crédit</td>
<td>Tarneaud</td>
<td>(Ireland)</td>
<td>(Spain)</td>
<td>(Spain)</td>
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<td>(Denmark)</td>
</tr>
<tr>
<td>Industriel Commercial</td>
<td>Banco Guipuzco</td>
<td>(Ireland)</td>
<td>Banco Popular</td>
<td>(Spain)</td>
<td>(Ireland)</td>
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<tr>
<td>(France)</td>
<td>Bankinr SA</td>
<td>(Ireland)</td>
<td>(Spain)</td>
<td>(Spain)</td>
<td>(Ireland)</td>
<td>(Denmark)</td>
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<tr>
<td>EFG (France)</td>
<td>Irish Life</td>
<td>(Ireland)</td>
<td>Banco Espirito</td>
<td>(Portugal)</td>
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<td>Irish Life</td>
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<td>(Portugal)</td>
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<td>(Ireland)</td>
<td>(Denmark)</td>
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<tr>
<td>Landes bank</td>
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<td>(Portugal)</td>
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<td>(Ireland)</td>
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<tr>
<td>(Germany)</td>
<td>(Spain)</td>
<td>(Ireland)</td>
<td>Banksabadell</td>
<td>(Spain)</td>
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<td>(Denmark)</td>
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<tr>
<td>Piraeus (Greek)</td>
<td>(Spain)</td>
<td>(Ireland)</td>
<td>Danskebank</td>
<td>(Spain)</td>
<td>(Ireland)</td>
<td>(Denmark)</td>
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<td>Sevenska (Sweden)</td>
<td>(Spain)</td>
<td>(Ireland)</td>
<td>Emporiki</td>
<td>(Denmark)</td>
<td>(Ireland)</td>
<td>(Denmark)</td>
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<td>(Ireland)</td>
<td>(Denmark)</td>
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<tr>
<td></td>
<td>(Spain)</td>
<td>(Ireland)</td>
<td>Nationam Bank</td>
<td>(Denmark)</td>
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<tr>
<td></td>
<td>(Spain)</td>
<td>(Ireland)</td>
<td>Sydbank</td>
<td>(Denmark)</td>
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</table>
MARKET PERCEPTION OF THE INFORMATION CONTENT IN BOOK - TAX DIFFERENCES : EMPIRICAL EVIDENCE IN TUNISIA

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OMRI Mohamed Ali²

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Abstract
The purpose of this study is to investigate whether the information impounded in book-tax differences provide information about firm’s future earnings and equity value in Tunisian context. Otherwise, this study attempts to examine the implication of book-tax differences to earnings quality. To determine which information contributes to the valuation of book-tax differences, we decompose book-tax differences into its two components: discretionary and non discretionary items. Non discretionary book-tax differences are related to regulatory differences between accounting rules and tax laws; whereas, discretionary differences reflect management’s opportunistic choices in reporting accounting earnings and taxable income, i.e. accounting and tax management practices. Applying a Tang and Firth (2008) methodology, we hypothesise that book-tax differences contain information about future earnings and stock returns. Using a sample of 131 firm-year observations corresponding to the period ranging from 2003 to 2009, our results show that book-tax differences is value relevant in terms of predicting future performance; however there is week evidence regarding the valuation role of book-tax differences in terms of predicting stock returns.

Key Words: Book-tax differences, earnings quality, value relevance, future earnings, stock returns
1. INTRODUCTION

During these last decades, the question of the differences between book income and taxable income, arisen on the front of the scene of the international actuality, has drawn the attention of several researchers and analysts. In fact, in the wake of the emergence of the several cases of resounding bankruptcies (Enron\(^1\), Worldcom…), the quality of accounting information has been affected and the confidence of investors using this information has been weakened. While assigning these cases of scandals to the aggressive earnings management, tax management and tax sheltering practices, researchers and several practitioners in accounting recalled the importance of a qualitative appreciation of financial reporting earnings. Since then, more transparency concerning the differences between book income and taxable income (i.e. book-tax differences) has been required (Hanlon, 2005).

In the literature, several researchers draw attention to the differences between book income and taxable income. They focused on the sources of these differences, on the one hand (Mills and Newberry, 2001; Philips et al. 2003; Joos et al. 2003, Philips et al. 2004, Manzon and Plesko, 2002; Desai and Dharmapala, 2006; 2009a; 2009b; Tang and Firth, 2010; Frank et al. 2009; Wilson, 2009; Seidman, 2010), and on the quality of the information content in book-tax differences, on the other hand (Guenther and Saising 2000; Amir et al. 1997; Givoly and Hayn 1992; Beaver and Dukes 1972; Barragato and Weiden 2004; Chaney and Jeter 1994; Joos et al. 2000; Lev and Nissim, 2004; Hanlon, 2005; Jackson, 2009; Tang and Firth, 2008).

Some researchers argue that only the institutional arrangements explain book-tax differences (Porcano and Tran, 1998; Lamb, 1996). Other studies consider that book-tax differences are bound to either earnings management (Mills and Newberry, 2001; Philips et al. 2003; Joos et al. 2003) or tax management behaviours (Frank et al. 2009; Wilson, 2009). Desai and Dharmapala (2006) assume that both earnings management and tax management explain these differences. Tang and Firth (2010) and Shakelford et al. (2007) consider that book – tax difference is explained by both the regulatory differences and the opportunistic managerial behaviour related to earnings and tax management practices.

Recently several researches examine the association between book-tax differences and earnings quality. Hanlon and Krishnan (2006) test auditors’ use of the information content in book-tax differences when setting audit fees. They find that large book-tax differences are associated with higher audit fees, consistent with book-tax differences reflecting information about earnings quality and auditors’ assessment of the risk associated with auditing these statements. Dhalwal et al. (2008), examining variability of book-tax differences, find that this variability is positively associated with cost of capital. The authors suggest that variability of book-tax differences reflects information about the firm's underlying economic volatility and on uncertainty about information quality, interpreting this as the results of the discretionary managerial practices.

In an attempt to extend prior value relevance’s literature (Lev and Nissim, 2004; Hanlon, 2005; Jackson, 2009) and in light of the value relevance related studies and the efficient market hypothesis, Tang and Firth (2008) examine the implication the of book-tax differences to the market perception of the tax and financial information.

In Tunisia, in the early 2000s, the quality of accounting information has been questioned after the several cases of bankruptcies of which the affair of the company Batam that caused a

\(^{1}\) Note 1
decrease of portfolio value for small investors (Ben Ayed and Abaoub, 2006). The Tunisian context is characterized by an accounting system offering several discretionary ways in the choice of accounting methods, and by a supple tax legislation offering abundant tax incentives and allowing large latitude in terms of tax management practices. Moreover, in Tunisia, accounting regulation is independent from the tax regulation. They serve very different purposes, determining current year tax liability on the one hand, and providing a particular informational input to investors on the other. Although Tunisian accounting rules and tax system are autonomous, they have a common field. The determination of taxable income relies on the book income; and ideally there are differences between the two measures, taxable income and financial accounting income.

On the other hand, value relevance research in Tunisia focused on accounting variables (Ben Flah and Omri, 2010; Baccouche and Bakini, 2007; Ben Naceur and Nachi, 2006; Ben Ayed and Abaoub, 2006) and has never been interested by tax information. Moreover, as book – tax differences have been documented to be a useful indicator of earnings and tax management practices; the data availability of book – tax differences in Tunisia is particularly advantageous, providing thus possibilities and opportunities to empirically investigate the role of these differences in capital markets.

We focus in this paper on the information content of book-tax differences in Tunisian context. Particularly, this paper tests the valuation role of book-tax differences in terms of earnings quality. We investigate how book-tax differences provide information about firms’ performance and future earnings. This research considers book-tax differences as value-relevant because it provides information about the quality of accounting and financial information. In fact, book-tax differences provide too types of information. The first is linked to the divergence between book and tax reporting rules. The second reflects opportunistic information caused by earnings and tax management practices.

Applying a Tang and Firth (2010) methodology, we decompose the book-tax differences into discretionary component or opportunistic information, caused by earnings and tax management practices, and non discretionary component or mechanical information, explained by the discrepancy between accounting rules and tax laws. When examining the valuation role of book-tax difference, Tang and Firth (2008) find that the decomposition of book-tax difference to discretionary and non discretionary components provides incremental information to the market. They observe a negative association between discretionary book-tax differences and future earnings suggesting that larger discretionary book-tax differences indicate low earnings quality. Moreover, they suggest that the negative association between non discretionary book-tax differences and future earnings indicates that differences between accounting regulation and tax laws increase the transitory components of current earnings and cash flows, leading hence to less persistent current earnings. Further, Tang and Firth (2008) conclude that the predictability of non discretionary book-tax differences is stronger, and the predictability of discretionary book-tax differences is weaker than that of earnings per share (EPS) suggesting that the information conveyed by the non discretionary component is much richer than that conveyed by EPS; and the weak predictability of the discretionary component may be because the information content about the noise in reported earnings is less than that of the earnings themselves. On the other hand, Tang and Firth (2008) find that large discretionary and non discretionary book-tax differences produce a lower stock price reaction.
Using the data from Tunisian listed firms, we based our study on a sample of 131 firms-year observations over the period 2003-2009. In our analysis, we adopt the book-tax differences’ decomposition of Tang and Firth (2010) because these differences discriminate between non-discretionary component and discretionary difference which could be a signal of both earnings management and tax management. We hypothesize that book-tax difference is negatively related to one-year-ahead earnings, and to stock returns suggesting that the information in these difference is useful for predicting firms’ future performance and explaining stock returns. Within this framework of analysis, we developed linear regression models to test the validity of our assumptions. First of all, we estimate discretionary book-tax difference (DIS-BTD) and non-discretionary book-tax difference (NDIS-BTD). Then, we examine the usefulness of both DIS-BTD and NDIS-BTD in predicting future earnings and stock returns.

This paper contributes to existing research in several ways. First, it extends prior literature as regard the value relevance research in Tunisia. Second, it is the first study regarding the valuation role of book-tax differences in Tunisia. Finally, it tempts to examine the implication of the tax information implemented in the financial statements for earnings quality in terms of assessing firm’s future performance and explaining stock returns.

Existing research suggests the tax information contained in the financial statements provides information about earnings quality. Our study will highlight explanation to the information content in book-tax differences in Tunisia and thus will contribute to investors’ understandings and assessing of the quality of information published by Tunisian listed firms.

The remainder of the paper is organized as follows. Section 2 presents the research background and reviews previous research on the value relevance of book-tax differences. Section 3 describes the institutional context in Tunisia and provides discussion regarding the value relevance research in Tunisian context. Section 4 outlines the hypotheses. Section 5 specifies the research design including variable definitions. Section 6 describes the sample selection, summary statistics and empirical results. The last section concludes the paper.

2. The value relevance research under the efficient market hypothesis: Related Research

In the literature, Barth and al. (2001) and Beaver (1998) consider an accounting variable as value relevant if it reflects information that could be useful by investors in assessing firms’ equity, else if it reveals the predicted association with a measure of equity market value. Penman (2001) defines a variable as value relevant if it is able to predict its future value. Lev and Thiagarajan (1993) and Abarbanell and Bushee (1997) defines value relevance otherwise, they regard a variable as value relevant if it is informative for evaluating firms’ performance and assessing future earnings, and when if this information is reflected in stock prices.

The efficient market hypothesis suggests that accounting data influences the evaluation of firms’ performance, i.e. future earnings or future cash flows, and could be correlated with stock prices. Indeed, according to this theory, stock prices are defined as the present value of expected future dividends, and future dividend-paying ability is determined by future performance, i.e. future earnings or future cash flows; besides, future performance is predicted by current or historical accounting data (Core, Guay and Buskirk, 2003; Kothari et Shanken, 2003).

Following this predictive link, prior value relevance researches provide evidence that accounting data are value relevant suggesting that current earnings are a significant predictor of future
earnings. (Finger 1994; Ball and Watts 1972; Collins and Kothari, 1989; Easton and Harris, 1991; Alford et al. 1993; Kothari and Zimmerman, 1995).

Recently, several studies have established a link between the information impounded in book-tax differences, which is associated with earnings quality, and the market’s earnings and earnings expectations (Tang and Firth, 2008; Chaney and Jeter 1994; Joos et al. 2000; Hanlon 2005); other researchers assert that this information is value relevant (Guenther and Sansing 2000; Amir et al. 1997; Givoly and Hayn 1992; Beaver and Dukes 1972; Barragato and Weiden 2004).

Indeed, Joos et al. (2000) find that firms with large book-tax differences, as measured by deferred taxes, have weaker earnings-returns relations. Mills and Newberry (2001) find that book-tax differences are positively associated with earnings management’s related variables.


Most of those studies examine the implication of book-tax differences for earnings quality and stock returns but they do not separate all components of book-tax differences\(^3\), even they do not investigate the implication of each component for firm’s performance and equity value.

Lev and Nissim (2004) extend prior literature by investigating the ability of the ranked ratio of taxable income to book income to predict earnings growth and stock returns. The authors find that the ratio of tax to book income is positively associated with future earnings growth. Mainly, the authors highlight the information provided by this ratio, asserting that this ranked ratio is informative about earnings quality, on the one hand, and about differences between accounting rules (GAAP) and the tax code on the other hand\(^4\). However, and while Hanlon (2005) find that firms with large temporary book-tax differences, earnings are less persistent, Lev and Nissim (2004) find that the ranked ratio of deferred tax expense to assets (a proxy for temporary differences) do not inform about future performance.

On the other hand, and consistent with expectations, Tang and Firth (2008) find that book-tax difference is value relevant. Tang and Firth (2008) argue that the mechanical information related to the differences between accounting and tax rules, i.e. the non discretionary component of book-tax differences, may reveal some transitory earnings components, which could help predicting firms’ future tax-related cash flows and future earnings; however, and as regard to the opportunistic information related to the discretionary differences resulting from earnings and tax management practices, it may reflect the distortions in reported earnings and cash flows, thereby affecting the investors’ estimation and the forecast of a firms’ future profitability. Moreover, Tang and Firth (2008) recommend that the predictability of non discretionary book-tax differences is stronger, and discretionary difference is weaker than that of earnings per share.
The authors conclude that the information content about the noise in reported earnings is less than that of the earnings themselves since the weak predictability of discretionary book-tax difference relative to earnings per share.

3. The Value relevance Research and the book-tax differences in Tunisia: Institutional Background and Related Research

3.1. The value relevance research in Tunisia

Tunisian research in value relevance is still in its initial stages. Recently, some studies have demonstrated that accounting information is value relevant (Ben Flah and Omri, 2010; Ben Naceur and Nachi, 2006; Baccouche and Bakini, 2007; Ben Ayed and Abaoub, 2006). Ben Flah and Omri (2010) conclude that the value relevance of the accounting data is conditioned by some characteristics, peculiar to the company, of which growth opportunities. The authors suggest and find that growth opportunities are negatively associated with the value relevance of earnings; moreover, growth opportunities favour the relevance of the book value to the detriment of the earnings. Baccouche and Bakini (2007) examine the valuation role of accounting data on a simple of Tunisian listed firms. They find a positive and significant association between financial statement items, such as debt, property plant and equipment, earnings, equity and stock returns. Ben Ayed and Abaoub (2006) assert that some accounting earnings, of which operating income, income before taxes, special items and income taxes are value relevant for firm valuation and, that cash flow from operations and accruals are not value relevant. While examining the impact of the 1997 accounting reform on the value relevance of financial information in Tunisian listed firms, Ben Naceur and Nachi (2006) find that earnings, cash flows and book values are positively and significantly associated to security prices and that this positive relation has significantly improved after the 1997 accounting reform.

3.2. Institutional Background and the book-tax differences in Tunisia

Until 1968, the Tunisian accounting regulations and practices were governed by a French-style oriented accounting system. Since this time, accounting regulation was strongly connected with tax law. Indeed, in a continental context, where we borrow a lot to the French culture, the accounting Tunisian system looked like the French model. However, after the financial and environment evolution and the different mutations occurred in Tunisia, when the country engaged in economic reforms aimed at introducing market instruments in the 1990’s, this system became unfit5. Thereafter, in the framework of its economic and financial reforms, and following the emerging of the 96-112 law in December 1996, a new accounting system was introduced. This accounting system was based on its own regulation which is independent from the tax law but coexists with this last6. To have a system consistent with international style, the new accounting standards were implemented by adopting norms complying with those of the IASC. Since then, the new Tunisian accounting system import to the Anglo-Saxon model, where accounting and tax are two different branches; they serve different objectives. Indeed, the new framework aims to promote interests of investors. Moreover, and according to Ben Naceur and Nachi (2006) “Tunisian’s committee on accounting principles made the assumption that, in the future, the Tunisian companies would call money more and more upon market, they would be increasingly international, and it made possible to them to use the financial statements required by the market”. On the other, and when accounting regulation aims to provide financial

5 Note 5
6 Note 6
information to investors, tax law’s objective is to determine tax liabilities, and to provide information to tax authorities. Otherwise, taxable income is determined through book income, while conducting some adjustments (i.e. reinstatements and deductions). Subsequently, Tunisian book-tax differences emerged when the Tunisian accounting system and Tunisian tax law changed from dependent systems to independent systems (non-conforming), giving rise to much institutional or non discretionary book-tax differences.

Moreover, in Tunisia, both tax and accounting systems afford managers flexibility and discretion in the choice of accounting and tax methods, giving rise to discretionary book-tax differences, related directly to opportunistic accounting and tax management practices. Indeed, prior literature has demonstrated that discretionary book-tax differences ensue from opportunistic managerial behaviours in terms of making accounting and tax choices (Tang and Firth, 2010; Desai and Darmaphala, 2006).

4. The value relevance of book-tax differences: Hypotheses development

In the value relevance research, growing body of literature has investigated the implication of book-tax differences to earnings quality. Researchers assert that the information content in book-tax differences is value relevant (Lev and Nissim, 2004; Amir et al. 1997; Beaver and Dukes 1972; Joos et al. 2000; Hanlon 2005; Tang and Firth, 2008).


Lev and Nissim (2004) find that the ratio of tax to book income, being the proxy of the book-tax differences, is positively associated with future earnings growth. The authors conclude that this ranked ratio is informative about earnings quality.

Tang and Firth (2008) investigate the implication of book-tax differences to the market perception of the tax and financial information. They find that book-tax difference is value relevant. Tang and Firth (2008) argue that book-tax differences may reveal some transitory earnings components; it may reflect also the distortions in reported earnings and cash flows, affecting, hence, the investors’ estimation of firms’ future performance and equity value. Moreover, Tang and Firth (2008) confirm that the predictability book-tax difference is stronger than that of earnings per share.

In this research, we hypothesise that book-tax differences are value relevant in terms of predicting firm’s future performance and stock returns in Tunisian context. Based on the results of previous studies (Tang and Firth, 2008; Lev and Nissim, 2004; Hanlon, 2005), we propose the hypotheses as follows:

Hypothesis 1a: book-tax differences are value relevant in predicting firms’ future performance

Hypothesis 1b: book-tax differences are negatively related to stock returns

Hypothesis 1c: book-tax differences have additional information content beyond earnings per share
While prior literature examines the implication of book-tax differences for earnings quality and equity value, researchers were not interested in the valuation role of the discretionary and non discretionary items composing book-tax differences. Some researchers identify three components of total book-tax differences: temporary differences, permanent differences and tax accruals, and examine the implication of both these components and total book-tax differences to earnings quality, but empirical results are mixed (Jackson, 2009; Hanlon, 2005; Lev and Nissim, 2004; Joos et al. 2000).

In an attempt to fill in this gap, Tang and Firth (2008) discriminate between mechanical differences (i.e. non discretionary book-tax differences) and abnormal differences (i.e. discretionary book-tax differences), and examine the impact of each component on firms’ future performance and equity value.

In this paper, we identify two components of book-tax differences: discretionary and non discretionary items. We hypothesise that book-tax differences’ components are value relevant. Subsequently, we tempt to examine the valuation role of these components in terms of predicting future performance and evaluating stock returns.

4.1. The value relevance of non discretionary book-tax differences

Non discretionary book-tax differences consist of temporary differences (deferred tax expense) and permanent differences resulting from the different income reporting requirements in accounting and tax rules. On the one hand, temporary differences are hypothesised to be informative about earnings quality. Hanlon (2005) provides evidence that earnings are less persistent for one-year-ahead earnings in firms with large positive and large negative temporary book-tax differences. Moreover, Hanlon asserts that investors consider large book-tax differences as a “red flag” reducing their expectation of future earnings. Joos et al. (2000) find that large temporary book-tax differences reflect weaker earnings to returns relation. Jackson (2009), as for him, finds that large temporary book-tax differences are negatively related to pre-tax income, suggesting that this relation is due to mechanical differences and to economic factor rather then opportunistic behaviour. Revsine et al. (1999) assert that increases in deferred tax liability, which result from the excess of book income on taxable income, could be “an indication of deteriorating earnings quality”. Tang and Firth (2008) state that deferred taxes “temporarily yield the gaps between income tax expenses and current tax liability”. The authors also claim that, “as a result, the magnitude of net deferred taxes has an effect on current tax-related cash flows”. Besides, several researchers report evidence that the ”reversal” of temporary differences in the near future affects future tax payments, and subsequently, helping inform share prices (Guenther and Sansing, 2000; Amir et al. 1997; Givoly and Hayn, 1992; Ayers, 1998).

On the other hand, permanent differences can be informative about future earnings. Indeed, permanent differences could affect current post-tax earnings so much that these differences affect the determination of income tax expense (Tang and Firth, 2008). Particularly, current income tax expenses increase when permanent differences are high resulting in decreasing post-tax earnings. The influence of permanent differences on current earnings informs on future earnings as current earnings are a considerable predictor of future earnings (Tang and Firth, 2008). Following this reasoning, permanent differences are expected to be informative about share prices. Tang and Firth (2008) find results that confirm this prediction. More precisely, they find a negative association between non discretionary book-tax differences and one-year-ahead earnings, and these non discretionary differences and share prices. Moreover, Tang and Firth provide evidence
that non discretionary book-tax differences have incremental explanatory power beyond earnings in explaining firm’s future performance suggesting that non discretionary differences “implicitly reflects some political and economic factors that substantially influence investors’ expectations of future earnings”.

Based on the previous discussion, we propose the hypotheses as follows:

**Hypothesis 2a:** Non discretionary book-tax differences are value relevant in predicting firms’ future performance

**Hypothesis 2b:** Non discretionary book-tax differences are negatively related to stock returns

### 4.2. The value relevance of discretionary book-tax differences

Discretionary book-tax differences result from opportunistic managerial behaviours such as earnings management and tax management practices. Tang and Firth (2010) assert that discretionary book-tax differences result from these combined practices.

Prior literature suggests that managers manipulate earnings in the aim of altering financial reports to either mislead some stakeholders about the underlying economic performance of the company, or to influence outcomes that depend on reported accounting numbers and thus in the aim of expropriation and wealth transfer (Healy and Wahlen, 1999). Likewise, managers adopt tax management practice to reduce tax burdens and thus to influence a firm’s expected discounted after-tax cash flows (Hoffman, 1961; Scholes et al. 2002). Manager’s discretion in accounting and tax reporting create noise in reported earnings, and hence affects firm’s future performance, particularly, investors’ expectations of future earnings and equity value. Tang and Firth (2008) suggest that discretionary book-tax difference is value relevant because it reveals distortion in reported earnings and cash flows. They report evidence that the magnitude of discretionary book-tax differences reflect the level of the managerial opportunistic behaviour and noise in reported earnings, and affect performance measurement and prediction, i.e. positive discretionary book-tax difference reveals lower future performance as it results from manipulating book income upward or reducing tax expense; and negative discretionary book-tax difference reveals higher future performance as it results from taking a bath or boosting taxable income.

Indeed, Tang and Firth argue that positive discretionary book-tax difference reveals overstated current earnings, increasing the base for future earnings growth; this difference is transitory and less persistent, leading, hence, to understated future earnings. This understatement of future earnings affects firm’s future performance. Subsequently, discretionary book-tax differences are informative about future earnings; and this information may help in assessing equity value. However, and when non discretionary items have been shown to be more informative than earnings in terms of predicting future performance, discretionary items seem to be less informative than EPS. Tang and Firth (2008) interpret this result as forecasts of investors failing to completely integrate information in discretionary differences. Therefore, our hypotheses are as follows:

**Hypothesis 3a:** Discretionary book-tax differences are value relevant in predicting firms’ future performance

**Hypothesis 3b:** Discretionary book-tax differences are negatively associated with the firms’ stock returns

### 5. Research Design
The research question in this paper is to examine the implication of book-tax differences in Tunisian context for earnings quality in terms of predicting future performance and estimating equity value. To address this question, we first present estimation models to determine discretionary and non discretionary book-tax differences. Then, we present two types of valuation models: the one-year-ahead model and the return model.

5.1. Estimating discretionary (D-BTD) and non discretionary (ND-BTD) book-tax differences

Several studies have used a residual approach to separate the different components of book-tax differences. Tang and Firth (2010) use the residual from a regression of total book-tax differences on institutional factors which could explain non discretionary components due to the differences between accounting rules and tax laws, but are less likely to relate to managerial discretionary practices. The unexplained portion is the measure of discretionary differences. So, non discretionary differences are estimated as the fitted values from this regression, and discretionary differences are estimated as the residual from the model.

Likewise, Desai and Dharmapala (2006) use a residual approach to estimate tax management practices. They use a regression of total book-tax differences on total accruals to determine discretionary differences. Assuming that only earnings management and tax management practices explain book-tax differences, Desai and Dharmapala (2006) consider that the residual from this regression represent the measure of discretionary book-tax differences related to tax management practices. Lim (2010) use the same residual method adopted by Desai and Dharmapala (2006) to estimate the discretionary differences. The contribution of Lim consists of improving the measure used by Desai and Dharmapala (2006) by using the discretionary accruals rather than total accruals as an earnings management proxy, and asserting that tax management results from both temporary and permanent book-tax differences. Unlike these previous studies, Frank et al. (2009) apply the residual approach to disentangle the discretionary and non discretionary differences. Frank et al. (2009) suppose tax management generating only permanent differences. To estimate the tax management measure, the authors regress total permanent book-tax differences on non discretionary items resulting from differences between accounting and tax rules.

In this research, we apply the residual method used by Tang and Firth (2010) as they consider all items composing book tax differences: permanent and temporary differences, discretionary and non discretionary differences. First, we regress total book-tax differences on factors known to cause non discretionary differences and which are related to differences between accounting rules and tax laws. These factors are less likely to relate to discretionary managerial behaviour. The residual from the estimated regression, rather, the unexplained portion represents the measure of the discretionary differences.

In the literature, several factors have been defined to explain book-tax differences. Manzon and Plesko (2002) identify four types of activities that are likely to affect book-tax differences such as demand for tax favored investment and financing actions (of which profitability, presence of net operating losses and change in net sales), direct sources of investment related timing differences (of which property, plant, and Equipment and post-retirement benefits), permanent differences (of which pre-1993 Goodwill), and noise factors (of which change in net operating losses and foreign operations, …). Tang and Firth (2010) regress total book-tax differences on
factors of changes in sales, gross property, plant and equipment, non-goodwill intangible assets, net operating loss, and tax rate differences to explain non discretionary book-tax differences. In this study, we use factors related to differences in Tunisian tax and accounting rules to explain non discretionary differences. We regress total book-tax differences on factors of changes in sales, gross property plant and equipment, non Goodwill intangible assets and profitability. Those factors are known to cause non discretionary book-tax differences and are less likely to be related to discretionary managerial behaviour.

The estimation equation is:

\[
BTD_{it} = \beta_0 + \beta_1 \Delta REV_{it} + \beta_2 \Delta INV_{it} + \beta_3 PROF_{it} + \beta_4 NGW_{it} + \epsilon_{it}
\] (1)

Where

\[BTD_{it}\] = total book-tax differences for firm i in year t obtained from the difference between pre-tax book income and taxable income.
\[\Delta REV_{it}\] = the change in revenue from year t-1 to year t;
\[\Delta INV_{it}\] = the change in investment in gross property, plant and equipment from year t-1 to year t;
\[PROF_{it}\] = is a binary variable equal to one if the firm reports positive pre-tax income and zero otherwise;
\[NGW_{it}\] = the value of the non goodwill intangible assets for firm i in year t;
\[\epsilon_{it}\] = error term in year t for firm i;

\[\Delta REV\] is used to control for the effect of economic growth on ND-BTD insofar as, this growth could drag enormous irrecoverable credits. These credits, which are subject to management judgment and rather are appreciated with subjectivity, are immediately known as losses of the year under accounting rules while they are non-deductible under tax laws, leading to a lower book income compared with taxable income. Therefore, growth in revenue will lead to large negative ND-BTD.

\[\Delta INV\] is used to capture the effect of the growth in investment scale on ND-BTDs that relate to mechanical depreciation. Indeed, under Tunisian accounting rules, depreciation of property plant and equipment is required under accounting rules; however no depreciation another that the amortization for tax purposes is not admitted according to the tax rules. Hence, taxable income will be higher than book income. Otherwise, when the investment in fixed depreciable assets increases, it contributes a larger base to determine depreciation, thereby leading to large negative ND-BTDs. Subsequently, investment growth will lead to large negative permanent ND-BTD. So we expect ND-BTD to increase with utilization of depreciable assets measured using changes in gross property, plant and equipment.

Manzon and Plesko (2002) suggest that profitable firms ‘can make efficient use of tax deductions and tax credits and benefit from tax exemptions’. They introduce ‘profitability’ in their analysis of the factors that are likely to affect book-tax differences to control for firm’s differences between profitable and nonprofitable firms in their use of tax-advantaged position that could reduce taxable income and tax burden. We use PROF variable to control for the effect of the use of tax-advantaged positions by profitable firms on ND-BTD. We expect that this
variable affects positively the mechanical differences between book income and taxable income as the use of tax deductions and exemptions could reduce taxable income giving rise to positive ND-BTDs.

NGW is used to control for the effect of non goodwill intangible assets on ND-BTD that relate to amortization. Amortization lives of non goodwill intangible assets are set by statute for financial purposes, and are shown in the income statement as required under Tunisian accounting rules. However, Amortization of non goodwill intangible assets is non-deductible under Tunisian tax laws, thereby giving rise to negative ND-BTD.

All variables are scaled by total assets for year t to control for firm size, except for PROF. ND-BTD are the fitted values from equation (1) and the residuals are discretionary book-tax differences (D-BTD).

To test the research hypotheses, we first present the one-year-ahead model, then, we present the return model.

5.2. One-year-ahead Model, Return Model, and variable definition

One-year-ahead Model

Applying a Tang and Firth (2008) methodology, we employ a one-year-ahead earnings regression model to examine the potential of book-tax differences in predicting firm’s future performance. The estimation equation is as follow:

\[ \text{EPS}_{it+1} = \beta_0 + \beta_1 \text{EPS}_{it} + \beta_2 \text{BTD}_{it} + \epsilon_{it+1} \]

Where,

- \( \text{EPS}_{it+1} \): earnings per share for firm i in year t+1, scaled by stock price three months following the end of fiscal year t-1,
- \( \text{EPS}_{it} \): earnings per share for firm i in year t, scaled by stock price three months following the end of fiscal year t-1,
- \( \text{BTD}_{it} \): book-tax differences in year t, deflated by total assets.

Stock price in year t-1 is used as a deflator of earnings levels and earnings changes to reduce heteroscedasticity. Moreover, we use total assets-deflated BTD rather than price-deflated BTD per share to control for the impact of firm size on ND-BTD and D-BTD.

According to prior value relevance research, we expect current earnings to be positively associated with future earnings (Sloan 1996; Fama and French 2000; Zhou 2004). Moreover, we expect that book-tax differences i.e. BTD, ND-BTD and D-BTD to be negatively associated with future earnings. Indeed, book-tax differences resulting from discretionery managerial behaviour reveal low earnings quality, otherwise earnings that are transitory and less value-relevant current earnings.

Return Model

To investigate the valuation role of book-tax differences in terms of assessing equity value, we use the return model which is subject to less heteroscedasticity and fewer misspecification problems than the price and differenced-price models (Tang and Firth, 2008; Kothari and Zimmerman, 1995).
Easton and Harris (1991) regressed annual stock returns on the price-deflated earnings level, which is a relevant explanatory variable for returns, earnings changes and scaled book-tax differences (BTD, ND-BTD and D-BTD).

\[
\text{RET}_{it} = \beta_0 + \beta_1 \text{EPS}_{it} + \beta_2 \Delta \text{EPS}_{it} + \beta_3 \text{BTD}_{it} + \delta_{it}
\]

Where,

\( \text{RET}_{it} \): the return on a share of firm \( i \) obtained three months following the end of fiscal year \( t \),

\( \text{EPS}_{it} \): earnings per share for firm \( i \) in year \( t \), scaled by stock price three months following the end of fiscal year \( t-1 \),

\( \Delta \text{EPS}_{it} \): the annual change in earnings per share between year \( t \) and year \( t-1 \), scaled by stock price three months following the end of fiscal year \( t-1 \),

\( \text{BTD}_{it} \): book-tax differences in year \( t \), deflated by total assets.

We expect that if large book-tax differences are informative about future earnings, there should be a negative association between BTD and stock returns.

6. Sample selection and empirical results

We describe first our sample and data collection, and then we present descriptive statistics and results for univariate and multivariate analysis, for one-year-ahead earnings model, first, and for return model, second.

6.1. Sample selection and data

The Sample includes 24 companies listed in the Tunisian stock exchange covering the period 2003-2009. We collect data from the annual reports of the selected listed companies and the official bulletins of both Tunisian Stock Exchange and the CMF\(^9\). Data on book-tax differences is manually collected from the tax and financial notes in the financial statements. Book-tax differences data is obtained also from firms upon our request, as not all firms report data on tax information. The number of observations is not identical for each company since it depends on its first date of listing in the Tunisian Stock Exchange, resulting in 131 firm-year observations. We exclude firms without seven-year consecutive data and firms in financial sector because they are subject to special accounting and tax rules.

6.2. Descriptive statistics and univariate analysis for Earnings and Return Model

Panel A: Earnings Regression Model

(Inset table 1 and table 2 here)

Panel A presents descriptive statistics and Pearson correlation coefficients for variables used in earnings regression model, indicating that EPS exhibits more dispersion than BTD, D-BTD and ND-BTD with a standard deviation of 0.287, 0.064, 0.063 and 0.178 respectively. Univariate results in table 2 show that EPS is positively and significantly correlated with EPS1, which is consistent with prior research results, whereas BTD, D-BTD and ND-BTD are not significantly negatively correlated with EPS1, which is not consistent with our predictions. On the other hand,

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\(^{9}\) Note 9
BTD and D-BTD are significantly positively correlated with EPS. While this result may involve multicolinearity problem, it indicates that BTD and D-BTD may be correlated with EPS by affecting earnings levels.

**Panel B: Return Model**

(Inset table 3 and table 4 here)

Panel B presents descriptive statistics and Pearson correlation coefficients for variables used in the return regression model. Table 3 shows that EPS and ∆EPS exhibit more dispersion than BTD, D-BTD and ND-BTD; moreover, as shown in table 4, EPS is positively correlated with RET at 10% level, whereas ∆EPS is not significantly positively correlated with returns. Coefficient correlation for BTD, D-BTD and ND-BTD did not exhibit results as predicted, indeed ND-BTD is negatively but not significantly correlated with RET. In particular, BTD and D-BTD exhibits higher correlation with EPS and ∆EPS. While this result may raise multicolinearity problem, it suggest that BTD could be correlated with stock returns by affecting earnings levels and earnings changes. To test for the absence of multicollinearity problem, Variance Inflation factor “VIF” is calculated.

### 6.3. Multivariate results

**Results of the One-Year-Ahead earnings regression model**

To test the power of book-tax differences to predict future earnings, one-year-ahead EPS is regressed on current EPS and BTD. Thereafter, we replace BTD with D-BTD and ND-BTD to determine whether the predictability of BTD is attributed to D-BTD and/or ND-BTD. We present the regressions estimated as follow:

- **Model 1:** 
  \[
  \text{EPS}_{i,t+1} = \beta_0 + \beta_1 \text{EPS}_{i,t} + \epsilon_{i,t+1}
  \]

- **Model 2:** 
  \[
  \text{EPS}_{i,t+1} = \beta_0 + \beta_1 \text{EPS}_{i,t} + \beta_2 \text{BTD}_{i,t} + \epsilon_{i,t+1}
  \]

- **Model 3:** 
  \[
  \text{EPS}_{i,t+1} = \beta_0 + \beta_1 \text{EPS}_{i,t} + \beta_2 \text{D-BTD}_{i,t} + \beta_3 \text{ND-BTD}_{i,t} + \epsilon_{i,t+1}
  \]

(Insert table 5 here)

Table 5 presents in the first row the regression estimated on EPS, in the second row the regression estimated on EPS and BTD and in the third row the regression on EPS, D-BTD and ND-BTD. To test for the absence of multicollinearity problems, we calculate the Variance Inflation Factor “VIF”. The results show that no VIF does exceed the limit of 10, being the individual critical value suggested by Ender (2004). Besides, no mean VIF does exceed the limit of 3, being the mean VIFs critical value suggested by Ender (2004). We correct estimation coefficients for heteroscedasticity problem (White, 1980). According to F-test, the three models are significant at the 0.01 level, which suggests that they adequately fit the data, and the adjusted R2 shows that they jointly explain about 82.15% of the future earnings in the simple model, and 83.02% in the second model, and 82.90% if we refer to the third model. In the first univariate model, EPS is significantly positively associated with future earnings at the 0.01 level which is consistent with prior research. Second row of the future earnings regression on EPS and BTD show that, as predicted, BTD is negatively related to EPS1 (β = -37.016) at the 0.05 level suggesting that book-tax difference is informative of lower future earnings quality. EPS is positively related to future earnings at 0.01 levels. On the other hand, after including BTD, the adjusted R2 in the second model is 83.02%, relatively larger than that of 82.15% in the first
model; besides, the Vuong (1989) test presents a positive and significant value suggesting that by including BTD, the model has incremental explanatory power beyond the benchmark estimated only on EPS. These results, showing that BTD has richer information than EPS in predicting future performance, confirm the hypothesis (H1c) of the research. Results in the third regression of future earnings on EPS, D-BTD and ND-BTD show that, with expected sign, D-BTD is negatively related to future earnings ($\beta = -35.602$) at 0.05 level, confirming the hypothesis (H3a) of the research, and supporting prior findings (Tang and Firth, 2008; Hanlon, 2005) suggesting that D-BTD indicates lower earnings quality. ND-BTD is negatively and significantly related to EPS1 ($\beta = -60.785$) at 0.1 level. Results for ND-BTD are consistent with Tang and Firth (2008) findings suggesting that the mechanical information conveyed by non discretionary component may identify some transitory components of earnings.

**Results of the Return model**

To test whether book-tax differences are correlated with stock returns, we estimate the pooled and yearly regressions of return on EPS, changes in EPS, BTD, D-BTD and ND-BTD. Results for the return regression model on EPS, $\Delta$ EPS and BTD are presented in table 6 in the appendix.

(Insert table 6 here)

We correct estimation coefficients for autocorrelation and heteroscedasticity (White, 1980) problem. To test for the absence of multicollinearity problems, we calculate the Variance Inflation Factor “VIF”. The results show that no VIF does exceed the limit of 10. Besides, no mean VIF does exceed the limit of 6 (Ender, 2004). In the first row of table 6 are presented results for pooled regression on EPS, $\Delta$ EPS and BTD, on benchmark model, first, and on the model including BTD, second. In the rows below, are presented results for yearly regression models over 6 years. In the pooled regression, results exhibit a positive and significant coefficient of EPS on stock returns for both the benchmark model and the model including BTD; whereas, change in earnings are not significantly associated with stock returns. In the pooled regression also, although by including BTD, R2 is larger than that of the benchmark model, BTD is negatively but not significantly associated with stock returns ($\beta = -3.737$, $t = -0.90$). In the yearly regressions, BTD is significantly negatively associated with stock returns only in one of the six models. This not satisfying result is not consistent with prior research findings. EPS is positively and significantly related to stock returns in three of the six models, while coefficient on $\Delta$ EPS is positive and significant only in one of the six models. The Vuong (1989) test exhibits positive values in all regression. This statistics are significant in two of the six yearly regressions. Those results suggest that including BTD improves the explanatory power of the return model. Moreover after including BTD in the model, R2 improves in all regressions relative to the benchmark model. Consequently, results for BTD are not precisely satisfying but, as regard to the negative coefficients, the Vuong statistics and the R2 in all models, these results confirms generally the inference that BTD may inform about earnings quality and equity value. These results prove that BTD have incremental information content beyond EPS in predicting equity value confirming also the hypothesis H1c of the research.

To examine whether results obtained in those regressions are attributed to D-BTD and/or ND-BTD, we replace BTD with its two components. Table 7 reports results of the pooled and year by year return regression models.

(Insert table 7 here)
In the pooled regression, coefficient on D-BTD is negative but not significant ($\beta = -2.958$, $t = -0.73$), whereas, ND-BTD is negatively related to stock return at 0.1 level ($\beta = -20.315$, $t = -1.77$). In yearly regressions, D-BTD is negatively related to stock returns in three of the six years, but negative coefficients are significant only in two of the six models. ND-BTD is negatively associated with stock returns in five of the six yearly regressions, and is negatively significant only in one of the six years. Results of BTD, D-BTD and ND-BTD are mixed. The weak predictability of BTD in the pooled regression of table 6 is due to the weak predictability of D-BTD, of which $\beta$ coefficient is negative but not statistically significant. However, generally our results for BTD, D-BTD and ND-BTD confirm prior research findings suggesting that BTD may inform investors about earnings quality and firm value, and hence is value relevant. Moreover, the weak predictability of BTD, D-BTD and ND-BTD may be due to the impossibility for investors to integrate all information impounded in book-tax differences in Tunisia.

7. Conclusion

The aim of this study is to examine the value relevance and the market reaction to the information impounded in book-tax differences in Tunisian context. Using the data of 24 listed firms in the Tunisian Stock Exchanges from 2003 to 2009 with available data; we hypothesise that BTD is value relevant to predict future earnings and stock returns. We have tested univariate and multivariate models using pooled method and year by year regressions.

Our results show that book – tax differences are informative about future earnings, revealing that BTD indicates lower earnings quality. Results for the earnings model are in coherence with those of Tang and Firth (2008) and Hanlon (2005) whom investigate the valuation role of BTD in terms of earnings quality. Hence, the value relevance of BTD in terms of predicting future performance is due to the information about differences between tax law and accounting regulation, and the information about managerial opportunistic behaviour. Moreover, our results point out that BTD provides incremental explanatory power to future earnings over actual earnings, suggesting that investors should search for BTD information other than current earnings when assessing a firm’s future performance.

However, in general, there is weak evidence that market reacts to information about BTD. Indeed, in all regressions BTD is negatively significant only in one (for BTD) or two (for D-BTD and ND-BTD) years of the six. The weak predictability of D-BTD may be due to the noise of the information revealed caused by managers’ discretionary behaviour in reporting book and taxable income. Consequently, we conclude that market under reacts to the information in BTD perhaps because the investors are unable to integrate all information impounded in book-tax differences in Tunisia’s emerging capital market.

Our finding offers an additional insight into the subject question that management manipulations damage the value relevance of accounting information (Barth et al. 1996; Marquardt and Wiedman, 2004). Finally, while the accounting information has been demonstrated to be value relevant in Tunisia (Baccouche and Bakini, 2007; Ben Ayed and Abaoub, 2006), prevalent earnings manipulation and tax management have reduced the quality of accounting information and attenuated its value relevance.

References


Ben Flah, I., and Omri, M. A., (2010), L’impact des opportunités de croissance sur la pertinence des chiffres comptables des entreprises tunisiennes”, Revue Libanaise de Gestion et d’Economie, N° 4, pp


Seidman, J., (2009), “interpreting the Book-Tax income gap as earnings management or tax sheltering”, *McCombs Research Paper Series*, University of Texas at Austin.


**Endnotes**

Note 1: Before the bankruptcy of the Enron case in 2001, the press announced that Enron pays negligible taxes while it displayed billions of Dollars of profits during this period (Lev and Nissim, 2004).

Note 2: Phillips et al. (2003) and Hanlon (2005) focus on temporary differences because these are the differences most closely related to pre-tax accruals and most often hypothesized to provide information about pre-tax earnings quality (Hanlon and Heitzman, 2010).

Note 3: Most of prior studies examine temporary and permanent components of book-tax differences but they do not investigate the differences resulting from discrepancy between accounting rules and tax law and those resulting from managerial manipulations, i.e. earnings and tax management practices.

Note 4: In their study, Lev and Nissim (2004) are attempting to demonstrate the value relevance of taxable income, rather than book-tax differences.

Note 5: In fact, from 1994 to present, financial reforms aim to strengthen a financial market economy in Tunisia (Ben Naceur and Nachi, 2006).

Note 6: The important concerns of the new accounting system was: the distinction of assets and liabilities in current and noncurrent elements, the inclusion of cash flows statement as an obligatory financial statement, the re-organization of the income statement, and the updating of certain accounting operations such as leasing, research and development activities, treatment of the fixed assets held by the national companies abroad (Ben Naceur and Nachi, 2006).

Note 7: These differences could come either from the dismissal by the tax system of some loads (fines and penalties) or the exoneration of some products (the dividends cashed), either from the tax incentives; they could be bound also to the sanction of the rules of shape.

Note 8: These losses are non-deductible under Tunisian tax laws except if some conditions are verified, i.e. there are an action in justice and a verbal suit of deficiency established by a bailiff notary.

Note 9: The CMF in Tunisia is the equivalent of the SEC
Appendix

Univariate Results

Panel A: Earnings Regression Model

Table 1: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS 1</td>
<td>-0.001897</td>
<td>0.054953</td>
<td>0.261140</td>
<td>-1.245767</td>
<td>0.405283</td>
</tr>
<tr>
<td>EPS</td>
<td>-0.017497</td>
<td>0.062180</td>
<td>0.287443</td>
<td>-1.442332</td>
<td>0.529763</td>
</tr>
<tr>
<td>BTD</td>
<td>0.007600</td>
<td>0.009644</td>
<td>0.064051</td>
<td>-0.214770</td>
<td>0.178384</td>
</tr>
<tr>
<td>D-BTD</td>
<td>-0.000104</td>
<td>0.000810</td>
<td>0.063850</td>
<td>-0.232830</td>
<td>0.179940</td>
</tr>
<tr>
<td>ND-BTD</td>
<td>0.007704</td>
<td>0.010092</td>
<td>0.178384</td>
<td>-0.020514</td>
<td>0.058518</td>
</tr>
</tbody>
</table>

Table 2: Pearson Correlation Coefficients

<table>
<thead>
<tr>
<th></th>
<th>EPS 1</th>
<th>EPS</th>
<th>BTD</th>
<th>D-BTD</th>
<th>ND-BTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>EPS 1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS</td>
<td>0.8753***</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTD</td>
<td>0.3074***</td>
<td>0.4455***</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D-BTD</td>
<td>0.3397***</td>
<td>0.4769***</td>
<td>0.9761***</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ND-BTD</td>
<td>-0.1441</td>
<td>-0.1379</td>
<td>0.1210</td>
<td>-0.0976</td>
<td>1</td>
</tr>
</tbody>
</table>

*, ** and *** denotes the significance at the 10%, 5% and 1% levels respectively.

( ) Bilateral significance

Panel B: Return Model

Table 3: Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Standard deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>RET</td>
<td>0.080465</td>
<td>0.038261</td>
<td>0.463794</td>
<td>-0.902821</td>
<td>1.823060</td>
</tr>
<tr>
<td>EPS</td>
<td>-0.017497</td>
<td>0.062181</td>
<td>0.287443</td>
<td>-1.442332</td>
<td>0.529763</td>
</tr>
<tr>
<td>Δ EPS</td>
<td>0.015600</td>
<td>0.004739</td>
<td>0.177054</td>
<td>-0.677275</td>
<td>0.985560</td>
</tr>
<tr>
<td>BTD</td>
<td>0.007600</td>
<td>0.009644</td>
<td>0.064051</td>
<td>-0.214770</td>
<td>0.178384</td>
</tr>
<tr>
<td>D-BTD</td>
<td>-0.000104</td>
<td>0.000810</td>
<td>0.063850</td>
<td>-0.232830</td>
<td>0.179940</td>
</tr>
<tr>
<td>ND-BTD</td>
<td>0.007704</td>
<td>0.010092</td>
<td>0.178384</td>
<td>-0.020514</td>
<td>0.058518</td>
</tr>
</tbody>
</table>
### Table 4: Pearson Correlation Coefficients

<table>
<thead>
<tr>
<th></th>
<th>RET</th>
<th>EPS</th>
<th>Δ EPS</th>
<th>BTD</th>
<th>D-BTD</th>
<th>ND-BTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>RET</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EPS</td>
<td>0.1625* (0.0636)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δ EPS</td>
<td>0.0438 (0.6190)</td>
<td>-0.4497 *** (0.000)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BTD</td>
<td>0.0645 (0.4642)</td>
<td>0.7914 *** (0.000)</td>
<td>-0.4598 *** (0.000)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D-BTD</td>
<td>0.0899 (0.3069)</td>
<td>0.7807 *** (0.000)</td>
<td>-0.4403 *** (0.000)</td>
<td>0.9761 *** (0.000)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>ND-BTD</td>
<td>-0.1155 (0.1891)</td>
<td>0.0583 (0.5087)</td>
<td>-0.0944 (0.2834)</td>
<td>0.1210 (0.1685)</td>
<td>-0.0976 (0.2673)</td>
<td>1</td>
</tr>
</tbody>
</table>

* , ** and *** denotes the significance at the 10%, 5% and 1% levels respectively.

( ) Bilateral significance

### Multivariate Results

**Results of the One-Year-Ahead earnings regression model**

### Table 5: Regressions of One-Year-Ahead Earnings Model

<table>
<thead>
<tr>
<th>Sample</th>
<th>Intercept</th>
<th>EPS</th>
<th>BTD</th>
<th>D-BTD</th>
<th>ND-BTD</th>
<th>R²</th>
<th>F-stat</th>
<th>Vuong - Stat*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>131</td>
<td>0.757 *** (5.97)</td>
<td>0.317*** (2.90)</td>
<td></td>
<td></td>
<td>0.8215</td>
<td>8.40***</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td>131</td>
<td>0.627*** (4.91)</td>
<td>0.387*** (3.40)</td>
<td>-37.016** (-2.60)</td>
<td></td>
<td>0.8302</td>
<td>7.01***</td>
<td>7.81***</td>
</tr>
<tr>
<td>Model 3</td>
<td>131</td>
<td>0.672*** (4.77)</td>
<td>0.377*** (3.23)</td>
<td>-35.602** (-2.47)</td>
<td>-60.785* (-1.71)</td>
<td>0.8290</td>
<td>5.05***</td>
<td></td>
</tr>
</tbody>
</table>

* , ** and *** denotes the significance at the 10%, 5% and 1% levels respectively.

( ) t-statistics based on the heteroscedasticity-consistent covariance matrix (White, 1980).

* Vuong - Stat is the chi2 value of the Vuong (1989) test used to test whether Model 2 has incremental explanatory power over Model 1.

### Results of the Return model

**Table 6: Regressions of Return on EPS, Δ EPS and BTD**

<table>
<thead>
<tr>
<th>Year</th>
<th>Sample</th>
<th>Intercept</th>
<th>EPS</th>
<th>Δ EPS</th>
<th>BTD</th>
<th>R²</th>
<th>Vuong - Stat*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL</td>
<td>131</td>
<td>0.086*** (3.14)</td>
<td>0.331*** (3.51)</td>
<td>0.189 (1.10)</td>
<td></td>
<td>0.1506</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.079*** (2.81)</td>
<td>0.480*** (2.83)</td>
<td>0.157 (0.81)</td>
<td>-3.737 (-0.90)</td>
<td>0.2098</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>20</td>
<td>0.151* (0.15)</td>
<td>-0.439 (0.873)</td>
<td>0.873 (1.712)</td>
<td></td>
<td>0.1712</td>
<td>1.27</td>
</tr>
</tbody>
</table>
Table 7: Regressions of return on EPS, Δ EPS, D-BTD and ND-BTD

<table>
<thead>
<tr>
<th>Year</th>
<th>Sample</th>
<th>Intercept</th>
<th>EPS</th>
<th>Δ EPS</th>
<th>D-BTD</th>
<th>ND-BTD</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL</td>
<td>131</td>
<td>0.099***</td>
<td>0.468***</td>
<td>0.175</td>
<td>-2.958</td>
<td>-20.315*</td>
<td>0.3301</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.27)</td>
<td>(2.76)</td>
<td>(0.90)</td>
<td>(-0.73)</td>
<td>(-1.77)</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>20</td>
<td>0.239**</td>
<td>-1.131</td>
<td>1.056</td>
<td>21.908</td>
<td>-65.037</td>
<td>0.2599</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.76)</td>
<td>(-1.36)</td>
<td>(1.18)</td>
<td>(1.32)</td>
<td>(-0.98)</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>20</td>
<td>0.117</td>
<td>1.277</td>
<td>-0.588</td>
<td>3.126</td>
<td>81.139</td>
<td>0.3963</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.91)</td>
<td>(1.36)</td>
<td>(-0.56)</td>
<td>(0.25)</td>
<td>(1.20)</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>22</td>
<td>0.294*</td>
<td>1.144*</td>
<td>-0.401</td>
<td>-37.683</td>
<td>-98.222</td>
<td>0.1020</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.02)</td>
<td>(1.87)</td>
<td>(-0.58)</td>
<td>(-1.32)</td>
<td>(-1.13)</td>
<td></td>
</tr>
</tbody>
</table>

*, ** and *** denotes the significance at the 10%, 5% and 1% levels respectively.

( ) t-statistics based on the heteroscedasticity-consistent covariance matrix (White, 1980).

* Vuong - Stat is the chi2 value of the Vuong (1989) test used to test whether Model 2 (Model 3) has incremental explanatory power over Model 1 (Model 2).
<table>
<thead>
<tr>
<th>Year</th>
<th>n</th>
<th>Value</th>
<th>t-statistic</th>
<th>Value</th>
<th>t-statistic</th>
<th>Value</th>
<th>t-statistic</th>
<th>Value</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>24</td>
<td>0.021</td>
<td>(0.26)</td>
<td>2.393***</td>
<td>(4.26)</td>
<td>-0.205</td>
<td>(-0.49)</td>
<td>-57.776***</td>
<td>(-4.45)</td>
</tr>
<tr>
<td>2007</td>
<td>23</td>
<td>-0.110</td>
<td>(-1.45)</td>
<td>0.894**</td>
<td>(2.30)</td>
<td>0.571</td>
<td>(1.00)</td>
<td>-14.039*</td>
<td>(-1.95)</td>
</tr>
<tr>
<td>2008</td>
<td>22</td>
<td>0.193</td>
<td>(1.00)</td>
<td>0.099</td>
<td>(0.17)</td>
<td>0.386</td>
<td>(0.89)</td>
<td>8.707</td>
<td>(0.72)</td>
</tr>
</tbody>
</table>

*, ** and *** denotes the significance at the 10%, 5% and 1% levels respectively.

( ) t-statistics based on the heteroscedasticity-consistent covariance matrix (White, 1980).
EFFECTS OF SUBPRIME CRISIS ON STOCK MARKETS INTEGRATION : NONLINEAR VECM MODEL

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Higher Institute Of Management
University of Tunis

Abstract:

The subprime mortgage crisis is met in a context of interdependence. An event in one economy can affects the whole world economy. This interdependence seems to be the origin of the distribution of the Subprime crisis in the rest of the world economy. The recent studies show that the distribution of this crisis influenced the integration of financial markets by affecting the degrees of correlations of court and long-term. However during the period of crisis the variation of the correlation is characterized by a nonlinear volatility which describes several phenomena appropriate for the phenomenon of crisis. This article tries to study through a not linear model VECM the variation of integration of financial markets during financials crisis.

Keyword : Subprime financial crisis, co integration, stock markets, Nonlinear ECM model
JEL Classification : G15, C32

INTRODUCTION

The subprime crisis subsisted in a context of interdependence. An event in a given economy affects the entire global economy. This interdependence seems to be the origin of the subprime crisis spread to the rest of the world economy. The financial crisis that began in 2007 has surprised all observers. Shortly before the summer, there were many who expected a rise in default rates on subprime mortgages: “subprime loans.” But nobody imagined that this could lead to a financial crisis of this magnitude. Recent studies show that the spread of the crisis has influenced the integration of financial markets by affecting the degree of correlation of short and long term. Yet during the crisis period the change in correlation is characterized by a nonlinear volatility that describes several phenomena peculiar to the phenomenon of crisis, it is in our view
this paper attempts to study through a nonlinear ECM model, the variation of integration of financial markets in times of crisis.

**SUBPRIME CRISIS AND CONTAGION EFFECT**

"Subprime" mortgages are for a category of borrowers with limited financial capacities, with rates that are usually reviewed two or three years after the granting of credits that can be three times the fixed rate of the first two years. So after this review variable feature of the interest rates, borrowers have repayment difficulties. Terms have become three times as important as those redeemed during the first two years of repayment. They then find themselves unable to sell their property to realize a capital gain and pay their debt, thereby aggravating the increase in default rates. Faced with this situation, banks have seized a huge number of properties for sale at auction. This action has further accelerated the decline in property prices. More study shows that the prices of properties sold at auction are lower than 67% of their original sale price. This high number of default, the auction, the strategy of tightening credit standards for mortgages and rising interest rates have exacerbated the decline in housing prices and thus generates a crisis at the start to a real financial crash in the United States of America and by contagion to the rest of the world. This contagion phenomenon of the crisis was manifested by the passage of a financial shock triggered in the U.S. to other countries assisted by a financial imbalance observed in the beginning in the developed markets and subsequently to the rest of the world that witnessed a sharp volatility of asset prices is spreading of the crisis country to other countries. The contagion has also been demonstrated by the spread of market uncertainty in the rest of the world due to the increased volatility in the host market, that of the United States of America. Sander and Kleimeier, [2000] show that in this context that the contagion is referred to the spread of troubles or shocks from one country to others. In fact, according to these authors, the existence of interdependence across emerging markets or new sources or radically altered interdependencies among markets through trade or financial thus implies a contagion effect, which confirms the transition from crisis to emerging markets despite the very limited number of financial exchanges.

**FINANCIAL MARKET INTEGRATION AND TRANSMISSION OF THE CRISIS**

The theoretical literature on contagion is quite recent. We cite in this regard, in particular the contribution of Masson [1999] Mullainathan, [1998] Goldfajn & Valdez, [1997] and Drazen [1999]. We distinguish two main approaches in the literature: the first attempts to identify the transmission channels of shocks in the absence of fundamental economic links among countries and the second tries to analyze this phenomenon in the presence of these links. The "revaluation country" or "country learning "creates a third mechanism of spread of the contagion effect. Investors can apply the lessons learned after a shock manifested in one country to another country with macroeconomic structures and similar economic policies. For example, if a country with a relatively weak financial system faces a crisis, investors may reassess the robustness of the banking systems of other countries and adjust their probabilities of the crisis plan. The relationship between stock index returns, are measured by their coefficient of correlation. Contagion occurs when the correlation increases significantly during the crisis period; to the extent this increase suggests that there are stronger links or mechanisms of transmission between the two markets. However, if the increase is not statistically significant, it is only a phenomenon of interdependence rather than contagion. King and Wadhwani [1990] used this methodology to
test the presence of contagion across asset markets of the United States, the United Kingdom and Japan. They found that the correlations did rise after the U.S. market crash of 1987. In the same context, Calvo and Reinhart [1996] detected an increase in correlations between international asset markets after the Mexican crisis. Baig and Goldfajn [1998] have also applied this correlation test to other types of financial markets: markets for sovereign debts, foreign exchange and interest rates. They concluded that the existence of contagion during the Asian crisis was more evident in the markets for sovereign debt and currency markets. The correlation analysis allows detecting the effect of contagion from one country to another and detecting the channels of transmission of the crisis.

ANALYSIS OF THE CORRELATION IN THE SENSE OF FORBES AND RIGOBON 2001

The correlation of stock index returns is measured by the coefficient of correlation. This coefficient defines contagion in times of crisis, to the extent that this variation suggests that there are stronger links or mechanisms of transmission between two or more markets. However, if the increase is not statistically significant, it is only a phenomenon of interdependence rather than contagion. Forbes and Rigobon [2001] showed that the increase of a correlation coefficient between two financial series may be biased by the effect of changes in market volatility originating from the shock, which causes a problem of heteroscedasticity and an adjustment is necessary to correct this bias. Forbes and Rigobon also propose a correlation coefficient adjusted as:

\[
\rho^* = \frac{\rho}{\sqrt{1 + \delta(1-\rho^2)}}
\]

with

\[
\delta = \frac{V'(x_i)}{V'(x_j)}
\]

"C" and "t" indicate the periods of crisis and stability.

In fact, represents the relative increase in the two periods of crisis and stability.

NONLINEAR VECM MODEL

Granger and Lee, [1989] formulated the non-linearity in the adjustment mechanism or ECM. This representation was then developed by Escribano and Pfann, [1998] who considered the linear ECM models are based on restrictive conditions including:

- The uniqueness of the long-term equilibrium and adjustment with respect to the equilibrium is symmetric. Yet according to Masson, [1998], during periods of crisis, financial markets may give rise to situations of multiple equilibrium reflecting sudden changes in investor expectations with respect to the risk.

- These carry out operations of readjustment and reallocation of portfolios thus move the market from a steady state to another. Also, and as has been suggested by several studies, the adjustment with respect to the equilibrium is asymmetric. The markets’ reaction to the shock differs according to its positive or negative nature. Escribano and Pfann [1998] shared the error correction term in the ECM model in two positive and negative parts such as:
This transformation allows the creation of two situations of equilibrium, each characterized by a specific speed of adjustment. The first equilibrium of stability is captured by the term \( z_{t-1}^+ \). On the other side, the crisis equilibrium is captured by the term \( z_{t-1}^- \). Therefore, the new representation of the ECM is:

\[
\Delta y_t = \sum_{i=1}^{p} \alpha_i \Delta y_{t-i} + \sum_{i=1}^{q} \beta_i \Delta x_{t-i} + \delta_1 z_{t-1}^+ + \delta_2 z_{t-1}^- + \epsilon_t \tag{2}
\]

Thus, by Escribano and Pfann [1998], if \( \delta \) is statistically different from 0, we accept the hypothesis of the existence of significant asymmetry in the ECM model, otherwise, we retain the linear model specification of the adjustment mechanism.

DATA

In this article, we use daily data, especially the stock indexes can be regarded as benchmark indexes for various markets representing our sample. To test the existence of contagion during the “subprime” crisis, we use a sample of 28 countries (developed and developing). The studied period runs from January 3, 2006 to February 25, 2009. It includes a sub-period of stability (from 03/01/2006 to 22/10/2007) and a sub-period of crisis (from 23/10/2007 to 25/02/2009).

EMPIRICAL APPROACH

Adjusted Correlation

The adjusted correlation analysis on two sub-periods will allow us to have an idea of evolution. The correlation matrix shows the correlations between different countries (see Appendix).

According to the philosophy of the two authors, contagion is defined as “a significant increase of the links between financial markets after a shock to a country or group of countries”. However, as we know, the country originating from the shock is the United States of America, then we consider the DJIA index (Dow Jones Industrial Average) as the source of contagion subdivided in two sub-periods:

- A period before the crisis: from 03/01/2006 to 22/10/2007, including 446 observations
- A period after the crisis: from 23/10/2007 to 25/02/2009, including 332 observations

The Results give us:

\[
V^C(DJIA) = 1947,604 \times V^T(DJIA) = 985,8896
\]

So

\[
\delta = \frac{V^C(x_t)}{V^T(x_t)} - 1 = \frac{1947,604}{985,8896} - 1 = 0,9755
\]
By applying the formula of adjustment of the correlation coefficient, we conclude a variety of the correlation between the two sub periods (see appendix)

The test of the matrix of correlations shows a significant increase in the correlation coefficients between the United States and some other countries. In fact, the countries that are most affected by contagion are the European countries notably: Ireland with a noticeable increase of 228,91%, Italy, Belgium, France, etc. To its side, also Asia is not spared, we notice a significant increase of 131,57% between the DJIA and the Nikkei 225 (Japan) also Korea with an increase of 42,10% as well as Hong Kong with 34,37%.

**Test of co-integration :**

Arshanapalli and Doukas, [1995] tested, by resorting to the tests of co-integration, the presence of a stochastic trend among the stock markets of the United States and Asia before and after the stock “crash” of 1987. It was obvious the presence of co-integration relations that appeared after the stock crash. The co-integration is also used to estimate the interdependence between the European stock markets. By using the method of Johanssen, Rangvid, [2001], carried out the same tests between three indexes of the European actions: of France, Germany and the United Kingdom, before the creation on the euro.

Pascual, [2003] carried out tests on the same indexes used by Rangvid, [2001], by using the same methodology and in the same period. Additionally, this author assessed the interdependence of indexes of the evolution of their adjustment coefficient to the long-term relation. This method admits limits as the correlation method that there is only contagion when the level of the co-integration between two stock markets increases significantly after a stock shock. That proves the difficulty to define the period of crisis and to follow a certain linearity in the defined model. Thus, examining the results of cointegration test on our sample shows a difference in the results with respect to those provided by the correlation method in the sense of Forbes and Rigobon [1999]. However, some countries, like India, Indonesia, Italy, Japan, the Netherlands and Russia, show an increase in their degree of integration with the country originating from the stock market shock (DJIA) that is the phenomenon of contagion. It should be noted that this method is not the most appropriate in the context of our analysis it is necessarily linked to the choice of sub-periods (stability and crisis). As shown by Ayadi, Boudhina, Khallouli and Sandretto, [2006], the use of long-term interdependence through the error correction model (ECM) in identifying the contagion allows bypassing the problems related to the definition of crisis periods and that using the entire period in the estimates.
Estimation by the ECM Nonlinear model
The estimations results of nonlinear ECM are provided in the three tables below:

<table>
<thead>
<tr>
<th>Africa</th>
<th>South Africa</th>
<th>Morocco</th>
<th>Tunisia</th>
</tr>
</thead>
<tbody>
<tr>
<td>$z_{t-1}^+$</td>
<td>-1.333395</td>
<td>-0.020716</td>
<td>0.016044</td>
</tr>
<tr>
<td>(0.05335)</td>
<td>(0.02178)</td>
<td>(0.00313)</td>
<td></td>
</tr>
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<td>$z_{t-1}^-$</td>
<td>-1.143408</td>
<td>-0.028530</td>
<td>0.012446</td>
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<tr>
<td>(0.05476)</td>
<td>(0.02236)</td>
<td>(0.00321)</td>
<td></td>
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<table>
<thead>
<tr>
<th>America</th>
<th>Argentina</th>
<th>Canada</th>
<th>Brazil</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>$z_{t-1}^+$</td>
<td>-0.061387</td>
<td>-0.316258</td>
<td>0.447609</td>
<td>-0.096307</td>
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<tr>
<td>(0.00754)</td>
<td>(0.03680)</td>
<td>(0.26119)</td>
<td>(0.10437)</td>
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<tr>
<td>$z_{t-1}^-$</td>
<td>-0.055202</td>
<td>-0.236814</td>
<td>0.981056</td>
<td>0.008834</td>
</tr>
<tr>
<td>(0.00781)</td>
<td>(0.03816)</td>
<td>(0.27083)</td>
<td>(0.10823)</td>
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</table>

<table>
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<td>(0.00389)</td>
<td>(0.01806)</td>
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<tr>
<td>$z_{t-1}^-$</td>
<td>-0.029705</td>
<td>0.009301</td>
<td>-0.014078</td>
<td>0.119188</td>
<td>0.086872</td>
</tr>
<tr>
<td>(0.01919)</td>
<td>(0.01332)</td>
<td>(0.00424)</td>
<td>(0.01970)</td>
<td>(0.02102)</td>
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<td>(0.00174)</td>
<td>(0.02656)</td>
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<table>
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<th>South Korea</th>
<th>Hong Kong</th>
<th>India</th>
</tr>
</thead>
<tbody>
<tr>
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<td>(0.00818)</td>
<td>(0.13248)</td>
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<td>0.001499</td>
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<tr>
<td>(0.02258)</td>
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<td>(0.00775)</td>
<td>(0.12560)</td>
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<tr>
<td>$z_{t-1}^-$</td>
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<td>-0.407332</td>
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<td>-0.028733</td>
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<tr>
<td>(0.01030)</td>
<td>(0.07472)</td>
<td>(0.00398)</td>
<td>(0.01262)</td>
<td>(0.01159)</td>
<td></td>
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</table>
The aim is to follow the logic of Escribano and Pfann [1998], that is to test if \( \delta_1 \) is statistically different from \( \delta_2 \), we accept the hypothesis of the existence of significant asymmetry in the ECM model, otherwise, we retain the hypothesis of non-linearity of the propagation mechanisms of the stock market shock.

So we will proceed to the following hypothesis test:

\[
H_0 : \delta_1 = \delta_2 \\
H_1 : \delta_1 \neq \delta_2
\]

For this, we will calculate the "t *" of the Student's below and compare it with the tabulated value of Student of 1.96.

\[
t^* = \frac{\hat{\delta}_1 - \hat{\delta}_2}{\sqrt{\frac{\sigma^2_{\hat{\delta}_1}}{\hat{\delta}_1} + \frac{\sigma^2_{\hat{\delta}_2}}{\hat{\delta}_2}}}
\]

The rejection of the null hypothesis of linearity implies the existence of a significant asymmetry in the ECM model. In other words, we accept the hypothesis of non-linearity of the propagation mechanisms of shocks. We interpret the results of the table (Appendix) by the presence of contagion in some markets such as South Africa, Germany, Australia, France, Spain, Canada, etc.

Thus, the test of non-linearity of the propagation of the stock market shock through the United States to the rest of the stock exchanges in the world by applying the methodology of Favero and Giavazzi [2002] which emphasize the importance of modeling of the financial interdependence in order to test the stability of the mechanisms of transmission of the shocks. We have, first of all, found co-integration relationship between the index "DJIA" and the rest of the stock indexes in order to implement the ECM, then we estimated ECM linear specifications related to each region with the aim to know the sign of the coefficient \( \delta \), a negative sign implies that the phenomenon of return to equilibrium exists. Finally, we estimated the non-linear ECM models and we found the non-linearity in the adjustment towards the balance of certain indexes such as European stock indexes, which is explained by the significant difference between the coefficients \( \delta_1 \) and \( \delta_2 \). In fact, according Escribano and Pfann [1998], if these two coefficients are statistically different this implies the existence of an asymmetry in the mechanisms of the transmission of shocks that can be interpreted by the presence of a contagion phenomenon. Indeed, the correlation method in the sense of Forbes and Rigobon [2001] requires further investigation by a test of cointegration. However, the use of an error correction model has allowed us to more explain the contagion of the "subprime "crisis.

\[
\begin{array}{cccccc}
z_{t-1}^- & -0.016806 & -0.160309 & 0.001821 & -0.038644 & 0.015933 \\
(0.00976) & (0.07084) & (0.00378) & (0.01196) & (0.01099) & 
\end{array}
\]
CONCLUSION

Statistical analysis of the spread of the “subprime” crisis of U.S. financial markets to other markets used the correlation method of Forbes and Rigobon [2001] then the method of co-integration, despite the simplicity of their application, make a problem of sub-periods selections (stability and crisis). Using an error correction model ECM nonlinear allowed us to adequately test the effect of contagion from the subprime crisis to the rest of the world. Thus we see that the crisis has spread to the rest of the world, affecting the correlation and cointegration between markets. It also hit developed markets, emerging markets and has influenced significantly the volatility of stock indexes.

REFERENCES


### Appendix 1 Index Correlation before and After Crisis

<table>
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<tr>
<th>Country</th>
<th>Before the crisis</th>
<th>After the crisis</th>
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<tr>
<td>SOUTH AFRICA</td>
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<td>0.672417801</td>
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<td>0.610704544</td>
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### Appendix 2 : Test of cointegration before and after crisis

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### Appendix 3 :

<table>
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### Appendix 4: Estimation Results of long-term equations

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<th>Prob</th>
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<table>
<thead>
<tr>
<th>Variable</th>
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LOTTERIES CONTRIBUTION IN THE ESTIMATION OF INDIVIDUAL RISK AVERSION

Jihène Jebeniani Gouider¹ and Mokhtar KOUKI²

Abstract:
The use of lotteries is often a starting point in thinking about the new measures proposed in the literature. We propose in this article to study the lottery in order to understand the benefits of their use in the measurement of risk aversion of individuals in the context of financial investments. This study is a practical point of view by presenting the different lotteries from questionnaires on the Internet dedicated to the measurement of risk aversion of investors and theoretical. Then a theoretical point of view, examining the various methods used to analyze the risk aversion of individuals and the role of lotteries most common in the determination of risk aversion. We propose an analytical framework for studying the preferences of investors. In the context of the experimental economy, we developed the first experimental laboratory in Tunisia, on the evaluation of the individual risk aversion in the financial investments context in Tunisia. To do this, we study the implications for predicting probability distributions of financial returns, both in the context of expected utility and that of non-expected utility.

JEL classification Keywords: D81, D01, C44, C91.
Keywords: risk aversion, lotteries, decision theory, behavioral finance, experimental economics.

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INTRODUCTION

The financial sector study and analysis of the behavior of individuals who work but are currently receiving increasing interest due in part to recent developments in the capital market. However, the attention of economists and financiers is principally concerned with the study of financial products in asset management. However, this task represents only the side of "supply" problem of the investor. The other side "of demand," based on the study of preferences of the investor remains largely untapped. However, ignoring or underestimating the latter component may lead to a significant loss for the investor see de Palma and Prigent (2003). If the analysis of financial products is very sophisticated and uses mathematical tools lately, the study of investor behavior remains relatively underdeveloped.

Although risk aversion is a key factor determining the behavior of the investor, it is difficult to measure accurately the risk aversion in the context of financial investments. Indeed, risk aversion is expressed in two dimensions, one related to the economic liquidity or stability of income and the other expressing subjective psychological readiness of the investor to lose. One of the main difficulties in measuring risk aversion is related to its subjective nature that can not be measured only by using questionnaires trying to capture the key elements in the behavior of the investor.

Most methods for assessing the risk aversion developed today are based on models that explicitly assume linearity between the dependent and explanatory variables. Such models can be appropriate when we take into account the subjective nature of risk aversion. Indeed, standard approaches have failed to provide a quantitative assessment of risk aversion because of the nature of the questions asked and the process by which investors' responses are translated questionnaire. In a practical context, one of the most used, especially by financial institutions will be the method of scoring. The latter provides a method of preference measurement based on a series of questions "relevant" and answers with associated weights determined by experts. The total score is the sum of scores for each question. However, these weights are determined subjectively by experts. This may cause difficulties in cases of conflict, given that assessments of the opposing parties (investors and financial intermediaries) may not coincide.

Based on the importance of assessing the risk aversion and face the challenges identified for the measure, we propose an approach, like Ben-Akiva, de Palma and Bolduc (2002), Palma and Picard (2005), to study attitudes towards the risk of the investor. The latter combines both techniques of experimental economics (lottery-type questions based on risky assets and risk-free issues and on attitudes) and the flexibility of discrete choice models (see Anderson, de Palma and Thisse, 1992, McFadden 2001, Ben-Akiva, McFadden and Palma 2003). This approach is consistent with both the theory of expected utility theory and non-expected utility. Moreover, some research has developed estimates of risk aversion similar to ours, but which are implemented either as part of the theory of expected utility Hartog, Ferrer-i-Carbonell and Jonketand (2000) or in As part of the theory of non-expected utility Donkers, Melenberg, and van Soest (2000).

Our article mainly refers to the risk aversion of individuals in the context of financial investments, where the use of lotteries is of particular importance. For this reason we begin the first section by defining the lottery in classical decision theory. A typology of different lotteries will also be provided. In the second section, we emphasize the role of lotteries in the measurement of risk aversion of individuals in various websites designed for this purpose, as well as in the theoretical and empirical. In the third section, we proceed with the construction of lotteries on which our methodology for estimating the risk aversion of investors. First we present an analysis of
the different levels of trees lottery, then we present the method of bracketing. Once the level of the decision tree determined, we describe our lottery reference (or base) and its specificities. We explain the method of generating sets of lotteries transformed, their properties and invariance at the end of this section. Indeed, we generate two sets of lotteries: lotteries series additive and multiplicative series of lotteries to be used subsequently to test the utility functions. A conclusion will be presented in the last section.

1 LOTTERIES IN DECISION THEORY

The investment decision is a decision-making in a risky environment. Indeed, the purchase of securities is a financial investment whose future profitability is uncertain. This approach requires to describe the financial assets by random variables (or lotteries) that future payments are conditioned by the achievement of future events.

1.1 Definition and terminology

Lotteries have developed over the centuries to become an integral part of decision theory, allowing analysis of individual behavior in the presence of risk. A lottery is a choice between two or more options, more or less risky. The lottery is a concept that can represent the different possible realizations of a random event depending on the objective probabilities associated with those above. Lotteries are used to know the attitude of individuals towards risk. Indeed, as we shall see later on an individual's choice between different lotteries may be indicative of its behavior under risk.

Definition 1.1 Let \( X \) be a random variable whose realizations are \((x_1, \ldots, x_s)\). At each outcome \( x_s \), \( s = 1, \ldots, S \) is a probability \( p_s \), \( s = 1, \ldots, S \). These probabilities are assumed objective and their sum is equal to unity. There is a simple lottery \( L \), specifying the different possible outcomes and their probabilities: \( L: (x_1, p_1; \ldots; x_s, p_s) \).

The expectation of winning this lottery is: \( E = \sum_{s=1}^{S} p_s x_s \)

A lottery is a lottery composed of simple lotteries, such that: \( L(\tilde{X}_1, p_1; \ldots, \tilde{X}_s, p_s) \), where \( \tilde{X_s} \) a lottery where the probability of being obtained is \( p_s \).

Consider a lottery \( L_1(L_1, p_1; L_2, p_2) \) with \( L_1(x_1, q_1; x_2, q_2; x_3, q_3) \) and \( L_2(x_4, r_1; x_5, r_2; x_6, r_3) \). This composed lottery is equivalent to the simple lottery \( L_2(x_1, p_1; x_2, p_1q_2; x_3, p_1q_3; x_4, p_2; x_5, p_2r_2; x_6, p_2r_3) \).

1.2 Lotteries typology

According to the theoretical literature Alarie (2000), Alarie and Dionne (2001) and other items, and according to some surveys as (those of Canada Life, University of Bern, national bank, INOVESCO, proactive finance, Gardens, Pantheon, Mackenzie), we identify the importance of lotteries in determining the risk aversion of the individual. We will present the different forms they take and then we try to analyze them.

One type of lottery, is to ask people what they are willing to pay to participate in a lottery or otherwise to avoid random loss. These lotteries are used to classify individuals according to their
risk aversion. The higher the amount offered to participate in a lottery is less important individuals are risk averse, so their coefficient of risk aversion decreases with the amount proposed. Similarly if one asks how the individual is willing to pay to avoid a probable risk, the greater the amount is increasing risk aversion increases and the higher the coefficient of risk aversion increases. The amounts proposed are increasing but should not exceed the amount of earnings or insurance. Indeed, a person would choose such an option would be inconsistent. We find somewhat the same type of test questions in the Garden, in the questionnaire of Mackenzie Financial Corporation and the University of Bern.

The second type of lottery, is to ask people to choose among several lotteries. Most questions are composed of about four lotteries. They are most often in the form of different types of portfolios with expectancy levels higher or lower levels of variance and more or less important.

The third type of lottery, provides individuals to choose among different forms of winnings, lottery, · · ·

We find this type of lottery in the test PROACTIVE Financial Management in the questionnaire and the Pantheon, where the effect of low probability is highlighted.

2 LOTTERIES ROLE IN ESTIMATIONS OF RISK AVERSION

To date, we can say that there is no study on estimation of the risk aversion of investors who may be perfect. However, with a view to improving the estimation of the individuals risk aversion, several studies have emerged (see Brooks and Zank, 2004; Goeree, Holt and Palfrey, 2003; Holt and Laury, 2003; Jörg, 2003; Pfiffelmann and Roger, 2005; Segal, 1990). The use of lotteries is often a starting point in thinking about the new measures proposed in the literature.

We presenting the different lotteries from questionnaires (Bank or insurance, · · ·) on the Internet dedicated to the measurement of risk aversion of investors. A review of the important studies is done, where we examine the various methods used to analyze the risk aversion of individuals as well as lotteries most common in the determination of risk aversion.

2.1 Lotteries in the Internet questionnaires

On many websites, we find that the questionnaires are designed to determine the investment profile of an individual based, in particular, its attitude towards risk. We will focus, in particular, different lotteries that use these questionnaires. The results are generally presented in three classes form (conservative, moderate, dynamic).

Most questionnaires were obtained from the sites of banks or insurance. The number of questions from one test to another is very variable, between five and twenty questions. However, the majority of the questionnaires in these sites do not contain questions lotteries. We cite as an example, sites relating to financial products: www.ascolife.be, including a questionnaire in the name ASCO LIFE consists of 10 questions. www.bbtfunds.com site, including a questionnaire to as BBT Funds, consisting of 10 questions. www.weissra-tings.com site, including a questionnaire in the name WEISS RATINGS, composed of 17 questions. www.lamaritime.ca site, including a questionnaire under the name The Maritime composed of 5 questions.

Other sites focus on the banking business, as the site http://fondsbanquenationale.inves-net.com/gip/f/gip.htm, with a questionnaire as the National Bank, composed of 6 questions. www.rbcbanqueroyale.com site, including a questionnaire under the name RBC Royal Bank, consisting of 7 questions. www.axa.be site, including a questionnaire
in the name of AXA, consisting of 11 questions. www.bcv.ch site, a questionnaire known as BVC, consisting of 9 questions. www.clictrade.fr site, a questionnaire known as Click Trade, covers online brokerage, consisting of 7 questions.

Other websites have a questionnaire with a single lottery, we cite as an example www.canadalife.com site includes a questionnaire under the name Canada Life consists of 15 questions, covers the activities of Insurance and includes a lottery as a choice between a sure gain and a gain random. www.inovesco.com site includes a questionnaire to as INOVESCO, consisting of 7 questions on the activities and insurance and financial products and includes a lottery as a choice between several risky investments. The site www.proactivefinancial.com a questionnaire to as PROACTIVE, comprising 21 questions, covering financial products and has a form of lottery winnings: draw, gain some. www.desjardins.com site, a questionnaire as the Garden, with 6 questions on financial products and includes a lottery as a choice between several types of risky investments.

Some sites include a questionnaire consisting of lotteries, fails to advise the potential investor, which shows their non-qualification questionnaire, as the site www.cam.org/ white / pantheon / a questionnaire under the name Pantheon, with 8 questions and on financial products, gives the following results: and has not received a lottery as a choice between different forms of earnings: draw, gain some. www.mackenziefinancial.com site, a questionnaire under the name Mackenzie, comprising 15 questions on the management of mutual funds, results would not include lottery and managed as choices among several investments and games of chance.

The questionnaire is the most important is a study conducted by the University of Bern on the risk aversion of men and women. www.ifm.unibe.ch the site, a questionnaire as the University of Bern, comprising 76 questions, and on academic activities and has several lotteries on the choice among several investments.

2.2 Lotteries in estimation of risk aversion

Various works have been performed on risk measurement, used lotteries. We will present synthetically the main work. We focus on the methodology and major findings.

- Donkers, Melenberg and Van Soest (2000) aimed to estimate the individuals behave in the presence of risk by creating an risk aversion index. They were used as databases VSB-Panel (1993), which consists of 2593 households. The latter is divided into two bases: the first consists of homogeneously, the second includes only individuals with wages included in the 10% of the highest salaries. They proposed two types of respondents lotteries. The first five, presented in table (1), consist of a choice between two lotteries.

The second, presented in table (2), are to give the probability of winning for agreeing to participate in a lottery suggested against a starting sum they have won. Their estimation method is to apply the expected utility theory as a first step, using two types of questions. Then, using a semi-parametric model, they resorted to the cumulative prospect theory. Their estimate is done according to the following equations: For the first type of question:

$$ P(q \text{ certain lottery chosen to question } \mid x) = G(x \beta^q), \text{ with } G \text{ an unknown function assumed increasing, } x \text{ the vector of individual characteristics and } \beta \text{ a vector of parameters.} $$

For the second type of question:

$$ E(PE^q \mid x) = F(x \beta^q), \text{ with } F \text{ an unknown function assumed increasing, } x \text{ the vector of individual characteristics, } \beta \text{ a vector of parameters and } PE^q \text{ the equivalent probability given by individuals.} $$

Then, they tested the existence of a single risk index. This hypothesis was strongly rejected.
Indeed, the interval of the index changes with applied theory. With expected utility, it is $[-2.3]$, while with the CPT it is $[-2.7,3.7]$. 

- Moreover, Hartog, Carbonell and Jonker (2000) tried to estimate include individuals in the presence of risk and determine the variables that influence attitudes in the presence of uncertainty. They used three different bases for their estimates: Brabant survey (survey on the family with 2800 individuals), Accountants survey (survey of 3000 accountants in 1999) and GPD newspaper survey (people are asked about their income, their work and personal characteristics). Regarding the type of lottery, people must give their reserve price to participate in a proposed lottery. The percentages of individuals at risk for showers all three bases are given in table (3). In their estimation method, they used the theory of expected utility to calculate the Arrow Pratt (see Pratt, 1964) approximation to obtain a coefficient of risk aversion. They also used their estimates in the OLS and a two-step procedure of Heckman.

- However, Brachinberg H. W., Brown M., Gysler M., Schubert R., (1999), wished to verify the idea that women are more risk averse. They believe that this result is largely due to questions about lotteries too abstract. The authors attempted to compare their results where lotteries are abstract and where the questions are concrete. For this they have established four lotteries. The first is a lottery represented as an investment. The second is a lottery represented in the form of insurance. The third is a lottery with the abstract end of the earnings and the fourth is a lottery whose outcome losses. For each of these lotteries the individual must give his certainty equivalent. Their estimation method is to estimate the relationship between individual behavior toward risk and sex, they used to do the MCG. Moreover, the difference in attitudes between women and men may be due to differences in income. So they introduced income as an explanatory variable. It seems the views of their study that women are not more risk averse than men. The differences are strong in the case where the issues are abstract. They therefore concluded that lotteries are not abstract a good tool for measuring differences in risk behavior of men and women.

- One pioneer in this field is the study of Barsky and al. (1997) on U.S. data (HRS). This study aims to simultaneously estimate for each respondent, risk aversion and preference for the present, focusing on ordinal measures. In terms of risk, Barsky and al. (1997) use a hypothetical choices on a chained series of lotteries on income risk professional to directly estimate the relative risk aversion. This measure, denoted $\theta$, implies homothetic preferences and maximization of expected utility, is no objection on pollution by other factors.

- Other recent studies Luasardi (2002) and Ameriks and al. (2003) on U.S. data merely as qualitative measures, derived from relatively concrete issues concerning both the preferences towards risk and time, and the "propensity to plan." The main difference is that the cited studies never use one or two subjective questions, assuming they are sufficiently well laid to be able to identify the preference setting in question and eliminate as much as possible the impact of uncontrolled pollution factors. To compensate for the reduced number of questions, these studies merely to introduce a gradation in the detailed answers. For example, with Ameriks and al. (2003), the key question "I have a great deal of Spend Time Developing a Financial Plan", the answers are well into six categories of codes 1 = "Strongly disagree"to 6 = "Agree Strongly".
• The book Arrondel and Masson (2007) "Unequal heritage and individual choices"\textsuperscript{3}, examines the context of risky future with a probability distribution known by the agent, has attracted the attention of researchers. The authors have attempted a realistic behavior with respect to the risk by considering the transformation of probabilities and loss aversion. In addition, they adopted six preference parameters to characterize the risky choices of the investor. The originality in their research, in this case is the consideration of a single parameter of attitude towards risk, but may vary by area and time preference between impatience and short term altruism ...

Their goal is to classify individuals against each other, by purely ordinal measures and consequently forego measuring parameters clearly identified. To do this, they offer a choice between lotteries to determine the relative risk aversion in a standard framework. Their basic principle for the construction of indicators is that no item is unambiguously indicative of the parameter of taste, but the summation carried out for the construction of the score should show a clear outline of this noisy information. For this they use as a means, a multiplicity of questions of any nature (beliefs, intentions, practice) and covering a multitude of areas. They approached each preference by a large number of disparate issues, concerning both the choice of everyday life that opinions or plans of the individual, and that in many areas of life.

3 CONSTRUCTION OF LOTTERIES

Previous studies have shown the importance of the use of lotteries in the determination of individual behavior in the presence of risk. As we have already seen many surveys use lotteries to determine the level of tolerance of individuals towards risk. We are looking to build lottery, which will clearly forward the attitudes of individuals in the presence of risk. For this, we draw on the method used by de Palma and Picard (2005) in their study of risk in the context of transport. This one creates a set of classes for different levels of risk aversion. We seek to build a set of lotteries that we can order and allowing individuals to differentiate between them.

Each issue will be proposed to the individual a safe alternative and a risky alternative. This one will feature two exits: one better than the other. The second question to be asked of respondents who depend on the response has been made in the previous step. Indeed, if the individual has chosen the safe option, the lottery will be given to the second question would be more beneficial and present less risk. Otherwise, it will be offered a lottery riskier than the last. To do this we must first determine the level of the decision tree.

3.1 Principles of lottery optimization

We will present the importance of determining the level of lottery trees, allowing for the optimal information for the calculation of risk aversion. We then define the method of bracketing to give the limits of optimal intervals of risky choices.

3.1.1 Optimal level of the lottery tree

Through a comparative analysis between the trees to one, two or three levels, we propose

\textsuperscript{3}Some parts of this book have been largely incorporated in all five articles, co-authored by L. Arrondel (CNRS and PSE-ex Delta ), A. Masson (CNRS, EHESS and PSE) and D. Orchard (INSEE). These five items form the special issue of Economics and Statistics 374-375 (2005) under "Preferences of savers and wealth accumulation. " The sixth "preference towards risk and the future types of investors" is published in Land Economics and Sociology of confrontation (2005)
to determine which provides the necessary information on specifications and quantities for a better estimate of risk aversion. To do this, we perform a maximization of the likelihood of a good prediction of the econometrician.

• For a tree level: we offer to individuals to choose between a risky option and an option to some. This tree used to classify individuals into two categories depending on their level of risk aversion. Individuals have two choices of response: a risk with a probability \( p_1 \) and a clear choice with probability \( p_2 \). We note that

\[
P(\text{individual } i \text{ chooses } j) = p_j
\]

The objective is to maximize the probability of a good prediction of the econometrician.

\[
\text{max}(P(\text{good prediction}) = p_1^2 + p_2^2)
\]

So we get, \( p_1 = p_2 = \frac{1}{2} \).

• For a tree with two levels, we propose a series of two lotteries. For the first question we ask respondents to choose between a safe alternative \( L_s \) with a certain gain and a \( s \) risky alternative \( L_r \) which is a lottery following the uniform law on the interval \([r_1, r_2]\). For the second question, if the individual select the risky alternative we propose to him to choose between the same certain alternative as in the first issue \( L_s \) and \( L_2 \) riskier alternative than \( L_r \). If the individual chooses the certain alternative, we will offer the same alternative sour \( L_2 \) and a less risky alternative \( L_4 \) than \( L_r \). Trees at two levels used to classify individuals into four categories (RR, RS, SR, SS) \(^4\) respective probabilities \( p_1, p_2, p_3, p_4 \). An individual is class 1 if selected RR, Category 2 if selected SR, category 3 if selected SR and category 4 if selected SS.

\[
\text{The objective is : } \text{max}(\text{Proba}(\text{good prediction}) = p_1^2 + p_2^2 + p_3^2 + p_4^2)
\]

So \( p_1 + p_2 + p_3 + p_4 = 1 \).

Applying the Lagrangian method, and writing the first order necessary conditions, we deduce that \( p_1 = p_2 = p_3 = p_4 = \frac{1}{4} \). Therefore, trees at two levels used to classify individuals into four categories (RR, RS, SR, SS) with a probability to the optimum of \( \frac{1}{4} \). Thus, trees with two levels give more information on individuals allowing a better measure of risk aversion.

• For a tree with three levels, we offer individuals to answer a series of three questions. For the first question we ask people to choose between a certain alternative \( L_s \) with a certain profit \( s \) and a risky alternative \( L_4 \) which is a lottery after the uniform law on the interval \([r_1, r_2]\). For the second question, if the individual select the risky alternative we propose to him to choose between the same certain alternative that in the first issue \( L_s \) and \( L_2 \) the riskier alternative than \( L_4 \). If the individual chooses the certain alternative, we will offer the same certain alternative \( L_s \) and \( L_6 \) the alternative which is less risky than \( L_4 \). The third question depends on the individual's

\(^4\) \( R(=1) \) is the risky choice and \( S (=2) \) is the clear choice with
response to the first and the second question, with the same logic. Based on second order stochastic dominance, we say that $L_2$ dominates $L_4$ if and only if $L_2$ is preferred to $L_4$ for any concave utility function defined on $[a,b]$.

Thus, the seven lotteries are ranked the riskiest $L_4$ to the least risky $L_1$ according to the criterion of stochastic dominance. As a result individuals are classified into eight categories according to their degree of risk aversion (RRR, RRS, RSR, RSS, SRR, SRS, SSR, SSS) with respective probabilities $p_1, \cdots, p_8$. The individual is class 1 if he chooses RRR, class 2 if he chooses RRS, \cdots and class 8 if he chooses SSS. Applying the same method as before,

$$\text{max}(\text{Proba}(\text{goodprediction}) = p_1^2 + p_2^2 + p_3^2 + p_4^2 + p_5^2 + p_6^2 + p_7^2 + p_8^2)$$

So, $p_1 + p_2 + p_3 + p_4 + p_5 + p_6 + p_7 + p_8 = 1$

We deduce that $p_1 = p_2 = p_3 = p_4 = p_5 = p_6 = p_7 = p_8 = \frac{1}{8}$. Therefore, trees at three levels allow the optimum classify individuals into 8 categories with probability $\frac{1}{8}$. Thus, trees with three levels give more information about individuals that trees with one or two levels, allowing a better measure of risk aversion.

- For a tree with three levels, provides more information on population, since the division into 16 categories, but the difference is not very significant compared to the three levels.

So with the maximization of the likelihood of a good prediction, we find that the higher the level of the tree increases, we have information on the individuals risk aversion. But there is a certain level where we get more meaningful information on the individual risk aversion. Studies on the variance analysis, can observe the dispersion for each level of the tree, comparing average levels of the tree. And this, to infer a relationship between the level of the tree and the rate of information provided to determine the level of the tree. Indeed, the variance for a two-level tree is less than that for a tree at one level, this difference means that the dispersion for a tree with two levels is lower than that for a tree to one level. Thus, we make fewer errors by a tree rather than a two-level tree level. Similarly, the variance for a tree with three levels is significantly smaller than that for a tree with two levels.

These differences are reflected by the fact that the rate information provided by a tree with three levels is much greater than that provided by a shaft to one or two levels. However, for a tree with four levels, the variance will be smaller than a tree with three levels, but not significantly. So a tree with three levels allows for information to calculate the optimal risk aversion.

### 3.1.2 Bracketing principle

Bracketing is the design of a stability study where only the samples correspond to extreme values of certain variables (here the extreme intervals of risky choices) are tested. Bracketing is used to estimate the risk aversion of an individual. Its principle is as follows: we propose an individual to choose a clear choice between $s$ and a risky lottery that is a bit of a law on $[r_1, r_2]$.

We consider a small step bracketing $\epsilon$. If the individual make a risky choice, we offer him a risky choice following the law binary on $[r_1 - \epsilon, r_2 - \epsilon]$. If the individual make again a risky choice, we will propose a new risky choice following the law binary $[r_1 - 2\epsilon, r_2 - 2\epsilon]$. We continue...
in this same process until the individual makes a certain choice. If the bracketing is continued, the interval is becoming smaller and tends to the lottery expectation.

### 3.2 Reference series of lotteries

Lotteries are used to classify individuals according to their risk aversion. For this, they must be ordered. We also hope that the values provided for those outcomes are plausible and if possible integers. We aim also, that once individuals are grouped in a class, they shall be relatively uniform in size. To preserve the stochastic dominance between lotteries, we change between each row a single lottery outcome. Therefore, the certain outcome will always be the same for each question. Our lotteries concern random return investment. The certain outcome is thus the risk-free rate investment, the same whatever the stage of the questionnaire, \( r_s = 2\% \).

We propose individuals, like Palma and Picard (2005), a series of three lotteries to measure and quantify their ability to take risk. This series of lottery is presented as a tree with three levels. The problem with three stages is shown in Figure (1).

The person who chooses the certain alternative to question \( L_7 \) will be the one with the most risk-averse. Conversely, if the question \( L_1 \) it opts for the risky alternative, it will have the lowest level of risk aversion. This reasoning is of course true that if lotteries are ordered:

\[
L_5 > L_6 > L_7 > L_4 > L_5 > L_6 > L_7
\]  \( (1) \)

In fact, we classify individuals according to the interval in which is the safe alternative. We try to establish a set of ordered lotteries. For this we will seek the conditions under which a set of lottery ordered.

We use a standard form sets of three lottery, which can be represented by a decision tree. Basis lottery that we adopt is depicted in Figure (2). A series of basic lottery is a tree with three levels. Each respondent answered three questions selected from among \( 2^3 - 1 = 7 \) questions involving lotteries 1 to 7. The number of possible answers is \( 2^3 = 8 \), which corresponds to the number of ordinal risk category in which investors can position themselves. These categories are: RRR, RRS, RSR, RSS, SRR, SRS, SSR, SSS.

The individual most risk-averse is SSS, while the individual the less risk-averse RRR. Lotteries are arranged such that the individual SSR is more risk averse than an individual who meets SRS. In other words, information on risk aversion is higher at the first level and less at the last level.

- More specifically, the first question, the respondent must choose between safe alternative \( L_s \) and risky alternative \( L_4 \), for which the lower and upper limit are \( [r^0_{1,4} = 12\%, r^0_{2,4} = 24\%] \).

  The response of indifference between \( L_4 \) and \( L_s \) is not proposed. The return is fixed \( r^0_s = 2\% \) is less than the average of random return \( \frac{12 + 24}{2} = 6\% \). So the risk neutral investor prefers the risky alternative \( L_4 \) to \( L_s \).

- For the second question in the series lottery, the respondent must choose between \( L_s \) and a risky alternative \( L_2 \) or \( L_6 \), depending on its response to the first question. If the respondent
has previously selected the risky alternative \( L_4 \), we will propose the lottery \( L_2 \) with \([r_{1,2}^0 = -18\% r_{2,2}^0 = 30\%]\) which is more risky than \( L_4 \). If the respondent selected the safe alternative \( L_s \), we will propose the lottery \( L_6 \) with \([r_{1,6}^0 = -6\% r_{2,6}^0 = 18\%]\) which is less risky than \( L_4 \). The expected rate of return is the same for \( L_2 \) and \( L_6 \) for \( L_4 \) is equal to 6%.

Finally, the third lottery in the series depends on the answers of the first and second lottery, using the same logic as just described.

The easiest way to construct lotteries is that they satisfy this property, based on second order stochastic dominance. Without explanatory variables, this classification in the eight categories is the best that can be achieved responses. However, with explanatory variables, we will see how it is possible to refine the estimate of risk aversion. We propose to compute the decision problem for the different thresholds of indifference to each class.

However, several sets of lotteries are generated, like, Palma A. and Picard N. (2003), de Palma A., Picard N. (2005), de Palma A., Picard N. (2006) in the context of transportation problems and Palma, A. and N. Picard (2002) in the context of investment, calculated from a reference series. Each lottery entails a choice between a certain and a risky alternative. The certain alternative \( L_s \), is characterized by a certain return rate \( r_s^0 = 2\% \) (which is the same for each question), whereas the risky alternative \( L_j \), is characterized by a random return rate \footnote{The return rates are net of inflation and tax-free. uniformly distributed on \([r_j^0, r_j^0]\) for all \( j = 1, \ldots, 7\).} The return rates are net of inflation and tax-free. uniformly distributed on \([r_j^0, r_j^0]\) for all \( j = 1, \ldots, 7\).

The questionnaire contains 10 sets of lotteries. In the three first sets of lotteries, the returns are considered uniform over a specific interval of the lottery. Each set comprises 7 lotteries that are ordered in the sense of stochastic dominance of order 2 (same mean, variance increasing).

In the following three series (series 4, 5 and 6), returns follow a binary equiprobable with the same chance (50%) for the lower return and the higher returns. Each set comprises 7 lotteries that are ordered in the sense of stochastic dominance of order 2 (a lottery to the next, only the lower or higher return rate change). Series 7 and 8 provide a low probability (which varies from one issue to another) significant loss. For a given series, the returns are lower and upper set, and the likelihood of substantial loss is increasing in a lottery to the next in the series, which allows to classify a series of lotteries under the dominance of order two. Series 7 and 8 has a low probability of large loss, while the series 9 and 10 offers a low probability of jackpot.

Their minimum return rates \( r_{ij} \) is generally negative, but their average return is always positive and higher to certain return \( r_s^0 > 0 \), corresponding to a certain asset \( L_s \) (degenerate lottery).

Each lottery \( L_j \), the returns considered on the set \( \{r_{j1}, r_{j2}\} \) are such that:

For all \( j \) we have either

\[
\begin{align*}
    r_{j1} &= r_{(j+1)1}, r_{j2} < r_{(j+1)2} \\
    \text{Either,} \quad r_{j1} &< r_{(j+1)1}, r_{j2} = r_{(j+1)2}
\end{align*}
\]

Note further that the relationship between the rate of return \( r \), used in our lotteries and

\[
159
\]

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wealth argument utility function is: \( x = 1 + r \).

### 3.3 Transformed series of lotteries

In order to check how the risk aversion depends on the efficiency levels (scale effects), we propose to generate based on our basic lottery, two lotteries families \( L_j \): additive and multiplicative lotteries, for \( j = 1, \ldots, 7 \); where \( k \) indicates the number of series.

This is because we find that some utility functions retain their coefficients of risk aversion for additive lotteries constant, while others retain their utility functions coefficients of risk aversion for multiplicative lotteries constant. These series of lotteries will enable additive and multiplicative test the type of function that represents the preferences of individuals.

From our basic lottery, we generate 30 different additive series and 14 multiplicative series. 1 in 45 series is randomly assigned to each respondent. We consider a series of lottery that has the same order for all individuals in the population.

It should be noted that we also vary the rate for certain alternative. We have set a limit for random returns -20% and 30%. We can verify that the coefficients remain constant between lotteries on the one hand additive lotteries and on the other hand multiplicative loteries. However, for multiplicative lotteries, we do not find exactly the same thresholds as we rounded close to 0.25 our results.

#### 3.3.1 Additive series of lotteries

In the series of additive lotteries type, the individual \( i \) is subjected to a series of three Lotteries chosen based on earlier responses in a 7 Lotteries \( L_j \). When the additive series design, the constants \( \lambda^k \) have been defined for that lotteries \( L_j \) different individuals proposed to be additive.

All values of returns min, max and certain simultaneously raise \( 0.5\% \) in \( 0.5\% \) from the basic lottery. All these lotteries are equivalent if the absolute risk aversion is constant. The additive series are obtained by adding \( \lambda^k \) for all returns:

\[
\begin{align*}
    r_i^k &= r_i^0 + \lambda^k, \\
    r_j^k &= r_j^0 + \lambda^k, \\
    r_j^k &= r_j^0 + \lambda^k
\end{align*}
\]

#### 3.3.2 Multiplicative series of lotteries

In the series of multiplicative lotteries-type individual \( i \) is subjected to a series of three lotteries chosen based on previous responses in a 7 lotteries \( L_j \). When designing the survey, the constants \( \lambda^k \) have been defined as lotteries \( L_j \) different individuals proposed to be multiplicative.

All values min, max, and certain (for 1+ return rate) are simultaneously multiplied by \( 1.02 \) to \( 1.12 \) from the basic lottery. All these lotteries are equivalent if the relative risk aversion is constant. Multiple series are obtained by multiplying all the returns by the same constant \( (1 + \lambda^k) \):

---

5 \( \lambda^k \) is the product of a certain return by indicator is 1 if the transformation is additive and 0 if not.
6 \( \lambda^k \) is the product of a certain return by indicator which is 1 if the transformation is multiplicative and 0 if not.
3.3.3 Lotteries invariance and properties

**Definition 3.1** Preferences of an individual are "additive invariant" if he class \( L_i^k \), independently of the value of the additive parameter \( \lambda_i^k \).

In the context of a lotteries series, the above definition, means that an individual will give the same three responses when responding to one of 30 sets of additive lotteries. In this case, if \( \lambda_i^k \) is added to all returns are considered in the series, this does not affect the responses to the series.

**Definition 3.2** preferences of an individual are "multiplicative invariant" if he class \( L_i^k \) independently of the value of the multiplicative factor \( \lambda_i^k \).

Similarly, the above definition means that an individual must give the same three responses to any series of 14 multiple series. In this case, if \( (1 + \lambda_i^k) \) is multiplied all returns considered in the series, this does not affect the responses to the series.

Since each respondent faced only a lotteries series, we extend the previous definition, and we treat two individuals with similar characteristics as an individual. We consider that preferences are "additive invariant" to the same level if all individuals with similar characteristics, which differ only by additive parameter \( \lambda_i^k \) lotteries series to which they are face, give the same set of answers. If not, we say that preferences are additives effect of scale at the sample level.

Similarly, preferences are invariant multiplicative level of sample, if all individuals with similar characteristics, which differ only by multiplicative parameter \( \lambda_i^k \) lotteries series to which face, give the same series of responses. If not, preferences exhibit a multiplicative scale effect.

3.4 Other features of lottery

3.4.1 Invested amount

The utility depends on the amount available at the end of the investment period. The final amount, \( M \) depends on the amount initially invested \( M_0 \), and the interest rate (random or certain), \( r \) in the period:

\[
M = M_0 (1 + r)
\]

In order to be exogenous variables, a random initial amount \( M_0 \) is proposed. Performance and some parameters for the distribution of returns for different lotteries are determined randomly, so the final amount can be assumed exogenous in the regressions. Specifically, for each individual, the proposed amount varies randomly: For "small" investors (who say they want to invest an amount less than threshold), the proposed amount may be so random equiprobable between
While for the "big investors" (who say they want to invest more than the threshold) the proposed amount can take it on a random equiprobable between $[M_{0.3}, M_{0.4}]$.

The interest to vary the amount of random is to measure the effect of the amount invested in risk aversion. However, the advantage of dividing the population into two is to provide more relevant amounts. The disadvantage of this division, it is impossible to make plausible predictions about the consequences and propose amounts in the other category in which the person is located.

### 3.4.2 Time horizon

Moreover, the duration of the proposed investment is between 5 and 20 years for medium term investors (who say they want to invest over a period of less than 15 years) or between 15 and 35 years for long-term investors (who says want to invest over a period exceeding 15 years).

Similarly, for each individual, the proposed duration varies randomly. For medium-term investors (who say they want to invest for less than 15 years), the proposed period may take as equiprobable values between 5 and 20 years.

For long term investors (who say they want to invest in longer than 15 years), the proposed period may take as equiprobable values between 15 and 35. Finally, the time horizon to be considered for investment is generated randomly.

### 4 Experimental laboratory in the context of financial investments in Tunisia

In the context of the experimental economy, we developed an experimental laboratory, as far as we know, the first in Tunisia, on the evaluation of the risk aversion of the individuals in the context of the financial investments in Tunisia (see Brook and Zank, 2004; Goeree, Holt and Palfrey, 2003; Holt and Laury, 2003; Luce, 2000; Roth, 1988). We conducted experiments in a guided and controlled way which measured and quantified the individual reactions towards situations where the risk was on the financial investment. Respondent were encouraged to provide sincere answers with a remuneration related to their answers. Indeed, the choices of the individuals determine their earnings.

#### 4.1 Experimental protocol

In order to measure the risk aversion of the same individual in several situations of choice, we tried to vary the context of the decision-making, and to evaluate the effect of each variable in order to trace the risk aversion of the same individual for different risk levels, amounts and time investments. Indeed, the aversion to risk involves specific part to the investor when he makes his choices while the other part is related to the context of choices by the sets of lotteries (see Pfiffelman and Roger, 2005).

$[M_{0.1}, M_{0.2}]$ correspond to the lower bound and upper bound within which an amount may be randomly assigned to a small investor.

$[M_{0.3}, M_{0.4}]$ correspond to the lower bound and upper bound within which an amount may be randomly assigned to a major investor.

The same remarks apply to the amount here.

Experience is a set of observations production sessions in a controlled environment.
The financing of the experimental sessions related to our research was provided by the French National Agency of Research (ANR). The experiments were conducted at the High school of commerce of Tunis, in a computer room equipped of broadband Internet so as to get easily connected the site www.RiskToleranceOnLine.com. However, we adapted the questionnaire of the Web site to the Tunisian context (reference currency, adapting the invested amounts in dinars, Tunisian diplomas.

The experimental sessions were held from February 2008 to April 2008. Given the planned treatments, 30 experimental sessions; each including between 9 and 15 subjects were conducted. The average duration of the experiments was approximately 1h30. The subjects were mainly students of second degree in economic sciences, finance, the teaching and administrative staff of the universities. We collected 400 respondents, during this experimental laboratory. Each participant, responded to 10 series of lotteries. We selected for our estimates only 386 respondents. During each session, the subjects made choices to ten series of lotteries. In addition, they were informed of the number of sets of lotteries to be filled. The only modifications among the series of the lotteries game were the laws of return of the lotteries and the interval terminals where its returns vary. Indeed, we prepared 10 sets of lotteries.

The experimental sessions were held from February 2008 to April 2008. Given the planned treatments, 30 experimental sessions; each including between 9 and 15 subjects were conducted. The average duration of the experiments was approximately 1h30. The subjects were mainly students of second degree in economic sciences, finance, the teaching and administrative staff of the universities. We collected 400 respondents, during this experimental laboratory. Each participant, responded to 10 series of lotteries. We selected for our estimates only 386 respondents. During each session, the subjects made choices to ten series of lotteries. In addition, they were informed of the number of sets of lotteries to be filled. The only modifications among the series of the lotteries game were the laws of return of the lotteries and the interval terminals where its returns vary. Indeed, we prepared 10 sets of lotteries. The monetary incentives were varied according to the individual choice. Starting with an initial equal amount for all the respondents that is worth 30 Tunisian dinars, the final remuneration consisted of this amount that was multiplied by the output corresponding to the choice which was made on one of the 10 series of lotteries drawn at random. The choice of the initial monetary values took into account several potentially contradictory constraints. We carefully selected this initial amount by resorting to excavated pilot studies (with about fifteen subjects). To be remunerated, the individual randomly drew a number between 1 and 10 that corresponded to the series determining his gain. Specifically, after having answered the 10 series of lotteries, a summary table containing again the questions and answers of the individuals was displayed at the end:

- If the randomly drawn series number, corresponded to a series in which individual carried out an unquestionable choice, then remuneration is the rising basic one (30 Dinars Tunisian) multiplied by the unquestionable yield which it chose at the time this series.
- If the randomly drawn series number corresponded to a series in which the individual made a specific choice, then the output is the basic amount (30 dinars) that is multiplied by the output rate that one has chosen in the series.
- If the randomly drawn series number corresponded to a series in which the individual made a specific choice whose output followed a binary equiprobable law (series 4, 5 and 6) we must launch a coin. If it was pile, we multiply the negative output by the basic amount. But if it was face, we multiply the positive output by the basic amount.
- If the randomly drawn series number has a uniform output (series 1, 2 and 3), it is necessary to proceed as follows: if the output uniform varies between -5% and 20%, it is necessary to have drawn a paper in a ballot box which contains written papers of -5%, -4.5%, , 19%, 19.5%,

The experimental session is a sequence of games within the same group of players.

The table is displayed for the individuals who are only connected within the experimental laboratory (with a particular password that the experimenter introduced at the beginning of the experiment) and obviously answered the 10 series.

The proposed amounts were discussed here in euros. However, during the Tunisian data-gathering, we transformed the amounts into the Tunisian dinar and we calibrated the proposed sums according to the context of investments in Tunisia.
20%. The output drawn from the ballot box is multiplied by the basic amount.

- Finally, if the randomly drawn series number corresponded to an output with a small probability of large loss or Jackpot (series 7 to 10), it is necessary to proceed as follows: if for example the respondent chose a lottery with 5% of chance to have -20% and 95% of chances to have +10%, it is necessary that the individual draws a paper in a ballot box with 19 papers written on them "max" and 1 paper written on it "min". If it draws the min, he receives -20% multiplied by the basic amount and if he draws the max, he receives 10% multiplied by the basic amount. However, for the series 7 to 10, the low probabilities of loss or jackpot vary from a lottery to another for the same individual as well as the output rates vary from one individual to another.

4.2 Risk aversion classes

According to the table (4) that summarizes the distribution of the individuals responses to the lotteries series in the Tunisian sample, we found that the percentage of the respondents to be in the category of the less risk averse "RRR" was the highest and it is followed by the percentage of individuals in the category of respondents who are the most risk averse "SSS". Therefore, a priori the individuals in our samples were mostly either very risk averse or very playful.

The percentage of the individuals in the intermediate categories is almost identical. We thus, succeeded placed an individual according to his answers to the various series of lotteries on an increasing scale of risk aversion made up of eight classes of risk aversion (RRR, RRS, RSR, RSS, SRR, SRS, SSR, SSS).

CONCLUSION

To understand and predict the behavior of individuals facing many uncertain prospects, researchers have developed a theory known as the theory of expected utility. Models of expected utility theory assumes that the individual has an aversion to risk. This risk aversion is considered a fundamental element in the standard theories of lottery choice, asset pricing, contracts and insurance.

Furthermore, the use of lotteries to better characterize the risk aversion of investors. Several studies are currently underway in this direction by trying to better understand the contribution of this method and limits its use. In this article we discussed the importance of the lottery as part of the risk. The ultimate goal was to build a lottery to highlight the risk aversion of individuals. We started by presenting what a lottery as an analytical tool in the presence of risk. Once the theoretical elements presented, we reviewed the principal who made use of lotteries to determine the behavior of individuals in the presence of risk. That was indeed very useful since the ultimate goal was the construction of a lottery to be used as part of a questionnaire on risk.

For the first decision problem, we have put in place, we were inspired by the method used by Picard and Palma (2003) in their analysis of travel time. The purpose of the lottery was to have eight groups, if possible homogeneous, for classifying individuals according to their risk aversion. So we had to choose the right coefficients to have a range of classes the most varied possible. To build our lottery, we referred to the empirical literature. We then constructed families lottery multiplicative and additive based on a lottery basis that we met, to test the following type of preferences that individuals possess. These lotteries will be used later in a questionnaire to determine people's behavior towards risk.

In the context of the experimental economy, we developed the first experimental laboratory
in Tunisia, on the evaluation of the individual risk aversion in the financial investments context in Tunisia. We conducted experiments which measured and quantified the individual reactions towards situations where the risk was on the financial investment. Indeed, the choices of the individuals determine their profit. In order to measure the risk aversion of the same individual in several situations of choice, we tried to vary the context of the decision-making. Indeed, the aversion to risk involves specific part to the investor when he makes his choices while the other part is related to the context of choices by the sets of lotteries. This component of experimental economy that our work comprises enabled us to test various factors that were likely to intervene in the individual decisions in a risky environment.

REFERENCES


APPENDIX

<table>
<thead>
<tr>
<th>Question</th>
<th>% the riskiest choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choice between (1000;1) and (2000;0,5)</td>
<td>0,21</td>
</tr>
<tr>
<td>Choice between (30;1) and (45;0,8)</td>
<td>0,4</td>
</tr>
<tr>
<td>Choice between (100;0,25) and (130;0,2)</td>
<td>0,49</td>
</tr>
<tr>
<td>Choice between (3000;0,2) and (6000;0,01)</td>
<td>0,56</td>
</tr>
<tr>
<td>Choice between (0;1) and (1500;0,5;-1000;0)</td>
<td>0,12</td>
</tr>
</tbody>
</table>

Table 1: Presentation of the results of the first type question. Source: Donkers, Melenberg and van Soest(2000)
Table 2: Presentation of the results of the second type question. Source: Donkers, Melenberg and van Soest (2000)

<table>
<thead>
<tr>
<th></th>
<th>Brabant</th>
<th>Accountants</th>
<th>GPD newspaper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Averse</td>
<td>88,2</td>
<td>53,2</td>
<td>95,7</td>
</tr>
<tr>
<td>Neutral to risk</td>
<td>10,2</td>
<td>37,1</td>
<td>3,7</td>
</tr>
<tr>
<td>Risk lover</td>
<td>1,6</td>
<td>9,4</td>
<td>0,6</td>
</tr>
</tbody>
</table>

Table 3: Presentation of the individuals distribution according to their risk aversion. Source: Hartog, Carbonell and Jonker (2000)

![Figure 1: Representation of the decision problem](image)

Figure 1: Representation of the decision problem
Figure 2: Basic lottery

Appendix C

<table>
<thead>
<tr>
<th>Range</th>
<th>Choice</th>
<th>% sample of experimental economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RRR</td>
<td>29.09</td>
</tr>
<tr>
<td>2</td>
<td>RRS</td>
<td>9.80</td>
</tr>
<tr>
<td>3</td>
<td>RSR</td>
<td>7.76</td>
</tr>
<tr>
<td>4</td>
<td>RSS</td>
<td>9.34</td>
</tr>
<tr>
<td>5</td>
<td>SRR</td>
<td>9.78</td>
</tr>
<tr>
<td>6</td>
<td>SRS</td>
<td>6.90</td>
</tr>
<tr>
<td>7</td>
<td>SSR</td>
<td>8.20</td>
</tr>
<tr>
<td>8</td>
<td>SSS</td>
<td>19.14</td>
</tr>
</tbody>
</table>

Table 4: Recapitulation of the choice distributions of the Tunisian sample
DOES MANAGEMENT OWNERSHIP EXPLAIN THE EFFECT OF LEVERAGE ON FIRM VALUE? AN ANALYSIS OF FRENCH LISTED FIRMS

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Abstract

The purpose of this study is to analyze the influence of leverage on firm value. The emphasis is placed on the importance of managerial ownership in explaining the disciplinary role of debt in controlling the opportunistic behavior of managers. The empirical investigation examines a sample of 246 French companies of the SBF 250 and observed over the period 1997-2007. The results of using a priori classification approach show that the influence of debt on firm value is non-monotonic, reflecting the importance of managerial ownership as a determinant of this relationship. Indeed, for low/high levels of managerial ownership, debt conveys a negative signal to investors confirming an entrenchment/expropriation effect of minority shareholders. The disciplinary role of debt is much more pronounced for moderate levels of managerial ownership justifying an effect of alignment of interests between managers and shareholders.

Keywords: firm value, leverage, managerial ownership, entrenchment, expropriation, agency costs.

1. INTRODUCTION

During recent years, an extensive research effort has been devoted to models where capital structure is determined by agency theory. This latter is based on relationships between different groups of investors where information asymmetry is the source of conflict between insiders and outsiders (Fama and Miller 1972, Jensen and Meckling 1976). Thus the use of external financing in the presence of asymmetric information can give rise to conflicts between owner-managers on
the one hand and creditors on the other. This may lead the company to a sub-optimal investment policy, which is not consistent with the objective of maximizing shareholder wealth. Jensen and Meckling (1976), examining the influence of the existence of outside shareholders on firm value by comparing manager’s behavior as the exclusive owner of the company and what it would be if he held a portion of the capital. In this context, conflicts of interests between shareholders and manager arise because the latter do not hold the entire capital and therefore do not receive all the gains that are the result of their effort. According to Jensen and Meckling (1976), there is an optimal debt level for which total agency costs are minimized. Grossman and Hart (1980), also consider the issuance of debt as a means of solving conflicts between shareholders and managers. However, contrary to Jensen and Meckling (1976), they analyze the situation where managers do not hold shares or bonds. In this case, change in financial structure does not preclude managers to pursue a profit-maximizing objective. The incentive effect of debt will rather come from the long-run goal of manager to avoid interruption of business activities.

According to Jensen (1986), the presence of conflicts of interests between managers and shareholders are due to existence of non-profitable projects financed by free cash flows while these funds should be distributed to shareholders. Therefore, issuing debt is a way to monitor and control financial management behavior. In particular, entrenched managers with excess cash flow have incentives to spend inefficiently funds by practicing overinvestment policy. However, Jensen (1986) noted that the monitoring hypothesis does not imply that the issuance of debt has always positive effect on firm value. Companies must give the market the opportunity to evaluate the firm’s prospects. The author concluded that shareholders are supposed to indirectly control managers through financial structure. Similarly, Stulz (1990) shows that debt and dividend policies may discipline managers to undertake unprofitable projects, since they have resources available after financing all profitable projects. However, it is optimal to prefer debt constraint if the tax cost of dividend exceeds the marginal gain of debt.

The role of debt as an important mechanism to reduce agency problems in firms characterized by separation between ownership and control is a central theme of corporate finance literature. Following Jensen (1986), the question of the disciplinary role of debt as an active mechanism in the hands of shareholders who can use it to mitigate managers’ entrenchment strategies, raises more debate and needs further financial research (Grossman and Hart, 1980; Stulz, 1990, Hart and Moore, 1995, Agrawal and Knoeber (1996), Harvey et al. (2004), Datta et al (2005) ..). The argument underlying the disciplinary role of debt is as follows: When the firm has excess cash flows and low investment opportunities, debt can serve as a disciplinary mechanism that reduces agency problems between managers and shareholders. Debt implies the obligations to repay the liquidity in the form of principal and interest charges. If these obligations are not honored, creditors can declare the bankruptcy of the firm. Indeed, conflicts of interest and the risk of managers’ opportunistic behavior increase the firm’s capital cost, which implies that investors are reluctant to trust managers and provide more financial funds to the firm. In this case, the issuance of debt in the presence of excess cash flow may convey positive signal to the market which is replicated by an increase in firm value.

However, several studies have shown that this mechanism is not always effective. The positive effect of debt is not constantly observed. Two explanations are possible: (i) the negative reaction of stock prices to debt issues can be justified by the presence of negative “leverage effect”. In particular, return on investment is insufficient to meet interest payments on debt, which reduces the profitability of financial capital and therefore creating a crowding-out effect of the arrival of

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new investors. (ii) The second argument is justified by signaling theory which states that the opportunistic/expropriation behavior of the owner-manager outweighs the behavior of alignment of interest between them and minority shareholders. In this case, the resulting agency costs are sufficient to decrease the firm’s market value.

The analysis of the previous literature on this subject shows divergence in the study of possible associations between firm value, leverage and managerial participation. Indeed, most studies focus more on the impact of managerial ownership on firm performance (Demsetz 1983, Stulz 1988, Morck et al 1988, McConnell and Servaes 1990 ...), others analyze the behavior of debt under the entrenchment hypothesis. In this case, the empirical studies addressing the impact of debt on firm value neglect the role of managerial ownership as a fundamental factor in explaining market reaction to debt issue (Zingales, 2000, Claessens et al. (2002) Bhagat and Jeffersis (2002), Fluck (1998), Zhang (1998), Heinrich (2000), Brailsford et al (2002), Mahrt-Smith (2005), Ghosh (2007), Leonard (2009) Collins and Huang (2011)).

The purpose of this paper is to fill this gap by shedding light on the nature of the relationship between managerial ownership, firm value and debt. We seek to answer the following question: Does managerial ownership help to enhance or attenuate the relationship between firm value and debt as highlighted by Jensen and Warner (1988), Heinrich (2000), and Bhagat and Jeffersis (2002) ?. In other words, for different levels of managerial shareholdings, is sensitivity of firm value to any change of debt significant? Consequently, the positive or negative effect of this latter variable can explain behavior of entrenchment / expropriation or alignment of the manager.

To answer these questions, we have structured our study as follows: in the second section, we will analyze the previous theoretical and empirical literature which has developed the potential links between managerial ownership, debt and firm value. Section 3, will be devoted to the analysis of data and methodology. The results and empirical analysis are reported in section 4. Section 5 will conclude.

2. THEORETICAL MOTIVATION

Agency theory relative to corporate governance assumes firm as a nexus of contracts that relate all of its participants (shareholders, managers, creditors, customers, suppliers, employees ...). This research direction was initiated by Berle and Means (1932), Coase (1937), Alchian and Demsetz (1972), and developed by Jensen and Meckling (1976). Fama (1980), considers firm as a complex set of contractual relationships that define the rights of the parties involved. If each party maximizes its utility function, it is inevitable that conflicts of interests arise. In this context, several studies have examined the financial mechanisms that can limit and reduce the costs of these conflicts. According to Jensen and Meckling (1976), debt can be used to minimize agency costs. They showed that the larger a manager’s ownership in the firm’s capital, the lower is agency costs of equity (represented by a manager’s private consumption) and thereby the greater the value of the firm is suboptimal. The model of Diamond (1989) and Hirshleifer and Thakor (1989) as part of agency theory, determines the optimal capital structure under the hypothesis of conflict of interest between shareholders and creditors. They show how managers are encouraged to invest in projects relatively safe even at the expense of the firm’s reputation. According to Harris and Raviv (1990), managers are encouraged to continue the current operations of the firm even if investors prefer liquidation. Indeed, for managers liquidation means loss of their jobs, while for shareholders and creditors, it allows them to recuperate some of their funds (as residual claimants) and invest them in more profitable projects. Therefore, the use of debt reduces agency problem by giving creditors and shareholders an option to liquidate the firm if cash flows of investment are relatively low.
According to Stulz (1990), debt financing reduces the cost of overinvestment but increases the cost of under-investment. However, financing with equity increases the cash available to managers, reduces the costs of under-investment and increases the costs of overinvestment. The resulting optimal capital structure is determined by the trade-off between the benefits of debt consisting of the decrease of free cash flow (added discipline) and the cost of debt related to the possibility to abandon profitable projects because of the importance of financial distress risk. According to Zwiebel (1996), managers will not voluntarily increase leverage because it can be substituted by other mechanisms of governance. According to this view, managers try to avoid debt, but may be required by other governance mechanisms to increase leverage, which serves as an ultimate disciplinary mechanism to mitigate the problem of overinvestment.

Fishman (1989), Eckbo, Giammarino and Heinkel (1990) and Weston, Chung and Hoag (1990), Nandkumar and Switzer (1998) examined the impact of debt, managerial entrenchment, and other factors on stock prices reaction. Claessens et al. (2002) consider data from 1301 firms observed in eight Asian countries in order to examine the effect of ownership structure on firm value. They find that stock prices increase with cash flow right and decreases when the voting rights of largest shareholder exceed his property rights.

The paper of David and Diane (2006) is an extension of the empirical works developed by Myers (1977), Jensen (1986), Stulz (1990), Berger and Ofek (1995), Comment and Jarrell (1995), Lang and al. (1996) and Peyer and Shivdasani (2001), who consider the relationship between debt and investment, as well as empirical work of McConnell and Servaes (1990, 1995), who analyze the influence of debt on firm value. After examining descriptive statistics, David and Diane (2006) show that for diversified firms, the negative impact of leverage on investment is significantly more important for firms with high Tobin’s Q than for firms with low Tobin’s Q. The authors have also, examined the impact of debt on firm value and obtained results consistent with those of McConnell and Servaes (1995). Similarly the tests show that for firms with low growth opportunities, debt positively affects firm value. However, for firms with high growth opportunities, debt is inversely related to firm value.

Bunkawanicha et al. (2008) examine the relationship between debt and governance in emerging markets. The empirical results show that a poor governance system characterized by the presence of entrenchment problems led to high level of indebtedness. This relationship is much more observed in periods of crises. Garvey and Hanka (1999), Noe and Rebello (1996), Stulz (1990), Zweibel (1996), Jensen and Meckling (1976), and Limpaphayom Ngamwutikul (2004) and Nam et al (2003), Leonard (2009) analyzed the relationship between manager ownership and the change in debt around the announcement date of shares issue. The empirical results show that managerial ownership affects positively and significantly leverage for capital shareholding between 5% and 25%.

Collins and Huang (2011) examine the problem of estimating the cost of equity under the assumption of manager entrenchment. Using the index provided by Bebchuck et al. (2009), they show that high level of entrenchment is associated with an increase in the cost of equity. With the choice of leverage ratio below the desired level, Wang (2011) shows that small firms are more affected by the negative effect of management entrenchment. This deviation is even more important as the increase of firm’s risk. Thomas and Wang (2011) have generalized the model of Zweibel (1996) by introducing different levels of manager entrenchments in analyzing the dynamic behavior of firms’ debt.
3. DATA AND RESEARCH DESIGN

3.1 Summary statistics
Our sample consists of 246 non-financial French firms listed in the "SBF250" index for a period of 11 years from 1997 to 2007. This allowed us to form a cylinder panel data of 2706 observations. The data bases Mergentonline and Datastream are our primary sources of information. Similarly, we used Mergentonline to collect accounting and financial data from company financial statements. The market capitalization of firms is obtained by consulting Datastream Database. Regarding data on the ownership structure of firms, they are obtained after consultation of the annual reports of companies available in the Mergentonline Database.

Table 1 summarizes the characteristics of our sample according to three indicators: firm size, sector and managerial ownership. It seems that our 246 companies are fairly dispersed among SMEs (small and medium firms) (54%) and Large firms (46%). On the other hand, dispersion of firms by sector is heterogeneous, as the industrial sector occupies 47% of the observations followed by the service sector (21%) and trade (17%). For managerial ownership, we note that 41% of companies have managers with shares below 20%, while 55% of firms have managerial ownership between 20% and 80%. Only 4% of observations have managers with an ownership over 80%.

3.2 Variables description
The dependent variable: we use a single variable to explain: the value of firm (Q) is approximated by Tobin's Q (Morck et al. 1988, Kaplan and Zingales 1997). This variable is defined economically as the ratio between the market value of the assets of the firm and the replacement value of these assets.

\[ \text{TobinQ} = \frac{\text{book value of assets} - \text{book value of equity} + \text{market capitalization of the firm}}{\text{book value of assets}}. \]

The explanatory variables: we distinguish two categories of variables: fundamental variables such as capital structure and managerial ownership and control variables related to market imperfections and firm financial characteristics such as firm size, tangibility, return on assets, dividend, research and development, Non debt tax shields and Free Cash Flow(see Table 2).

The financial structure (Lev): Leverage is defined as the sum of long-term debt and current liabilities divided by total assets. From agency perspective and signaling theories, an increase in debt reduces "Free Cash Flows" and agency cost to monitor managers. The sign of this variable is expected to be positive. However, this sign may vary depending on the level of managerial ownership: indeed, in the case of firms with low managerial shareholding, increased debt leads to over-investment policy. In this case, coefficient of debt is expected to be negative. Contrary to firms with high managerial ownership, debt plays a disciplinary role and coefficient of debt is expected to be positive.

Manager ownership (MOW): Leland and Pyle (1977) argue that manager’s ownership is used as manager confidence and future growth opportunities. The variable is defined as the proportion of capital held by directors and board memberships. We use this variable as a classification criterion according to the work of Fazzari et al. (1988). Low manager ownership leads to an alignment effect of interests between managers and outside shareholders, which favorably affects the value of the firm. The influence of this variable is expected to be a positive one of the relationship between firm-value and debt. However, increased manager ownership leads to a
managerial opportunistic behavior combined with an expropriation policy of minority shareholders. Therefore, investors perceive negatively this situation which will decrease firm value.

**Firm Size (Size):** There are two explanations for the effect of Size on firm value: according to Friend and Lang (1988), Marsh (1982), large Size firm has the opportunity to create more tax savings, with better knowledge of the market and are able to employ the best managers. In such case, Size is positively correlated with firm value. While, Rajan and Zingales (1995), Himmelberg et al (1999), Jensen (1986) argue that large firms are less efficient and are confronted to management entrenchment problems more than small businesses, in such case size is negatively related to firm value. We measure size of the firm by a logarithm of total assets.

**Age of the firm (Age):** As a control variable, we use the logarithm of the age of the firm. We consider that the age of the firm can significantly influence the value of the firm, since older firms transmit signals to investors about the company’s financial survival and profitability, which will favorably affect shareholders’ wealth. The coefficient of this variable is expected to be positive.

**Tangibility of assets (TANG):** According to Kroszner and Strahn (2001), the tangibility of assets is measured as the sum of tangible assets of the firm divided by total assets. Firms with fewer tangible assets are more exposed to problems of asymmetric information than firms with more tangible assets. The former firms should have difficulty in obtaining external funding and therefore are less leveraged. Hence, the coefficient of this variable is expected to be positive.

**Return on assets (ROA):** Return on assets is defined as net operating income (EBIT) divided by total assets. Profitability measures the degree of efficiency of asset utilization. It also indicates the ability of the firm to generate revenues in excess of expenses. A measure of current profitability may partially explain the opportunities for future growth and profitability, suggesting a positive relationship between profitability on assets and firm value.

**Ratio of research and development (R & D):** This ratio is approximated by research and development expenditures divided by total assets. Indeed, high levels of research and development lead to more future growth opportunities, which will increase firm value.

**Dividend (Div):** Dividends are measured by total dividends paid on total assets. For entrenched firms, payments of dividends will reduce the amount of "free cash flow" available in the hands of managers, which will lead to a positive effect on shareholder’s wealth. Similarly, any decrease in dividend level should be classified as an expropriation form of minority shareholders, which has a negative effect on stock prices.

**Non debt tax shields (NDTS):** According to DeAngelo and Masulis(1980), firm can gain from alternative other than debt tax shield. Tax benefits non related to debt can be approximated by depreciation and amortization. The existence of these tax shields should affect positively shareholder’s wealth and firm value.

**Free Cash Flow (FCF):** Considered as a measure of financial performance, free cash flow represents the funds that the company can generate after financing profitable projects. This variable is measured as the sum of net profits plus depreciation and amortization, minus changes in working capital needs and capital expenditures divided by total assets. For firms with low growth opportunities, the presence of excess cash flows can exacerbate agency problems because managers who are encouraged to raise the firm beyond its optimal size will undertake projects with negative net present values. The argument is that an increase in debt can remedy this problem of over-investment by limiting managerial discretion on "Free Cash Flows." In other words, free cash flow seems to have a positive effect on firm value.
Volatility of stock prices (Volty): Volatility is approximated by the standard deviation of changes in stock prices. Used as a proxy of firm business risk, volatility is likely to decrease the amount of contracted debt (Myers, 1977; Kim and Sorensen, 1986). Similarly, higher volatility is associated to a higher level of profitability. The coefficient on this variable is expected to be negative.

Sectors: We introduce in this study the sectorial effect on firm value. In particular, we consider the following sectors: Industrial (IND), Commerce (COM), and Services (SER), Transport (TRA) and Oil (PET). We compute this variable as a binary variable (1 or 0) combined with the variable debt (IND * Lev, COM * Lev, SER*Lev, TRA * Lev, PET*Lev). In this case, we observe the values of indebtedness for each sector based on the level of managerial ownership.

3.3 The Model to be tested and Hypotheses development

The analysis of managerial ownership effect on the sensitivity of firm value to financial structure is performed using the indirect test that considers ownership as a priori classification criteria according to Fazzari et al. (1988). In this context we will proceed in two types of tests:

(i) The impact of managerial ownership on the relationship between firm value and debt: We test the relationship firm value-debt either in the absence (equation1) or in the presence of managerial ownership MOW (Equation 2).

\[ Q_{it} = a_0 + a_1 \text{Lev}_{it} + a_2 X_{it} + \epsilon_{it} \]  
For global sample  

\[ Q_{it} = \lambda_0 + \lambda_1 \text{Lev}_{it} + \lambda_2 X_{it} + \epsilon_{it} \]  
For sub samples 1, 2, 3  

Where sub-sample 1 is for MOW <5%; sub-sample 2 where 5%<MOW<20%, sub-sample 3 where MOW>20%.

(ii) Tests of the nonlinear relationship between firm value and debt: we use two tests to validate the robustness of the sensitivity firm value-debt to managerial ownership:

- The priori criteria: according to the different classes of managerial ownership (MOW low <5% 5% <MOW <20% 20% <MOW <40% 40% <MOW <60% 60% <MOW <80% MOW > 80%), using the equation 2, we try to show that the sign of debt (Lev) changes.

- The Analytical method: we add two variables squared leverage (Lev^2) and cubic leverage (Lev^3) to the variable Leverage (Lev) in order to analyze their effects. A non-linear or non-monotonic relationship between firm value and debt is obtained when Lev and Lev^3 have opposite signs to Lev^2. These tests are performed on the entire sample, the subsamples MOW low (<5%), MOW middle (5-20%), MOW high (> 20%).

\[ Q_{it} = \lambda_0 + \lambda_1 \text{Lev}_{it} + \lambda_2 \text{Lev}^2_{it} + \lambda_3 \text{Lev}^3_{it} + \lambda_4 X_{it} + \epsilon_{it} \]  

Where X summarizes the explanatory variables (size, age of the firm, research and development, return on assets, tangibility, free cash flow, NDTs, volatility of profits, dividends, sectors)  

In our model, the highest level of manager ownership affects firm value according to the alignments/entrenchments hypotheses (Jensen and Meckling 1976). Similarly, if the debt acts as a disciplinary mechanism, we expect that the leverage ratio has a positive effect on firm value. Indeed, Jensen (1986) argues that managers of firms with low growth opportunities and generating substantial discretionary funds are expected to overinvest and develop activities which are not in the shareholders’ interests. In this case, and according to the free cash flow hypothesis, debt is assumed to reduce the opportunistic behavior of managers. This argument
allows us to point to a positive relationship between debt and firm value. So our first hypothesis is formulated as follows:

**Hypothesis 1:** in the presence of free cash flow and low investment opportunities, debt positively affects firm value.

The entrenchment hypothesis is considered for cases where managers with low/higher ownership. Also this hypothesis can be combined with the hypothesis of expropriation when managers strongly control the firm. Chen and Steiner (1999) argue that for high levels of managerial shareholdings, debt is negatively related to manager ownership. Similarly, in the context of agency theory, Jensen and Meckling (1976) argue that for high levels of managerial shareholdings, the entrenchment hypothesis will affect negatively firm value. So, our hypothesis can be presented as follows:

**Hypothesis 2:** For low or high level of managerial ownership, debt is negatively related to firm value (entrenchment/expropriation effect).

As part of agency theory, for medium levels of managerial ownership, where the existence of other controlling shareholders who can offset the control actions taken by the officer, Jensen and Meckling (1976) suppose the existence of the alignment of interests between managers and other large shareholders. So for medium levels managerial ownership, debt should positively affect firm value. Our hypothesis can be stated as follows:

**Hypothesis 3:** for medium levels of managerial shareholdings, debt positively affects firm value (alignment effect).

4. Analysis of empirical tests
4.1 Descriptive statistics
Descriptive statistics is summarized in Table 3 in the appendix. The results are reported for the entire sample. The percentage of the share of managers (MOW) is on average 35.52%. The debt ratio measured by the variable "Lev" is on average 48.29% and significantly different from zero. The variable Tobin’s Q is on average 1.375833. Our sample is characterized by a relatively small proportion of tangible assets 19.55%, which makes firms with more asymmetry information problem. Finally, the average level of research and development (R&D) is less than 0.5%, which is very low relative to an average level of 2 to 3% for other developed countries. This suggests that the intensity of spending on research and development of French firms is still limited.

4.2 Empirical tests of impact of managerial ownership on the relationship between firm value and leverage
The purpose of this section is to test the hypothesis of the positive effect of debt on shareholders wealth. Table 4 in the appendix reports the estimation results of our models using a panel data method for the two sub-samples of firms with/without regard to managerial ownership:

- By making an estimate of the total sample and ignoring the effect of managerial ownership, results reported in Table 4 (regressions 1 and 2) provide us with quality adjustment of 62%. Indebtedness influences positively and significantly firm value at the 1%. In this case, leverage serves as a positive signal to the market. This relationship is much more confirmed for a profile of firms characterized by a small/medium size, low experience, with low distribution rate, and with important growth opportunities(low FCF) and collateral assets. These results invalidate the theorem of neutrality (MM 1958) and confirm the importance of market imperfections in explaining the impact of debt on stock prices. Indeed, the relevance of variables such as size, tangibility, NDTS, R&D, show us the importance of asymmetric information, tax and agency
costs in explaining the significant relationship between firm value and financial structure. But the significance of the constant suggests that the existence of other omitted variables could affect this relationship.

- Consideration of managerial ownership as a priori criteria for classification of low or high levels of ownership shows that the positive effect of debt as noted above is not verified for all ownership classes. Indeed for low ownership levels <5%, the impact of debt is significant and negative, while this sign changes to become positive when managerial participation becomes important (> 20%).

The negative and statistically significant effect of debt is explained by several reasons: (i) The leverage effect: The increase in debt reduces financial profitability of French firms because of the negative effect of leverage when the return on investment is less than the cost of debt, which induces a decrease in shareholder’s wealth. Consequently, the increase of debt implies additional financial charges which increase the risk of bankruptcy of the firm, and therefore decreases firm value (Myers 1977). (ii) Signaling effect: An alternative explanation is that an increase of debt leads to an increase of the collateral assets imposed on firm’s loan. This is negatively perceived by investors when firm ownership is concentrated in the hands of a few shareholders, which is the case of France, because managers with concentrated ownership act according to shareholders’ interests. This result is consistent with the results obtained by McConnell and Servaes (1995) for U.S. firms. (iii) The entrenchment effect and the disciplinary role of debt: for low levels of managerial ownership, an executive-employee with a low stake in the company seeks to preserve the value of his/her personal wealth at the expense of dispersed shareholders’ wealth. With incentives/sanctions mechanism introduced by shareholders in order to lead to a management behavior consistent with the objective of maximizing firm value, directors are much more oriented towards improving their reputations by trying to increase firm size beyond its normal size (Shleifer and Vishny 1989), Morck et al (1988). Therefore, increasing leverage is much more observed as an instrument used by the manager to make investments with negative NPV(net present value). The negative effect on firm value is much more explained by the assumption of management entrenchment compared to the disciplinary role of debt.

Size: According to the work of Lang and Stulz (1994) and Servaes (1996), firm size is related inversely to firm value. This association is observed for the entire sample and for firms with managerial participation more than 5%. However, for firms with managerial ownership less than 5%, size has a positive influence. This divergent result of size reflects the importance of the agency problem in explaining the effect of this variable for different levels of managerial ownership. The negative effect of size in the case of companies where a manager owns substantial shares of the firm reflects the problems of control and expropriation that may result. Although, the positive impact of size in the case where managers hold small/insignificant shares shows that the advantages of being a large firm dominates the negative effect of management entrenchment.

The Age of the firm significantly negatively affects the value of the firm for the entire sample. This result means that young firms signal wrong signals to outside investors about the survival and profitability of the firm.

Research and Development: In accordance with what is expected; R&D has a positive and statistically significant coefficient for the whole sample and for firms with managerial ownership more than 5%. This result means that research and development convey positive signals to investors. Indeed, significant levels of research and development lead to higher future growth opportunities, which will increase firm value (Morck et al, 1988, McConnell and Servaes, 1990, Chung and Jo, 1996, Chen and Steiner, 2000).
Return on assets (ROA): The positive effect of expected return on assets is tested for the whole sample but statistically insignificant. However, contrary to what is expected, return on assets significantly and negatively affects shareholder wealth only for firms with managerial ownership from 5% to 20%. This result means that return on investment or economic performance of the firm conveys negative signal to the market when a manager acquires more power and control at the expense of minority shareholders.

Tangibility (TANG): This variable positively and significantly affects shareholder wealth for the whole sample, and for firms with managerial ownership more than 20%. This coefficient is also consistent with the argument that higher tangible assets can reduce agency costs of debt by providing more security value (Rajan and Zingales, 1995). The positive and significant impact of this variable for high managerial ownership means that firms strongly controlled use more and more tangible assets to undertake risky investments that could transfer wealth at the expense of creditors.

Free cash flows: In accordance with what is expected, the positive effect of this variable is observed only in case of managerial ownership between 5% and 20%. However the negative and significant effect of free cash flow is detected for the entire sample and for high managerial shareholdings (> 20%). This indicates that the beneficial effect of free cash flow is more observed for medium levels of managerial ownership at which the alignment effect outweighs expropriation behavior. However, when a manager has a majority control, the effect of entrenchment and expropriations are sufficient to accumulate private benefits of control and decrease thereafter firm value.

Non debt tax shields (NDTS): this variable exerts a positive effect and statistically significant at 1% for the total sample and for firms with a managerial ownership above 20%. This result means that for high levels of non-debt tax shield, shareholder’s wealth increases consequently. According to DeAngelo and Masulis (1980) debt tax shield is not the only tax saving mechanism used by shareholders to increase firm value. This conclusion is verified for any class of managerial ownership.

Volatility (Volty): for firms with managerial ownership between 5% and 20%, higher volatility of return affects negatively firm value. This result means that firm risk is much more severe when managers hold significant shares of the firm’s capital structure.

Dividend (DIV): According to the agency and signaling theories, the distribution of dividends favorably affects stock prices. However, in our case, for all specifications, dividends negatively and significantly impact firm value. The negative effect of this variable means that the disciplinary role of debt does not support companies with high dividends. The increase of dividend is the opportunity for shareholders to capture the value created at the expense of creditors which constitute a negative signal conveyed to the market.

For high levels of managerial ownership, we have divided the sample into sub classes of levels [20% - 40%], [40% - 60%] [60% -80%] [80% -100%]. The results (see Table 5) show that the sign of debt is not homogeneous. Indeed, for levels below 80% of managerial ownership, financial structure has a positive effect. When ownership exceeds this threshold, debt effect becomes negative. This result confirms the assumption of non-linearity between debt and firm value.

Leverage (Lev): In accordance with agency and signaling theories, leverage has positive and statistically significant effect for the sample of firms with managerial ownership between 20% and 80%. In this case, debt plays its full disciplinary mechanism against the opportunistic manager’s behavior. Under the hypothesis of alignment of interests between managers and...
shareholders, the increase in debt reduces the discretionary funds in the hands of managers, which will favorably affect firm value. Beyond the 80% threshold, managers are in a majority position of the firm’s capital; undertake more actions which maximize their private benefits of control at the expense of creditors and minority shareholders. This indicates that debt is perceived by investors as a tool available to managers who used it to increase their private wealth which will result in a negative impact on stock prices.

The Analysis of the signs of the coefficients of control variables for ownership classes between 20% and 80% allows us to draw the profile of the company where debt is considered as a disciplinary mechanism. These companies are characterized by being young, profitable, have strong collateral assets and medium-sized. These companies are also characterized by small risk and low payout ratio.

However, for the class of a managerial ownership above 80% which reflects an opportunistic behavior of managers where the disciplinary mechanism of debt is not operational. This class of firms are characterized by good experience, high research and development, large size, high level of Free cash flows, and distribute low level of dividend. Regarding the effect of sectors, the majority of firms belong to the industrial, services and transport sectors. Some companies are not well perceived by the market; others instead exert positive information content.

4.3 Testing the non-monotonic relationship between debt and firm value.

Model 3 reflects the non-linear effect between debt and firm value. MM (1958) attempted to test this hypothesis, but their empirical results show that debt has no effect on stock prices. In our case, this test is performed in order to justify the non-linear effect of the debt on firm value as showed in the earlier test. Indeed, review of previous literature shows that the impact of managerial ownership on firm value is ambiguous. Thus, some authors argue that the observed relationship is not linear (Stulz, 1988, Morck et al 1988 and McConnell and Servaes1990), while other authors find no significant relationship (Demsetz and Lehn 1985, and Agarawal Knoeber 1996, Himmelberg et al 1999).

In Table 6, we see that the variables Lev and Lev³ have opposite signs to the variable Lev². This result is verified for all estimates and all classes of managerial ownership. However, these coefficients are only significant for ownership above 80%. Indeed, the coefficients on the variables Lev and Lev² are respectively positive and negative. The coefficient on the variable Lev³ is positive. This indicates a non-linear relationship between debt and firm value. For managerial ownership above 80%, the positive and significant coefficient on the variable Lev reflects an alignment effect between managers and shareholders. In doing so, the managers follow a maximizing behavior of shareholders’ wealth and seek the reputation of the company. Therefore, an increase in debt sends a good signal to outside investors, which affects positively firm value. The meaning of variables Lev² and Lev³ with respective negative and positive effects shows that the disciplinary behavior of debt (positive effect of the variable Lev) for the managerial ownership class above 80% is not stable. In this case we can expect heterogeneous behavior as a result of expropriation and entrenchment followed by an alignment effect.

5. Concluding Remarks

Our research is part of the work aimed at testing the empirical relevance of the effect of debt on firm value. The main objective of this study is to enrich the empirical debate on the effect of
managerial ownership in explaining the disciplinary role of debt. In general, empirical tests confirm our three research hypotheses. According to our first hypothesis, debt as a disciplinary mechanism has a positive effect on firm value. The empirical results show that this relationship is verified for the whole sample regardless of the level of managerial ownership. But the significance of the constant term in the regression leaves us worried about the stability of the relationship between debt and firm value. In our second and third hypotheses, the introduction of different managerial ownership classes should explain other effects of leverage, given that the manager’s objective is not always the maximization of shareholders’ wealth. Empirical tests show that debt negatively affects firm value for negligible (<5%) or high (> 80%) levels of managerial shareholdings. Such a result supports the entrenchment/expropriation hypothesis. In this case, the company's debt conveys a negative signal about costs resulting from the opportunistic behavior of the manager. Firm value will drop accordingly.

Finally, confirmation of the robustness of assumptions 2 and 3 is consistent with the justification of the nonlinear relationship between debt and firm value. This test was conducted by the introduction of the variables and Lev² Lev3 in the basic equation. The results show that the expected effect is verified. However, the meaning of the parameters is observed for high managerial stakes (> 80%). In this case, the concentration of ownership in French companies is not only justified by the opportunistic behavior of the manager-shareholder. The instability of this fact underlines the importance of other considerations (such as corporate reputation/credibility and its influence on investors’ perceptions) that may encourage shareholders to opt for an alignment of interests with minority shareholders.

Our line of research can lead to several future directions: (i) an initial investigation would be to integrate coalition strategies adopted by other large shareholders when a manager engages in expropriation of minority shareholders. (ii) A second possibility would be to take into account effects of complementarities or substitution of other governance mechanisms. (iii) Finally, another avenue would be to test using the methods of event, for different levels of managerial ownership, the impact of debt change on abnormal returns.

References


Appendix: Tables

Table 1: Sample description (246 French firms)

<table>
<thead>
<tr>
<th>By sector</th>
<th>By size</th>
<th>Par CEO ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>PER</td>
<td>18(7%)</td>
<td>&lt; 20%</td>
</tr>
<tr>
<td>IND</td>
<td>114(47%)</td>
<td>20% - 40%</td>
</tr>
<tr>
<td>TRA</td>
<td>20(8%)</td>
<td>40% - 60%</td>
</tr>
<tr>
<td>COM</td>
<td>42(17%)</td>
<td>60% - 80%</td>
</tr>
<tr>
<td>SER</td>
<td>52(21%)</td>
<td>&gt; 80%</td>
</tr>
<tr>
<td>Total</td>
<td>246</td>
<td>246</td>
</tr>
</tbody>
</table>

- Sectors are Oil(PER), Industrial (IND), transport (TRA), Commerce (COM), service (SER).
- Size criterion if firm size < average size then it is classified as SME, otherwise it is classified as a big firm. SME: small and medium entreprises, LE: large entreprises.
- Managerial ownership is measured by percentage of shares held by managers and board members.

Table 2: Variables measurement and research hypotheses

<table>
<thead>
<tr>
<th>variables</th>
<th>symbol</th>
<th>Measures</th>
<th>Expected sign</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firm value</td>
<td>Q</td>
<td>book value of assets - book value of equity + market capitalization of the firm) / Book value of assets.</td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Descriptive Statistics of the variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>OBS</th>
<th>MEAN</th>
<th>ST DEV</th>
<th>MIN</th>
<th>MAX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q</td>
<td>2371</td>
<td>1.3758</td>
<td>1.6335</td>
<td>0.0126</td>
<td>15.5108</td>
</tr>
<tr>
<td>MOW</td>
<td>2475</td>
<td>0.3552</td>
<td>0.2792</td>
<td>0.0001</td>
<td>0.9992</td>
</tr>
<tr>
<td>Lev</td>
<td>2668</td>
<td>0.4828</td>
<td>0.1945</td>
<td>0</td>
<td>0.9777</td>
</tr>
<tr>
<td>MOW squared</td>
<td>2706</td>
<td>0.1866</td>
<td>0.2229</td>
<td>0</td>
<td>0.9984</td>
</tr>
<tr>
<td>SIZE</td>
<td>2701</td>
<td>19.8381</td>
<td>2.2938</td>
<td>10.5187</td>
<td>25.9498</td>
</tr>
<tr>
<td>AGE</td>
<td>2684</td>
<td>3.3364</td>
<td>1.0283</td>
<td>0</td>
<td>5.6454</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>2706</td>
<td>0.0144</td>
<td>0.0556</td>
<td>0</td>
<td>0.8774</td>
</tr>
<tr>
<td>Tang</td>
<td>2703</td>
<td>0.1954</td>
<td>0.01637</td>
<td>0</td>
<td>0.9506</td>
</tr>
<tr>
<td>FCF</td>
<td>2283</td>
<td>0.0729</td>
<td>0.1007</td>
<td>-0.8032</td>
<td>0.4780</td>
</tr>
<tr>
<td>NDTTS</td>
<td>2699</td>
<td>0.0733</td>
<td>0.0999</td>
<td>-0.8497</td>
<td>0.94433</td>
</tr>
<tr>
<td>VOLTY</td>
<td>2431</td>
<td>0.5677</td>
<td>1.1600</td>
<td>0</td>
<td>12.8417</td>
</tr>
<tr>
<td>DIV</td>
<td>2572</td>
<td>0.0182</td>
<td>0.0419</td>
<td>0</td>
<td>0.6368</td>
</tr>
<tr>
<td>ROA</td>
<td>2706</td>
<td>0.0358</td>
<td>0.0985</td>
<td>-0.8461</td>
<td>0.7126</td>
</tr>
</tbody>
</table>

Table 4: Effect of managerial ownership on the relationship between firm value and leverage

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total Sample</th>
<th>Sub sample1</th>
<th>Sub sample2</th>
<th>Sub sample3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model1</td>
<td>Model2</td>
<td>Model1</td>
<td>Model2</td>
</tr>
<tr>
<td>Constant</td>
<td>21.588^a</td>
<td>21.605^a</td>
<td>0.291^a</td>
<td>0.291^a</td>
</tr>
<tr>
<td>Lev</td>
<td>0.529^b</td>
<td>0.643^b</td>
<td>-0.034^b</td>
<td>-0.0502^b</td>
</tr>
<tr>
<td>Size</td>
<td>-1.004^b</td>
<td>-1.005^b</td>
<td>0.381^b</td>
<td>0.382^e</td>
</tr>
<tr>
<td>Age</td>
<td>-0.213^b</td>
<td>-0.211^a</td>
<td>0.016</td>
<td>0.023</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>3.264^b</td>
<td>3.263^b</td>
<td>0.003</td>
<td>NA</td>
</tr>
<tr>
<td>ROA</td>
<td>0.822</td>
<td>0.868</td>
<td>0.002</td>
<td>-0.007</td>
</tr>
<tr>
<td>Tang</td>
<td>1.335^a</td>
<td>1.330^a</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>FCF</td>
<td>-0.995^b</td>
<td>-1.016^e</td>
<td>0.013</td>
<td>-0.008</td>
</tr>
<tr>
<td>NDTTS</td>
<td>2.425^a</td>
<td>2.409^a</td>
<td>-0.568^a</td>
<td>-0.571^a</td>
</tr>
<tr>
<td>VOLTY</td>
<td>0.017</td>
<td>0.013</td>
<td>0.093</td>
<td>0.094</td>
</tr>
<tr>
<td>Div</td>
<td>-4.191^a</td>
<td>-4.199^a</td>
<td>-0.050</td>
<td>-0.054</td>
</tr>
<tr>
<td>PER*EVIER</td>
<td>-0.229</td>
<td>-0.406^b</td>
<td>1.462</td>
<td>2.424^a</td>
</tr>
<tr>
<td>TRAD*LEVI</td>
<td>-1.145</td>
<td>-0.061</td>
<td>1.614</td>
<td>4.668^a</td>
</tr>
<tr>
<td>COM*LEVIER</td>
<td>-1.418</td>
<td>-0.024</td>
<td>0.369</td>
<td>-0.2808</td>
</tr>
</tbody>
</table>
Table 5: Relationship between firm value and leverage for high class of managerial ownership

<table>
<thead>
<tr>
<th></th>
<th>Sub-Sample 3a 20% &lt; CEO &lt; 40%</th>
<th>Sub-Sample 3b 40% &lt; CEO &lt; 60%</th>
<th>Sub-Sample 3c 60% &lt; CEO &lt; 80%</th>
<th>Sub-Sample 3d CEO &gt; 80%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model1</td>
<td>Model2</td>
<td>Model1</td>
<td>Model2</td>
</tr>
<tr>
<td>c</td>
<td>31.710</td>
<td>31.013</td>
<td>-0.617</td>
<td>-0.614</td>
</tr>
<tr>
<td>Lev</td>
<td>0.770</td>
<td>1.837</td>
<td>1.520</td>
<td>1.519</td>
</tr>
<tr>
<td>size</td>
<td>-1.454</td>
<td>-1.416</td>
<td>0.004</td>
<td>0.004</td>
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<tr>
<td>Age</td>
<td>-0.375</td>
<td>-0.481</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>-7.346</td>
<td>-7.016</td>
<td>0.025</td>
<td>0.025</td>
</tr>
<tr>
<td>ROA</td>
<td>4.432</td>
<td>4.489</td>
<td>0.183</td>
<td>0.181</td>
</tr>
<tr>
<td>Tang</td>
<td>3.109</td>
<td>3.143</td>
<td>-0.038</td>
<td>-0.039</td>
</tr>
<tr>
<td>FCF</td>
<td>-3.381</td>
<td>-3.763</td>
<td>0.040</td>
<td>0.040</td>
</tr>
<tr>
<td>NDTs</td>
<td>-2.521</td>
<td>-2.121</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>VOLTY</td>
<td>0.011</td>
<td>0.016</td>
<td>0.001</td>
<td>0.004</td>
</tr>
<tr>
<td>Div</td>
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<td>-3.526</td>
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<td>-0.003</td>
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<tr>
<td>PER*LEVIER</td>
<td>-6.723</td>
<td>-0.008</td>
<td>-7.196</td>
<td>1.078</td>
</tr>
<tr>
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<td>-2.018</td>
<td>0.002</td>
<td>16.980</td>
<td></td>
</tr>
<tr>
<td>COM*LEVIER</td>
<td>0.113</td>
<td>0.096</td>
<td>1.473</td>
<td>-2.992</td>
</tr>
<tr>
<td>SER*LEVIER</td>
<td>5.117</td>
<td>0.028</td>
<td>-1.841</td>
<td>-2.626</td>
</tr>
<tr>
<td>IND*LEVIER</td>
<td>-2.369</td>
<td>-0.013</td>
<td>1.287</td>
<td>0.990</td>
</tr>
<tr>
<td>R-squared</td>
<td>59.978</td>
<td>60.543</td>
<td>82.912</td>
<td>82.861</td>
</tr>
<tr>
<td>observations</td>
<td>336</td>
<td>336</td>
<td>383</td>
<td>383</td>
</tr>
</tbody>
</table>

a, b and c indicate significance at the 1%, 5%, and 10% levels respectively.

Table 6: Non-monotonic relationship between debt and firm value

<table>
<thead>
<tr>
<th></th>
<th>Total sample</th>
<th>between 0% et 5%</th>
<th>between 5% et 20%</th>
<th>between 20% et 80%</th>
<th>between 80% et 100%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Model1</td>
<td>Model2</td>
<td>Model1</td>
<td>Model2</td>
<td>Model1</td>
</tr>
<tr>
<td>Constant</td>
<td>21.462</td>
<td>21.902</td>
<td>0.387</td>
<td>0.392</td>
<td>23.616</td>
</tr>
<tr>
<td>Lev</td>
<td>1.800</td>
<td>2.200</td>
<td>0.014</td>
<td>0.013</td>
<td>-7.104</td>
</tr>
<tr>
<td>Lev2</td>
<td>-3.623</td>
<td>-4.975</td>
<td>0.013</td>
<td>0.021</td>
<td>13.410</td>
</tr>
<tr>
<td>Lev3</td>
<td>2.804</td>
<td>3.718</td>
<td>-0.008</td>
<td>-0.009</td>
<td>-7.781</td>
</tr>
<tr>
<td>Size</td>
<td>-1.001</td>
<td>-1.019</td>
<td>0.215</td>
<td>0.219</td>
<td>-1.016</td>
</tr>
<tr>
<td>Age</td>
<td>-0.219</td>
<td>-0.220</td>
<td>0.0104</td>
<td>0.016</td>
<td>0.002</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>3.1854</td>
<td>2.369</td>
<td>-0.001</td>
<td>0.005</td>
<td>20.479</td>
</tr>
<tr>
<td>ROA</td>
<td>0.807</td>
<td>0.413</td>
<td>0.005</td>
<td>0.008</td>
<td>-5.328</td>
</tr>
<tr>
<td>Tang</td>
<td>1.337</td>
<td>1.136</td>
<td>0.005</td>
<td>0.005</td>
<td>1.191</td>
</tr>
<tr>
<td>FCF</td>
<td>-0.978</td>
<td>-0.893</td>
<td>0.091</td>
<td>0.075</td>
<td>5.796</td>
</tr>
<tr>
<td>NDTs</td>
<td>2.427</td>
<td>2.345</td>
<td>-0.395</td>
<td>-0.400</td>
<td>-1.944</td>
</tr>
<tr>
<td>VOLTY</td>
<td>0.017</td>
<td>0.014</td>
<td>0.110</td>
<td>-1.001</td>
<td>-1.009</td>
</tr>
<tr>
<td>Div</td>
<td>-4.159</td>
<td>-4.126</td>
<td>-0.050</td>
<td>-0.052</td>
<td>-24.535</td>
</tr>
<tr>
<td>PER*LEVIER</td>
<td>-0.211</td>
<td>-0.255</td>
<td>1.357</td>
<td>-5.093</td>
<td>0.909</td>
</tr>
</tbody>
</table>

a, b and c indicate significance at the 1%, 5%, and 10% levels respectively.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient 1</th>
<th>Coefficient 2</th>
<th>Coefficient 3</th>
<th>Coefficient 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRAD* LEVIER</td>
<td>-1.035</td>
<td>-0.041</td>
<td>1.963</td>
<td>4.511*</td>
</tr>
<tr>
<td>COM* LEVIER</td>
<td>-1.483*</td>
<td>-0.023</td>
<td>1.055</td>
<td>-0.463</td>
</tr>
<tr>
<td>SER* LEVIER</td>
<td>1.734*</td>
<td>-0.152*</td>
<td>-0.017</td>
<td>1.838</td>
</tr>
<tr>
<td>IND* LEVIER</td>
<td>-0.249</td>
<td>0.034</td>
<td>-1.124</td>
<td>-1.055*</td>
</tr>
<tr>
<td>R-squared</td>
<td>62.10</td>
<td>62.64</td>
<td>83.53</td>
<td>83.53</td>
</tr>
<tr>
<td>observations</td>
<td>1877</td>
<td>1877</td>
<td>483</td>
<td>483</td>
</tr>
<tr>
<td>FIXED EFFECTS</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
</tbody>
</table>

a, b and c indicate significance at the 1%, 5%, and 10% levels respectively.
NOSTALGIA AND BRAND ATTACHMENT: THEORETICAL FRAMEWORK AND APPLICATION IN THE CASE OF A TUNISIAN ADVERTISING

Leila Lefi and Abderrazak Gharbi
Faculty of Economics and Management of Tunis-Tunisia.

ABSTRACT:

As studied in recent consumer research, the relationship between the nostalgia and brand attachment seems to be neglected for a while. Marketing literature reveals many studies interested by the nostalgia characteristics and its effects on consumer behavior in general and the attitude to brand, in particular. However, questions remain concerning whether the relationship between nostalgia and brand attachment can be regarded as a positive one. To this end, this research presents an integrative model and investigates the relationship between the nostalgia and the brand attachment in the specific case of a Tunisian advertising. The results of a quantitative research conducted among 112 consumers exposed to a television advertisement prove that only age and nostalgic events explain the nostalgia proneness of the Tunisian consumer.

Key words: Nostalgia, nostalgia proneness, brand attachment

INTRODUCTION:

While the term of nostalgia is now widely used in several domains, its origins were in medicine and used for the first time in 1668 by Hofer (1934). Then, the concept of nostalgia was developed and used into different domains from psychology (Rose, 1948) to literature (Doane and Hodges, 1987) and sociology in particular with Davis (1979). After its introduction in marketing, several researches was developed especially after Stern works (1992) which was concentrated on the effect of the end of the 20th century on the behavior of the consumer thus supporting the appearance of the phenomenon of nostalgia. Work will follow thereafter we include Baker and Kennedy (1994) who proposed a typology of nostalgia. Other authors were able to identify its antecedents (Holbrook and Schindler, 1989; Hirsch, 1992; Kessous and Roux, 2006) and present its impact on consumer behavior after watching the nostalgic advertising (Perrusson, 2003; Boulbry, 2006). Indeed, it appears that the nostalgic advertising can develop an emotional bond toward the brand (Ben Hassine & Karaa, 2004) causing the brand attachment (Kessous, 2006, 2009; Kessous and Roux, 2007, 2008).
Despite the conceptual relevance and the increasing attention paid to nostalgia and its effects on brand attachment, the domain so far lacks a solid theoretical structure. Moreover, Lacoeuilhe (2000) noted the existence of a relationship between nostalgia and brand attachment without conducting a valid empirical studies. In quantitative research, Kessous (2006) assumed the existence of a positive relationship between nostalgia and brand attachment and has subsequently established a typology of consumers using a semiotics analysis (Kessous, 2008; Kessous and Roux, 2009) and confirmatory factor analysis (Kessous and Roux, 2009) and tried to empirically validate the existence of this relationship (Kessous, 2009, Kessous and Roux, 2010).

As part of this article, we will try to explain the nature of the relationship between the nostalgia proneness of the Tunisian consumer and the brand attachment. To do this, we first present the theoretical framework of research and assumptions that result. In a second step, we show the methodology adopted. In a third step, we present the results of the study conducted on a sample of 112 individuals. In conclusion, we point out the contributions, limitations and avenues of research.

NOSTALGIA: A BRIEF BACKGROUND

Although its origins can be traced as far back as the mid seventeenth century, the use of nostalgia on the marketing domain still recent. In fact, some authors emphasize that the first use of the concept of nostalgia was in the field of medicine (Evrard et al., 2003). Other authors such as Martin (1954) and Rauch (1998) argue that the concept was implicated by Hofer (1688) as a psychological explanation for "Heimweh". Nostalgia was considered as a description of a disease that is decimating the Swiss soldiers. The French call it homesickness or nostalgia derived from “nostos”, return (at home) and “algos” pain or suffering (Rauch, 1998).

It appears that the integration of nostalgia in the marketing field is more than just passing research fad and accords with the postmodern conception of consumer nostalgic and regressive (Babot and Cova, 2003) and with what Stern (1992) called "effect the end of the century". Indeed, the literature review has revealed that many authors were interested in studying this concept in a marketing context for several purposes starting from strategic purposes and / or tactical (Gouteron, 2004; Kessous & Roux, 2006) or in order to live the nostalgia experience. Even the universal nature of nostalgia (Ruml, 1933, Martin, 1954; Rauch, 1999), researches in marketing still based on intuitive basis, except those of Kessous & Roux (2006, 2008, 2009, 2010) who have tried to understand the nature of the relationship between nostalgia and brand attachment. Thus, the main definitions advanced in the literature have been grouped in Table 1 (in the Appendix section)

We can divide researches in marketing into two groups: Anglo-Saxon studies interested in the history criteria of nostalgia, and relationships with brands associated with the nostalgia (Bellelli, 1991, Holbrook & Schindler, 1991; Havlena & Holak , 1991, 1992; Hirsh, 1992; Stern, 1992, Baker & Kennedy, 1994) and French studies focused on the development, adaptation, or the comparison of measurement scales of nostalgia using advertising(Diard Demontroand and Robert, 1997).

Nostalgic Advertising: Nature and characteristics

Initial empirical studies indicate that nostalgic themes are used in advertising. In particular, the nostalgic advertising allows immediate connection with the consumer inspiration and creates a positive emotional response towards advertising and brand. Thus, this relationship depends on
the broadcast nature advertising and the importance of people, places, objects and events in the
nostalgic experience (Holak & Havlena, 1992).
Shimp et al. (1988) proved that attitude toward advertising is in accordance of the brand; that’s
why if the reactions of consumers according to the message indicates positive attitude, real
product will have the same attitude. Definitely, it appears that if the individual is exposed to a
nostalgic advertisement, he can, subsequently, develop positive reactions towards the promoted
brand based (Kessous, 2006, 2009).

The nostalgia antecedent:
Early research has also documented that there is two types of variables, qualified as antecedent
have grouped the attitudinal variables into two groups: the nostalgia proneness and the nostalgic
sensibility of individuals at different sensory stimuli such as odor (Hirsch, 1992) and music
(Holbrook and Schindler, 1989; Baumgartner, 1992). Kessous and Roux (2009) explained that
nostalgia depends certainly on the attitudinal variables as well as socio-demographic variables:
age and gender. Certainly, the marketing literature presents several studies on the gender variable
such Holbrook (1994) who showed that men are more sensitive than women to nostalgic stimuli
since they are more affected by discontinuities of life. In another way, Havlena and Holak (1991)
showed that the intensity of nostalgic feelings diverge during life and is strongly depend on the
age.

BRAND ATTACHMENT: GENEALOGY AND DEFINITIONS

Previous work on attachment has been designed to reproduce the relationship between mother /
sen in order to understand the specificity of the reaction in case of this circumstance (Lacoeuilhe
1997) and characterize the attachment degree of mother toward her son. For that reason,
attachment theory is based on the analysis of interpersonal relationship between individuals who
try to develop strong emotional quality among others as well as the objects (Maissoneuve, 1966,
Bowlby, 1969). Therefore we can conclude that brand reliability seems to be an emotional
connection between brand and consumer. Indeed, this idea has been supported by Fournier
of emotional factors in the relationship of reliability are the foundation of the concept of the
brand attachment.
Csikszentmihalyi and Rochberg-Halton (1981) have defined brand attachment as a psychic
investment while others authors like McQueen et al. (1993), Feldwick (1996), Heilbrunn (1996)
and Lacoeuilhe (1997) described the brand attachment as a long-term emotional predisposition
manifested by the consumer to a brand (Ratier, 2003).
Heilbrunn (2001) considers that there is a relationship between nostalgia and brand attachment,
but the nature remains to be identified and validated by empirical studies. Various researches in
marketing showed the existence of relationship between advertising and brand attachment
without specifying the nature of this relationship. Thus, Pérrusson (2003) was interested in the
nostalgia used in TV ad without focusing on the relationship between the ad and the brand
attachment. In fact, she limited her study on the analysis of the effect of nostalgia on consumer
response toward the ads.
So, we can confirm that the authors have shown the impact of nostalgia on consumer preferences
experiential (Holbrook & Schindler, 1991; Goulding 2001) and material consumption
preferences (Rindfleisch et al. 2000; Holbrook and Schindler, 2003), but the literature has never
explored in depth the potential relationships between the two concepts of nostalgia and brand attachment in the specific context advertising, except the study of Kessous (2009) that discussed the consequences of nostalgia on the attitudes and relationships with brands.

HYPOTHESES AND CONCEPTUAL MODEL:

As a first goal of this research, we seek to test whether the nostalgia proneness is influenced by the age. If the nostalgia is related to the age, so we seek whether a nostalgic ad will influence old consumers more than the young ones.

\[ \text{H1: When exposed to an ad evoking nostalgia, old persons are more predisposed to the nostalgia than young people.} \]

As our second goal, we seek to test whether the gender influence the nostalgia proneness. From the literature, it appears that men are more sensitive to nostalgia than women.

\[ \text{H2: When exposed to an ad evoking nostalgia, the men are more predisposed to the nostalgia than the women} \]

As our third goal, we seek to extend the previous finding that consumers develop a nostalgic affect when they hear a nostalgic music. In our particular case, we will check the influence of the music used on a Tunisian TV ad on the nostalgia proneness.

\[ \text{H3: When exposed to an ad evoking nostalgia, nostalgic music of the ad has a positive effect on nostalgia proneness.} \]

As our fourth goal, we seek to extend the finding that consumers develop a nostalgic affect when they remember some events from the past. Moreover, we seek to test the influence of those events and locations on the nostalgia proneness.

\[ \text{H4.a: When exposed to an ad evoking nostalgia, events have a positive effect on nostalgia proneness.} \]

\[ \text{H4.b: When exposed to an ad evoking nostalgia, locations have a positive effect on nostalgia proneness.} \]

As our fifth goal, we seek to investigate the relationship between the nostalgia proneness and brand attachment.

\[ \text{H5: There is a positive relationship between nostalgia proneness and brand attachment} \]

As our final goal, we test whether the gender tend to moderate the relationship between nostalgia proneness and brand attachment

\[ \text{H6: Gender has a moderating effect on the relationship between nostalgia proneness and brand attachment} \]

After exposing the hypothesis of this research, we can present the model as shown on the figure 1(in the Appendix section). The postulated relationships are assumed significant and positive.

METHODOLOGY

Since we are interested on Tunisian advertisement we decided to adopt a Tunisian food advertising based on the results of the study conducted by Kessous (2009) who showed strong nostalgic connection with such products compared to leather goods, clothing and accessories. Many ads were selected. Although it was believed that the nostalgic feeling a person would associate with an ad would not be mediated by the person's attitude toward the ad if the person did not like it, then nostalgia would not be felt (Baker et Kennedy, 1994). So we focus on this
and we have shown 4 selected ads to a sample of 30 students. The results were in favor of the television ad of a much known brand of Tunisian couscous “L’épi d’or”.

We used questionnaire to collect data on respondent’s attachment to brand and nostalgia proneness. A 7 points Likert scale was used and we have adopted the measurement scales of Pérrusson (2003) and Blaid & Lacoeuilhe (2005) that appears on table 2 (in the Appendix section). To make the final data collection, we conducted a preliminary questionnaire with 30 students (convenience sample) to examine the factorial structures and reliability of scales that allow us to purify our measurement scales.

As already mentioned, we must consider the age parameter, that’s why we opted to heterogeneous sample (quota sample). We choose to collect data on the area of the Ariana (Tunisia) and we interviewed 112 persons.

Based on the latest census of population of Tunisia (2004), we identified that population is divided in 7 age groups. However, the theme of nostalgia pushes us to exclude the age groups up to 19 years since these individuals are enough youn g to have a nostalgic experience. That’s why we conducted our survey on a group aged from 20 years over 60 years as shown on table 3 (in the Appendix section).

The questionnaire was conducted in three steps:

- The first step of data collection concerns the age group 20-29 years: we interviewed students. In classroom, students were asked to complete the first part of the questionnaire. Then, after seeing the ad, they were asked to complete the self-administered questionnaire.

- Second step: data collection of age group starting from 30 to 59 years: Since this age group corresponds to active persons, we chose to collect data in a public administration. Employees were asked to see the ad in laptop and to complete the self-administered questionnaire.

- Third step: Data collection of older persons (60 years and over): This age corresponds, in most cases, to retired persons. That’s why we conducted questionnaire at home. The questionnaire was self administered in the same manner as other phases.

ANALYSES AND RESULTS

Analysis of the relationships was conducted primarily by means of principal components and we have identified two factors: the past regret and reminder of memories. Similarly, the analysis factor of the brand attachment scale has enabled us to identify two factors namely brand attachment and dependence on the brand as shown on table 4 (in the Appendix section).

To test our hypotheses, we opted for simple and multiple regressions and analysis of variance ANOVA.

Impact of age on the reminder of memories:
The results of the ANOVA showed that there is no significant difference between groups of individuals belonging to different age groups (F = 1887, df = 111, p = 0.118 > 0.05) and reminder of memories. Both young and older people remember their memories despite of their ages.

Impact of age on the regret of past
The results obtained from the second ANOVA showed that there is a significant difference between groups of individuals belonging to different age groups (F = 3005, df = 111, P = 0.02). However, these results confirm that the regret of the past varies with age. We then opted for a POST-HOC test and the results showed that groups of individuals belonging to age groups 40 years until 60 years and over, are different (p = 0.025 for the age of 40 to 49 years, p = 0.004 for the age group 50 to 59 years, p = 0.001 for age 60 and over).
Thus, these results allow us to say that more the individual is older; more regrets are bigger. We conclude that the hypothesis H1 is partially validated.

**Gender influence on nostalgia proneness**

Examining the results of the ANOVA, we conclude that there was no significant difference between asked people. Thus, the regret of the past and recall of memory appear to be independent of the gender of asked persons (F1 = 0.558, df = 111, P1 = 0.0451 > 0.05 / F2 = 0.614, df = 111, 0.435 = P2 > 0.05). So the hypothesis H2 is rejected.

**Impact of music on nostalgia proneness:**

To emphasize the existence or not of a positive relationship between music and nostalgia proneness, we conducted two regressions.

**Impacts of music on the reminder of memories:**

The Fisher test (F = 2.521, p = 0.115 > 0.05) proves that the model is not significant. Even if the music in the spot is perceived by the respondent as nostalgic, but it has no relationship with the factor: reminder of memories.

**Impact of music on the regret of the past:**

The results of the Fisher test (F = 5.497, P = 0.021) shows the existence of a significant and positive impact on regret of the past factor which permits to us to partially validate our hypothesis H3.

**Impact of situational factors on nostalgia proneness**

Two regressions were made. The first indicates a positive impact of events presented during the ad on the regret of the past factor. Indeed, this factor has 9.3% of the variance of regret of the past factor (R² = 0.093, adjusted R² = 0.084). Similarly for the reminder of memories factor, it appears that the events mentioned in nostalgic advertising have a positive impact on the reminder of memories. Events explain 3.7% of the variance in the size of memory recall (R² = 0.037, adjusted R² = 0.028).

Finally, we can say that the events presented in an ad have a positive impact on nostalgia proneness, so the hypothesis H4.A is validated.

**Impact of locations on nostalgia proneness:**

The regression analysis shows a positive impact between the locations in an ad and the nostalgia proneness. Indeed, the nostalgic places in advertising have about 7.6% of the variance of regret of the past factor (R² = 0.076, adjusted R² = 0.067). The overall regression model was significant (F = 9.028, p = 0.003).

However, the examination of Fisher's test (F = 2.646, p = 0.107) shows that the relationship between the nostalgic places mentioned in the ad and the reminder of memories factor is not significant and that even if mentioned places are supposed to be nostalgic, this has no impact on the recall of memories of the past. Through these results, we can deduce that the hypothesis H4.B is validated only for regret of the past factor.

**Impact of nostalgia proneness on brand attachment:**

The examination of the regression shows that the regret of the past has a significant positive effect on brand attachment. Indeed, the regret of the past factor explains 5.6% of the variance in brand attachment factor (R² = 0.056, adjusted R² = 0.047).

The overall regression model is significant, even for reminder of memories factor. The results show that the recall of memory has a significant positive effect on brand attachment. This factor explains 4.6% of the variance in brand attachment factor (R² = 0.046, adjusted R² = 0.036). This second regression model was significant (F = 4.682, p = 0.033).
Even for the past regret factor, the results show that there is no significant relationship between brand dependence and regret of the past (p = 0.150 > 0.05). So we can conclude that even if the consumer regrets his past, this does not affect its degree of dependence on the brand. However, it appears that there is a significant and positive relationship between reminder of memories and the dependence of the brand. Thus, if a brand reminds the individual memories, it increases its reliance on it. Then, these results allow us to partially validate the hypothesis H5.

The moderating role of gender in the relationship between nostalgia proneness and brand attachment:

To highlight the moderating effect of gender on this relationship, we referred to the research of Chumpitaz and Vanhamme (2003) who recommend an analysis by subgroups. The comprehensive review of factors that we have shown proving that gender does not exert a moderating effect on the relationship between nostalgia proneness and brand attachment so the hypothesis H6 is rejected.

CONCLUSION

At the end of our research, it appears that nostalgia proneness is not only function of age. However, older people are sensitive and tend to regret their past more than young people since they have not yet lived long enough to talk about the past because in most cases, nostalgic scenes represent a present experience for young. This result agrees with the findings of Davis (1979) which showed that nostalgia can be felt only for periods actually experienced by the individual, so personal experience and not a narrative. In doing so, our results validate partially the comments developed by Goulding (2001), Holbrook and Schindler (2003) and more recently those of Kessous & Roux (2007) which confirm that age has a positive impact on nostalgia proneness.

On the other hand, we have demonstrated that gender has no impact on nostalgia proneness. Our results are in perfect agreement with the findings of Holbrook (1993).

Similarly, we have concluded that music has a positive and significant impact on the regret the past. Indeed, it appears that even if the music used in ad is perceived by the respondent as nostalgic (type of music, song accompaniment, tone, voice, etc.) this has no connection with the memories. In our research, respondents tend to regret their past when they hear the nostalgic music of the ad without remembering their childhood memories. However, we note that this result validates the hypothesis initially supported by Holbrook & Schindler (1989) and Holbrook (1993) which states that music preferences revealed maturity remain throughout the life cycle of the person and allow recalling the happy memories.

We were also able to validate the hypothesis initially supported by Holak and Havlena (1992) that the events (marriage, birth, etc) shown in the ad have a positive effect on nostalgia proneness. Indeed, it appears that the events remind people their happy memories and cause them to regret their past.

From a managerial point of view, our research is interesting for the specialists in advertising and showed them the importance of the use of nostalgia in order to create an emotional link with the promoted brand. As common in research on consumer behavior, the findings reported in this study are subject to certain important limitations. Indeed, the sample on which we based our research is an empirical sample and do not allow the generalization of results on the entire population. In addition, conditions for data collection are far from the real experimental conditions because we were unable to control the other external stimuli that may distract the
respondent. Therefore we recommend for future researchers trying equating the conditions of the investigation in an experiment.

Also, during the administration of the questionnaire for people aged over 60 years, we brought in 95% of cases to administer the questionnaire face to face and make an effort to translate items from French to Arabic even in the Tunisian dialect which may distort the results because the scales have not been pre-tested in the case of changing the original language in which they were written. We therefore hope the consideration of this matter in future researches and develop a measurement scales adapted to the Tunisian context. A final limitation of our research concerns the fact that we have take only one variable “nostalgia proneness” excluding other factors such as personal experience of the person, cultural affiliation, the quality of imagery and sensory acuity in the process of formation of attitude toward ad and brand, as suggested by Divard & Robert-Demontrond (1997).

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APPENDIX:

Figure 1 Conceptual / Hypothesized Framework

![Conceptual Framework Diagram]

Table 1
Definitions of nostalgia, adapted from Kessous & Roux (2008)

<table>
<thead>
<tr>
<th>Author and Year</th>
<th>Definitions of nostalgia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davis (1979)</td>
<td>“A positively toned evocation of a lived past” (p. 18)</td>
</tr>
<tr>
<td>Belk (1990)</td>
<td>“A wistful mood that may be prompted by an object, a scene, a smell, or a strain of music” (p. 670)</td>
</tr>
<tr>
<td>Holbrook and Schindler (1991)</td>
<td>“A preference (general liking, positive attitude, or favorable affect) toward objects (people, places, or things) that were more common (popular, fashionable, or widely circulated) when one was younger (in early adulthood, in adolescence, in childhood, or even before birth” (p. 330)</td>
</tr>
<tr>
<td>Stern (1992)</td>
<td>“An emotional state in which an individual yearns for an idealized or sanitized version of an earlier time period” (p. 11)</td>
</tr>
<tr>
<td>Baker and Kennedy (1994)</td>
<td>“A sentimental or bittersweet yearning for an experience, product, or service from the past” (p. 169)</td>
</tr>
</tbody>
</table>
Table 2
The measurement scales used

<table>
<thead>
<tr>
<th>Items adapted from Pérusson (2003) measurement scale</th>
<th>Items adapted from Blaid &amp; Laoeuilhe (2005) measurement scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - In general, I remember my memories.</td>
<td>1 - I have great affection for this brand.</td>
</tr>
<tr>
<td>2 - Memories of the past come to my mind.</td>
<td>2 - I have some passion for this brand.</td>
</tr>
<tr>
<td>3 - I saw in my thought some of my memories.</td>
<td>3 - I'm very tied to that brand.</td>
</tr>
<tr>
<td>4 - I think back to times of my life that are gone by now.</td>
<td>4 - I love this brand.</td>
</tr>
<tr>
<td>5 - I regret not being able to relive my happy memories.</td>
<td>5 - This brand appeals to me.</td>
</tr>
<tr>
<td>6 - I regret not being able to return to my past.</td>
<td>6 - I found some comfort in buying or owning this brand.</td>
</tr>
<tr>
<td>7 - I look back with regret at the right times of the past will not recur.</td>
<td>7 - I feel psychologically close to that brand.</td>
</tr>
<tr>
<td>8 - I wish I could relive the emotions of the past.</td>
<td>8 - This brand makes me happy.</td>
</tr>
<tr>
<td></td>
<td>9 - I feel like I'm missing something when I cannot find this brand.</td>
</tr>
<tr>
<td></td>
<td>10 - The fact that the mark disappears bother me much.</td>
</tr>
<tr>
<td></td>
<td>11 - If the mark disappears it makes me sad.</td>
</tr>
</tbody>
</table>

Table 3
Demographics % (N= 112)

<table>
<thead>
<tr>
<th>Sample description</th>
<th>Frequency</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>58</td>
<td>51.8%</td>
</tr>
<tr>
<td>Men</td>
<td>54</td>
<td>48.2%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women [20 - 29]</td>
<td>22</td>
<td>19.6%</td>
</tr>
<tr>
<td>[30 - 39]</td>
<td>14</td>
<td>12.5%</td>
</tr>
<tr>
<td>[40 - 49]</td>
<td>8</td>
<td>7.1%</td>
</tr>
<tr>
<td>[50 - 59]</td>
<td>8</td>
<td>7.1%</td>
</tr>
<tr>
<td>[60 - more]</td>
<td>6</td>
<td>5.4%</td>
</tr>
<tr>
<td>Men [20 à 29]</td>
<td>13</td>
<td>11.6%</td>
</tr>
<tr>
<td>[30 à 39]</td>
<td>14</td>
<td>12.5%</td>
</tr>
<tr>
<td>[40 à 49]</td>
<td>15</td>
<td>13.4%</td>
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<tr>
<td>[50 à 59]</td>
<td>6</td>
<td>5.4%</td>
</tr>
<tr>
<td>[60 – more]</td>
<td>6</td>
<td>5.4%</td>
</tr>
<tr>
<td>Occupations</td>
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<td></td>
</tr>
<tr>
<td>Executive, professional</td>
<td>16</td>
<td>14.3%</td>
</tr>
<tr>
<td>Middle management, technician, supervisor</td>
<td>9</td>
<td>8%</td>
</tr>
<tr>
<td>Workers</td>
<td>34</td>
<td>30.4%</td>
</tr>
<tr>
<td>Retired</td>
<td>8</td>
<td>7.1%</td>
</tr>
<tr>
<td>Student</td>
<td>35</td>
<td>31.3%</td>
</tr>
<tr>
<td>Inactive</td>
<td>10</td>
<td>8.9%</td>
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Table 4  
Test of fiability

<table>
<thead>
<tr>
<th>Nostalgia proneness</th>
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</tr>
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<tbody>
<tr>
<td>Items</td>
<td>The past Regret</td>
</tr>
<tr>
<td>IT 1</td>
<td>0.652</td>
</tr>
<tr>
<td>IT 2</td>
<td>0.808</td>
</tr>
<tr>
<td>IT 3</td>
<td>0.699</td>
</tr>
<tr>
<td>IT 4</td>
<td>0.584</td>
</tr>
<tr>
<td>IT 5</td>
<td>0.781</td>
</tr>
<tr>
<td>IT 6</td>
<td>0.831</td>
</tr>
<tr>
<td>IT 7</td>
<td>0.597</td>
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<table>
<thead>
<tr>
<th>% variance explained</th>
<th>31.927</th>
<th>20.737</th>
</tr>
</thead>
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<tr>
<td>λ</td>
<td>2.235</td>
<td>1.452</td>
</tr>
<tr>
<td>α of Cronbach</td>
<td>0.6269</td>
<td>0.7096</td>
</tr>
<tr>
<td>KMO</td>
<td>0.561</td>
<td></td>
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<table>
<thead>
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<th>Bartlett Test</th>
<th>Khi square</th>
<th>signification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>136.259</td>
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<table>
<thead>
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<th>Brand attachment</th>
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</thead>
<tbody>
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<td>Items</td>
<td>attachment</td>
</tr>
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<td>0.789</td>
</tr>
<tr>
<td>IT 2</td>
<td>0.871</td>
</tr>
<tr>
<td>IT 3</td>
<td>0.831</td>
</tr>
<tr>
<td>IT 4</td>
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</tr>
<tr>
<td>IT 5</td>
<td>0.781</td>
</tr>
<tr>
<td>IT 6</td>
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</tr>
<tr>
<td>IT 7</td>
<td>0.593</td>
</tr>
<tr>
<td>IT 8</td>
<td>0.800</td>
</tr>
<tr>
<td>IT 9</td>
<td>0.874</td>
</tr>
<tr>
<td>IT 10</td>
<td>0.882</td>
</tr>
<tr>
<td>IT 11</td>
<td>0.814</td>
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<table>
<thead>
<tr>
<th>% variance explained</th>
<th>59.125</th>
<th>13.118</th>
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<tbody>
<tr>
<td>λ</td>
<td>6.504</td>
<td>1.443</td>
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<td>0.9187</td>
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<tr>
<td>KMO</td>
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<th>Khi square</th>
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<tr>
<td></td>
<td>933.292</td>
<td>.000</td>
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FINANCIAL INTEGRATION AND GROWTH VOLATILITY: EMPIRICAL EVIDENCE OF THE THRESHOLD EFFECT OF FINANCIAL DEVELOPMENT FROM DYNAMIC PANEL DATA

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Abstract
This study aims to demonstrate that economies with higher level of financial sector development benefit more from financial integration than those with a lower one. In what follows, we extend our previous study by employing updated data and also exploring more questions related to the link between financial integration and volatility of growth. More specifically, we will investigate the issues relevant to threshold effect of financial development on which financial integration changes sign. We investigate the role of financial development (as measured by the credits to the private sector to GDP) in the relationship between financial integration and volatility of growth for different groups of countries. Estimations are conducted with a panel data of 70 countries over the period 1970-2009 using GMM-System estimator for dynamic panel data. Empirical results support that the financial integration aggravates the macroeconomic volatility according to the level of the domestic financial development. This implies that the countries which are at an intermediate phase of financial development are the most unstable. This threshold is estimated at a rate of the credits to the private sector to GDP around 50%.

JEL Classification: E44, C22, D74, F43.
Keywords: Financial development, Financial integration, Economic growth, Macroeconomic volatility.
INTRODUCTION

Given their low level of capital and their biggest volatility, developing countries, particularly, seem to have most interest to benefit from the process of financial integration. As the decision-makers estimate the risks and the advantages of financial integration including its implications for growth, the volatility took a big importance. Therefore, there was a debate of the impact of financial integration on economic growth. In spite of the crises which shook emerging countries, certain works show that the advantages of the financial integration are acquired in the long term. Several other studies have examined the causal relation of the financial integration and the economic growth. Although many of these studies concluded that the financial integration really produces advantages for growth. This relation is not yet found to be strong. In this context, we address the question to know if there is a threshold of financial development from which the financial integration can reduce the macroeconomic volatility.

The remainder of this paper is organized as follows. The next section provides a brief theoretical and empirical review on the relationship between financial development, financial integration and macroeconomic volatility. Section 3 highlights an econometric analysis where descriptive statistics, model and estimated methodology are described. Empirical results are presented in Section 4. Finally, this paper concludes with the Section 5.

THE REVIEW OF THE LITERATURE

The international financial integration has considerably increased since the end of 1980s and 1990s and it has been a source of important potential advantages. At first, the opening in the international capital markets supplies additional resources to finance the investment and can thus lead to a bigger accumulation of capital. This is particularly in the countries where the capacity of savings is forced by a low level of income. Besides, the integration can lead to a more efficient allocation of capital by improving the discipline of the market and by strengthening the banking system. The greater allocation of capital and efficiency has the objective to lower the investment cost and to favor economic growth. Another major source of advantages is to facilitate the sharing of international risk by supplying more opportunities for the diversification of portfolios. This channel supplies additional means of insurance for companies by allowing them to invest in projects with high return and more risks. However, if these potential advantages are well established in the theory, the empirical evidence is still mixed and rather weak.

In theory, most of the studies of the literature which treated the financial integration had concentrated on the evaluation of the impact of the capital account opening on the growth rate, (Edison and al., 2002). The attention is recently changed to be on the relation between the financial openness and the macroeconomic volatility. After the financial crises of the 1980s and 1990 which followed reforms of liberalization of the major account, some works supported that the financial integration could be a source of bigger macroeconomic volatility. This is going to expose the countries to be vulnerable in the sudden reversals of capital flows, (Kaminsky and Reinhart, 1999). According to this line of explanation, some countries are going to run a higher macroeconomic volatility by what they miss in terms of political instruments to smooth the cycles. On the other hand, they miss adequate financial institutions to face the sudden reversals of capital flows. Even, without considering the external episodes of the macroeconomic volatility as the financial crisis, it could be the case that the financial integration, associated with the weakness of domestic financial institutions is going to strengthen existing changes because of the imperfections of credit market. This can also bring report of volatility of the cycles of the economic activity. In the presence of informative
asymmetries, the opening of the capital account supplies the additional liquidity to the domestic banking system and leverage more raised for the loans of firms. In this context, the financial integration can amplify the mechanism of financial accelerator identified in the study of Bernanke and al. (2000). The international financial integration can have two major potential advantages, the improvement of the global allocation of the capital and the help of countries to better share the risk by reducing the volatility of consumption, (Mr. Ayhan Kose, Eswar Prasad and Marco Terrones; 2003). The understanding of the dynamics of the macroeconomic volatility is recently moved for certain reasons. At first, the works of Ramey and Ramey; (1995) showed the existence of a negative relation between the growth and its volatility. As quoted previously, the literature handled only the theoretical links and the channels of influence between the financial development and the economic growth. This interconnection always appreciated the positive impact of the development of the financial sector on growth. The potential connections between the financial development and the volatility of the economic growth were not completely studied. However, the increase of the volatility of growth that many developing countries have experienced in the last decades brought an important and major question: if and in which measure the fluctuations in the production can be moved closer to the development of the financial sector?

The previous studies of Easterly and al. (2000), Denizer and al. (2002), Haussmann and Gavin (1996) and Raddatz (2006) showed that the financial development reduces the macroeconomic volatility. The conclusion from these works is that nobody tried to identify the channels by which the financial development affects potentially the volatility of growth. In an attempt to examine if the financial intermediaries serve as shock absorbers by easing the effect of the real or monetary volatility on that of the economic growth, or if they amplify their impact. On one hand, this ensues from works of Bernanke and Gertler (1989) which showed that if the net value of the borrowers is affected by a shock, this is going to amplify the volatility of the economy through the effect of the investment accelerator. In this direction, Acemoglu and Zilibotti (1997) showed that the interaction between the indivisibility of the investment and the incapacity of diversification of risk increases the economic volatility. On the other hand, and in the same current of the literature, the studies of Bernanke and Blider (1992) and Bernanke and Gertler (1995) showed that the monetary policy can affect the real economy by its effect on the credit market. By reference to the model of Bacchetta and Caminal (2000), some studies showed that the entrepreneurs by difference in their levels of wealth have access to financial markets. The financial intermediaries appear because of the information asymmetries between the lenders and the borrowers, (Thorsten Beck, Mattias Lundberg and Giovanni; (2006)). Unlike Bacchetta and Caminal, these works modelled the financial intermediation in an explicit way by presenting the channel of the monetary policy. They studied two types of shocks which are the real shocks which affect only the non financial institutions and the monetary shocks which affect only the banking balance sheets. Because the entrepreneurs produce at different levels of productivity by depending on the level of the internal resources, the real and monetary shocks will have distributional effects which are going to result from its effect on the output according to the nature of the shock that is cooled or amplified. The theoretical studies which examine the effects of integration on the volatility of the business cycles failed to bring conclusive results.

Empirically, by using a dynamic stochastic model, Mendoza (1994) discovered that there is a low volatility of production and consumption with a greater financial integration. In front of bigger and more persistent shocks, there is a proof which the volatility of the production increases with the degree of financial integration. On the contrary, Baxter and Grucini (1995) showed that there is a negative relation between the financial integration and the volatility of the consumption and the relative volatility of consumption. For them, the volatility of production is found to increase with a bigger financial integration. The changes observed by the production and the volatility of the
consumption are largely awarded to the effects of the wealth and the interaction of these effects with the sharing of risk ensuing from various structures of the assets of the market. The analysis of the impact of financial integration on macroeconomic volatility can be complicated by other factors.

In connection with another branch of studies, Sutherland (1996), Senay (1998) and Buch, Doepke and Pierdzioch (2005) showed that the degree of influence on the volatility of output and consumption depends on the nature of the shocks affecting the economy. In case of the monetary and fiscal shocks, the volatilities of the production and the consumption move in directions set with the increase of the financial integration. Rodrik (1998) supports that with the financial integration, opened economies have a wider exhibition in the shocks in the world market and their underlying structures as the degree of exports and the diversification of the imports determine their capacity to absorb the shocks of the terms of trade and the foreign demand. These shocks explain a significant fraction of the volatility in developing countries. Aghion and al. (1999) and Aghion and al. (2000) showed that countries with a low level of financial development can expose more volatile growth rates. On the other hand, Beck and al. (2001) showed that this is not necessarily the case and that the effect of the financial development on the volatility depends on the nature of shocks that affect the economy that is real or monetary. These shocks explain a significant fraction of the volatility in developing countries. By using a panel of 63 countries over the period 1960-1997, they found no strong relation between the financial development and the volatility of growth. Other recent works analyzed the interdependence between the domestic and foreign financial markets. Chang and Valesco (1999) have examined the influence of banks and foreign investors on the domestic banking systems. The study of Caballero and Krishnamurthy (2001) has concerned the role of the domestic financial system in the access to the international financial markets. In spite of the rich empirical literature which studied the impact of the financial openness on economic growth, the studies on the links between the opening and the macroeconomic volatility are limited. Razin and Rose (1994) have studied the impact of trade openness on the volatility of production, consumption and investment for a sample of 138 countries over the period 1950-1988. They found no significant relation between the opening and the macroeconomic volatility. Estearly, Islam and Stiglitz (2001) have looked for the sources of the volatility by using a sample of 74 countries over the period 1960-1997. They found that the countries which have a more developed domestic financial sector are associated to a lower volatility.

AN ECONOMETRIC ANALYSIS OF FINANCIAL INTEGRATION, GROWTH VOLATILITY AND FINANCIAL DEVELOPMENT

DATA AND SAMPLE

The used sample consists of 70 developed and developing countries. The period of study extends over 1970-2009 where the observations for each country is averaged on 5 years periods. Data are used from WDI database and the IFS database (2009) and the database built by Levine (2009). The indicator of the financial development is measured by the ratio of the credits to the private sector to GDP. The net private capital flows to the GDP is a de facto measure of financial integration. Here we use those in Lane and Milesi-Ferretti (2006). For the volatility of growth we shall use the standard deviation of the GDP in Log in every period under five years. The same procedure is adopted for the other variables of control whereas the volatility of inflation rate which is measured by standard deviation of Log (1+inflation), the standard deviation of trade openness ((X+M)/GDP); exchange rate stability used in Aizenman (2008) and standard deviation of the government spending (G/GDP).

THE DESCRIPTIVE STATISTICS

According to the results presented in table 2 we notice that the volatility marked the value the most raised during the 80s and 90s decades for emerging countries (MFI), a period which was qualified by adoption of certain policies such as financial liberalization and integration. So, these countries knew economic recessions in parallel with crises that appeared in this period. On the other hand, in developed countries the volatility was almost stable during the four decades. In less financially integrated countries, the volatility is showed in decline throughout the studied period.

Table 3 shows that the indicator of the financial development reaches the maximum values in the developed countries and is in strong growth through decades. The more developed financial systems are the ones the most active and efficient in allocation of resources. For other countries, we notice that the indicator of the financial development is in a stable tendency for the most opened countries.

THE GMM-SYSTEM IN DYNAMIC PANEL DATA

The methodology of Generalized Method of Moments (GMM) for panel data analyses, proposed by Arellano and Bond (1991) and then further developed by Blundell and Bond (1998), is employed here to control for endogeneity in our estimations. The data will be calculated every 5 year period from 1970 to 2009. It gives a balanced panel of 70 countries and 8 periods. The empirical results suggest, however, that the past volatility is suited in the explanation of the current volatility for the economic growth. The following presentation of the structure of the model of regression is based on a dynamic specification. We are going to consider the model of following regression:

\[ y_{i,t} = \alpha y_{i,t-1} + \beta x_{i,t} + \mu_i + \epsilon_{i,t} \]

With \( \mu_i \) and \( \epsilon_{i,t} \) are independently distributed, \( E[\mu_i] = E[\epsilon_{i,t}] = 0 \) for \( i = 1, ..., N \) and \( t = 2, ..., T \). With this specification and our structure of panel (raised \( N \) and short \( T \)), the OLS estimator is biased. Arellano and Bond (1991) and Arellano and Bover (1995) proposed the linear GMM-IV estimator which consists in taking for each equation the first difference of the equation to be estimated in order to eliminate the specific effects of countries; and then use the values in a lagged level with one period at most from the explanatory variables as instruments of these variables at the level of the equation in first difference. The System-GMM estimator developed by Arellano and Bover (1995) consists in estimating a system of equations (one for each time period) specified in level and in first difference. The consistency of the GMM estimator depends on the validity of the assumption that the error terms do not exhibit serial correlation and on the validity of the instruments. To address these issues we use two specification tests suggested by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The first is a Sargan test of over-identifying restrictions, which tests the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process. The second test examines the hypothesis that the error term \( \epsilon_{i,t} \) is not serially correlated. We test whether the differenced error term is second-order serially correlated (by construction, the differenced error term is probably first-order serially correlated even if the original error term is not). Failure to reject the null hypotheses of both tests gives support to our model.

MODEL AND ESTIMATION STRATEGY

\( ^2 \) For simultaneous evolution of private credit and growth volatility looks at graphs in annexes.
By joining in the course of the previous modeling, we consider following both dynamic equations where we introduce the financial development and financial integration indicators:

\[ y_{it} = x_{it-1} + \beta_1 x_{it} + \beta_2 DF_{it} + \beta_3 FI_{it} + \mu_i + \epsilon_{it} \]  
(1)

\[ y_{it} = x_{it-1} + \beta_1 x_{it} + \beta_2 DF_{it} + \beta_3 FI_{it} + \beta_4 (DF_{it} \cdot FI_{it}) + \mu_i + \epsilon_{it} \]  
(2)

\( y_{it} \) is the measure of growth volatility for country \( i \) in year \( t \). More specifically, \( y_{it} \) is either output volatility measured as the five-year standard deviations of GDP per capita; (FD) is the private credit as a ratio to GDP as a measure of financial development; FI is a de facto measure of financial integration. Here we use those in Lane and Milesi-Ferretti (2006) and (DF, FI) which is an interaction term between the financial integration and the level of financial development. We are particularly interested in the effect of the interaction term because we suspect that international financial integration may complement or substitute other conditions.

\( X_{it} \) is a vector of macroeconomic control variables that include the variables most used in the literature, namely, inflation volatility as the five-year standard deviations of the rate of inflation; trade openness volatility defined as the five-year standard deviation of ((X+M)/GDP); government spending volatility and exchange rate stability index used in Asieman (2008), as five-year averaged.

The parameters of interest are \( \beta_2, \beta_3 \) and \( \beta_4 \) which get the effect of the potential interaction between the financial integration and the financial development. With this formulation, we allow the impact of one of both variables to depend on the level of the other one. \( \beta_2 \) and \( \beta_3 \) of the equation (1) represent the marginal impacts respectively of the financial development and the financial integration. On the contrary, \( \beta_3 \) in (2) represents the marginal impact of the financial integration conditional on the level of financial development being zero and the interpretation which is similar for \( \beta_2 \) is also held. Finally, to obtain the level of threshold of financial development, we have to calculate from (4) the function: \( \frac{dy}{DF} = 3 + 4DF^* \) being equal to zero.

### RESULTS AND DISCUSSIONS

Our estimation has supplied the following results. We have first of all to consider the mixed full sample, and then we shall proceed to separate the groups of countries according to the order of financial integration, adopted by Mr. Ayhan Kose, Eswar Prasad and Marco Terrones; (2003). The first estimation consists in considering the full sample mixed which contains 70 countries where 20 are industrialized economies. Secondly, we split developing countries (50) into two groups: 18 More Financially Integrated Economies (MFIE) and 32 Less Financially Integrated Economies (LFIE). Every time the instruments variables concern the indicator of the financial development by its values lagged and time dummies to check the time effect which are not postponed in all the tables.

Table 4 indicates two results. Firstly the test of second-order serial correlation justifies the acceptance of the null hypothesis. Secondly and at the same time, the Sargan test of over identification suggests that we cannot reject the hypothesis of the validity of instruments (prob X2 > 0.05). It noted that we have instrumented the indicator of the financial development by its values lagged and time dummies variables to check the time effect. Column (1) shows the results of the model without introduction of the variables of interest (financial development and financial integration), obtained from GMM-System. The results show that the coefficients associated with the explanatory variables answer favorably the expected signs. The standard deviation of the rate of trade opening exercises a negative effect on the severity of the volatility of the growth rate. This
result doesn’t confirm the Rodrik’s argument: more opened economies are more specialized and so running the biggest shocks of income, combined with imperfect financial markets, lead to a bigger macroeconomic volatility. On one hand, instability of inflation, exchange rate volatility and government spending has positive impact on the instability of the growth rate which showed strongly significant at 1 %. On the other hand, the coefficient of the lagged dependent variable has a significant and positive sign with a scale less than one. Given that we have considered 5 year periods, it suggests that this volatility is relatively persistent. Furthermore, it also supports the dynamic specification adopted here. In column (3), we have introduced the indicator of the financial development measured by ratio of credits for the private sector divided by GDP and the financial integration measured by the ratio of net private capital flows of the GDP. Financial development reduces favorably the macroeconomic volatility by the fact that an increase in the indicator of the credits of 1 point percentage weakens the volatility of 0.1 point percent. Financial integration aggravates significantly the economic growth volatility of 0.02 point. This means that a developed financial system, by the exercise of functions as mentioned in Levine papers, minimizes the economic danger of skidding. Other control variables resist due to the same signs as in (1) and (2). In model (4), it is interesting to point out that the addition of the interactive term between the financial integration and the financial development is in the objective of knowledge, at which level of financial development, the financial integration can change sign towards its effect on the volatility of economic growth rate. The estimation supplies a significant negative impact of the interactive term at a risk of 5 %. The financial integration reduces the volatility as soon as certain threshold of the financial development is reached by the studied countries. This means that there is a threshold of financial development from which the coefficient of the financial integration changes sign. This one is determined by the calculation of the marginal impact of the financial integration as the table shows. This means that from a certain level of the financial development, the financial integration has just brought its initial enthusiasm while reducing the macroeconomic volatility. This threshold is approximate at a level of 58 % of the private credit ratio. A financial system which is in phase of maturity can run instabilities which can engender an escalation of the volatility regarding the financial opening.

We notice that this rate is taken by the high levels of the developed countries appearing in the sample. It is possible that the procedure of separation of samples will give more precise results which take into account heterogeneous specificities of the studied groups. We shall divide the sample into three groups according to the degree of financial integration as adopted by the economists, Kose, Mr A. E. Prasad, K. Rogoff, and S.J. Wei. This will give 20 developed countries and 50 developing countries where 18 represent the Most Financially Integrated and 32 Least Financially Integrated Economies.

The estimation for the sample of developed countries shows that financial integration has no significant effect on the volatility of economic growth both in (3) and (4) (see table 5). The indicator of the financial development persists with a significantly negative effect which strengthens the idea that a developed financial system favors the economic growth while minimizing economic instability. The financial opening has no significant impact on the macroeconomic volatility; the result joins in the same lineage of the works of Kose and al. (2003) and of Easterly and al. (2004). The introduction of the interactive term returns has no significant effect.

Explanatory variables of control in table 6 resist by the same signs as in (1) and (2). In model (4), the addition of the interaction term between the financial integration and the financial development has a significant negative impact which validates the hypothesis that financial integration can change sign towards its effect on the volatility of the economic growth rate. The
financial integration which reduces the volatility at a certain threshold of the financial development is reached by the studied countries. This means that there is a threshold from which the coefficient of the financial integration changes sign. This one is determined by the calculation of the marginal impact of the financial integration as the table shows. This means that from a certain level of the financial development, the financial integration has just brought its initial enthusiasm while reducing the macroeconomic volatility. This threshold is approximate at a level of 50% of the private credit ratio. A financial system which is in phase of maturity can run instabilities which can engender an escalation of the volatility along with the financial opening.

We notice, as shown in table 7 column (3), that the increase in the volatility of growth during studied period is better and significantly explained by the evolution of the lagged volatility, the inflation rate volatility, the exchange rate volatility, the government volatility and the degree of financial integration. The financial development has a significant effect on the decline of volatility of LFIEs. This also says that the countries which have under developed financial systems can undergo instabilities further to the opening to international financial markets. The evaluation of (4) suggests that the financial integration changes sign of impact on the volatility of growth up to a certain level of development because the interactive term with the indicator of the financial development is shown statistically significant. This discovery is compatible Beck and al. (2001). The threshold of the financial development in LFI countries from which the financial integration changes sign towards the volatility is approximate at a level and in agreement with previous empirical results and with most of the theoretical models which plan an ambiguous impact of financial integration on the volatility of growth, according to the nature of the shocks which strike the economy. For the financial development, this result agrees with of 58%.

The estimated coefficients (see table 8) have the expected sign. The coefficient of the lagged dependent variable has a significant and positive sign with a scale less than one. The impact of the volatility of exchange is positive on the volatility of growth of GDP, as well as the indicator of the volatility of trade openness, which is confirmed by the estimation of the Rodrik study (1998) where his argument: more opened economies are more specialized and so throw the biggest shocks of income, combined with imperfect financial markets, lead to a bigger macroeconomic volatility. This result is also compatible with the discoveries of Kose and al. (2003) and of Easterly and al. (2004). The interaction term has no significant impact.

**CONCLUSION**

The contribution of this paper is that it purports to show the relation between the financial integration and the macroeconomic volatility conditional to the development of the domestic financial systems. The interaction between the domestic financial development and the financial integration is a determiner which does not miss importance of the scale of the volatility brought by the financial openness. The financial integration is associated with the highest volatility of the growth rates if the level of financial domestic development is below determined threshold. This result holds the level of threshold of financial development, measured by the ratio of private credit to GDP, is estimated to be around 50%. From this level, we expect the advantages and the benefits of the financial openness. It seems however that the countries which are at an intermediate phase of financial sector development can be the most unstable. In terms of policy conclusion, it suggests that

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3 The results in table 1 show that (i) test of second-order serial correlation justify the acceptance of the null hypothesis, and (ii) the Sargan test of over identification suggests that we cannot reject the hypothesis of the validity of instruments (prob $X^2 > 0.05$). It noted that we have instrumented the indicator of the financial development by its values lagged and time dummies variables to check the time effect.
the financial domestic system has to be a prerequisite for the effect of the financial integration. A basic implication is that the economies which run an intermediate level of financial development are more unstable than the others which are more developed or less developed economies. This is true in the sense that the temporary shocks have big and persistent effects, as long as these countries can expose economic cycles. Thus, the countries which are in a phase of financial development can be more unstable in the short-term. In the same way full liberalization of the capital account can destabilize these economies. This is explained by the phases of growth with the capital inflows which will be followed by a sudden fall by the outflows of capital.

Financial integration can catalyze financial development, improve governance, and impose discipline on macro policies. But, in the absence of a basic pre-existing level of these supporting conditions, financial integration can aggravate instability. Broader range of financial markets, greater financial depth can help deal with shocks; make transmission of macro policies more efficient. Financial integration can support and catalyze other reforms, especially financial development. But, there are other issues that are still below threshold levels of financial and institutional development in many developing economies. Still de facto fixed or tightly-managed exchange rates and inflation targeting create problems when there are surges in inflows. Real exchange rate appreciations can hurt poor and undeveloped economies. These economies can manage risks during transition to thresholds, but cannot eliminate them.

REFERENCES

APPENDIX

Appendix of tables

Table 1. Correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>FI</th>
<th>FD</th>
<th>EXCHANGE</th>
<th>GROWTHVOL</th>
<th>INFVOL</th>
<th>TRADEVOL</th>
<th>GOVVOL</th>
<th>FI*FD</th>
</tr>
</thead>
<tbody>
<tr>
<td>FI</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FD</td>
<td>-0.0545</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EXCHANGE</td>
<td>0.0425</td>
<td>-0.2000</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GROWTHVOL</td>
<td>0.0669</td>
<td>-0.1412</td>
<td>0.0981</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFVOL</td>
<td>-0.0586</td>
<td>-0.0767</td>
<td>-0.0817</td>
<td>0.0777</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRADEVOL</td>
<td>0.1141</td>
<td>-0.0224</td>
<td>0.0854</td>
<td>0.0784</td>
<td>0.1120</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOVVOL</td>
<td>-0.2466</td>
<td>-0.3334</td>
<td>0.1684</td>
<td>0.1334</td>
<td>0.0376</td>
<td>0.0605</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>FI*FD</td>
<td>0.5746</td>
<td>-0.5496</td>
<td>0.2200</td>
<td>0.0828</td>
<td>0.0085</td>
<td>0.1330</td>
<td>0.1186</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Table 2. The volatility of the growth rate by decade: a comparative analysis between the various groups of countries

<table>
<thead>
<tr>
<th>Groups</th>
<th>Standard deviation of growth rate by group of countries in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed countries</td>
<td>2.88</td>
</tr>
<tr>
<td>Developing MFI(^4)</td>
<td>3.7</td>
</tr>
<tr>
<td>Developing LFI(^5)</td>
<td>7.02</td>
</tr>
</tbody>
</table>

Table 3. The evolution of the indicators of the financial development of various groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean of private credit ratio to GDP in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>All countries</td>
<td>33</td>
</tr>
<tr>
<td>Developed countries</td>
<td>54</td>
</tr>
<tr>
<td>Developing MFI</td>
<td>28</td>
</tr>
<tr>
<td>Developing LFI</td>
<td>19</td>
</tr>
</tbody>
</table>

Table 4. Estimation by the method of GMM-System: full sample of 69 countries

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>GMM-SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lagged dependant variable</td>
<td>(1)</td>
</tr>
<tr>
<td>0.420***</td>
<td>0.303***</td>
</tr>
</tbody>
</table>

\(^4\) MFI: More Financially integrated.
\(^5\) LFI: Less Financially Integrated.
Inflation volatility | 0.00193*** | 0.00169*** | 0.00159*** | 0.00139*** |
Exchange rate volatility | 0.0230*** | 0.0390*** | 0.0312*** | 0.0371*** |
Trade volatility | -0.166*** | -0.117*** | -0.105*** | -0.0677*** |
Government spending volatility | 1.499*** | 1.198*** | 1.387*** | 1.579*** |
Private credit | -0.0936*** | -0.0774*** | -0.0774*** | -0.105*** |
Net private capital flows | -0.0200*** | 0.0353*** | 0.0353*** | 0.0353*** |
Credit*Capital flows | -0.0609*** | -0.0609*** | -0.0609*** | -0.0609*** |
Constant | 0.0370*** | 0.0850*** | 0.0850*** | 0.0841*** |

Observations | 483 | 483 | 483 | 483 |
Countries | 69 | 69 | 69 | 69 |
Serial correlation test (p-value) | 0.2343 | 0.2673 | 0.2646 | 0.3166 |
Sargan test (p-value) | 0.7709 | 0.9189 | 0.9995 | 0.9996 |

Threshold of Financial Development (%GDP) | 58 |

The regressions also includes dummy variables for the different time periods that are not reported.
* p<0.1; ** p<0.05; *** p<0.01 indicate significance at the 10%, 5% and 1% level in the first-stage regression respectively.
a The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation.
b The null hypothesis is that the instruments used are not correlated with the residuals.

$t$-stat in parentheses.

### Table 5. GMM-System Estimation of 20 developed countries

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>GMM-System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Lagged dependant variable</td>
<td>0.371***</td>
</tr>
<tr>
<td>Inflation volatility</td>
<td>0.622</td>
</tr>
<tr>
<td>Trade volatility</td>
<td>-0.321***</td>
</tr>
<tr>
<td>Government spending volatility</td>
<td>3.250***</td>
</tr>
<tr>
<td>Exchange rate volatility</td>
<td>0.0001</td>
</tr>
<tr>
<td>Private credit</td>
<td>-0.0590***</td>
</tr>
<tr>
<td>Net private capital flows</td>
<td>-0.00890</td>
</tr>
<tr>
<td>Credit*net capital flows</td>
<td>-0.00551</td>
</tr>
</tbody>
</table>

$\frac{\partial y}{\partial F_1} = \beta_4 + \beta_4 DF^*$ from equation (4).
<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
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<tr>
<td>Lagged dependant variable</td>
<td>0.298***</td>
<td>0.255***</td>
<td>0.309***</td>
<td>0.293***</td>
</tr>
<tr>
<td></td>
<td>(12.72)</td>
<td>(8.659)</td>
<td>(6.830)</td>
<td>(7.556)</td>
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<tr>
<td>Exchange rate volatility</td>
<td>0.0802***</td>
<td>0.0729***</td>
<td>0.0509***</td>
<td>0.0621***</td>
</tr>
<tr>
<td></td>
<td>(18.25)</td>
<td>(10.18)</td>
<td>(6.310)</td>
<td>(5.985)</td>
</tr>
<tr>
<td>Inflation volatility</td>
<td>0.00285***</td>
<td>0.00256***</td>
<td>0.00246***</td>
<td>0.00235***</td>
</tr>
<tr>
<td>Trade volatility</td>
<td>-0.151***</td>
<td>-0.120***</td>
<td>-0.0637*</td>
<td>-0.0282</td>
</tr>
<tr>
<td></td>
<td>(-3.706)</td>
<td>(-3.281)</td>
<td>(-1.689)</td>
<td>(-0.726)</td>
</tr>
<tr>
<td>Government spending volatility</td>
<td>1.433***</td>
<td>1.299***</td>
<td>1.490***</td>
<td>1.510***</td>
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<tr>
<td></td>
<td>(7.242)</td>
<td>(5.083)</td>
<td>(4.340)</td>
<td>(4.965)</td>
</tr>
<tr>
<td>Private credit</td>
<td>-0.0677***</td>
<td>-0.0659***</td>
<td>-0.0980***</td>
<td>-0.0980***</td>
</tr>
<tr>
<td></td>
<td>(-11.32)</td>
<td>(-10.09)</td>
<td>(-6.541)</td>
<td>(-6.541)</td>
</tr>
<tr>
<td>Net private capital flows</td>
<td>0.0228***</td>
<td>0.0361***</td>
<td>0.0361***</td>
<td>0.0361***</td>
</tr>
<tr>
<td></td>
<td>(11.12)</td>
<td>(9.683)</td>
<td>(9.683)</td>
<td>(9.683)</td>
</tr>
<tr>
<td>Credit*net capital flows</td>
<td></td>
<td>-0.0725***</td>
<td></td>
<td>-0.0725***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-5.420)</td>
<td></td>
<td>(-5.420)</td>
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<tr>
<td>Constant</td>
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<td>0.0459***</td>
<td>0.0551***</td>
<td>0.0540***</td>
</tr>
<tr>
<td></td>
<td>(4.530)</td>
<td>(9.266)</td>
<td>(10.05)</td>
<td>(6.096)</td>
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<tr>
<td>Observations</td>
<td>350</td>
<td>350</td>
<td>350</td>
<td>350</td>
</tr>
<tr>
<td>Countries</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Serial correlation test (p-value)</td>
<td>0.3435</td>
<td>0.3272</td>
<td>0.2959</td>
<td>0.4147</td>
</tr>
<tr>
<td>Sargan test (p-value)</td>
<td>0.7537</td>
<td>0.7674</td>
<td>0.9994</td>
<td>0.9996</td>
</tr>
</tbody>
</table>

T-stat in parentheses.

The regressions also include dummy variables for the different time periods that are not reported.

* p<0.1, ** p<0.05, *** p<0.01 indicate significance at the 10%, 5% and 1% level in the first-stage regression respectively.

a: The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation.
b: The null hypothesis is that the instruments used are not correlated with the residuals.

\[ \frac{\partial y}{\partial DF1} = \beta_1 + \beta_4 DF \] from equation (4).
<table>
<thead>
<tr>
<th>Variables</th>
<th>Two Step GMM-System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Lagged dependent variable</td>
<td>0.327***</td>
</tr>
<tr>
<td></td>
<td>(8.391)</td>
</tr>
<tr>
<td>Inflation volatility</td>
<td>0.00231***</td>
</tr>
<tr>
<td></td>
<td>(4.571)</td>
</tr>
<tr>
<td>Trade volatility</td>
<td>-0.0854***</td>
</tr>
<tr>
<td></td>
<td>(-3.184)</td>
</tr>
<tr>
<td>Exchange rate volatility</td>
<td>0.0688***</td>
</tr>
<tr>
<td></td>
<td>(8.250)</td>
</tr>
<tr>
<td>Government spending volatility</td>
<td>1.266***</td>
</tr>
<tr>
<td>Private credit</td>
<td>-0.0914***</td>
</tr>
<tr>
<td></td>
<td>(-6.461)</td>
</tr>
<tr>
<td>Net private capital flows</td>
<td>0.0327***</td>
</tr>
<tr>
<td></td>
<td>(12.79)</td>
</tr>
<tr>
<td>Credit*net capital flows</td>
<td>-0.0728***</td>
</tr>
<tr>
<td></td>
<td>(-2.834)</td>
</tr>
<tr>
<td>Constant</td>
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<tr>
<td></td>
<td>(-1.814)</td>
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<tr>
<td>Observations</td>
<td>224</td>
</tr>
<tr>
<td>Countries</td>
<td>32</td>
</tr>
<tr>
<td>Serial correlation test (\hat{\rho}\text{(p-value)})</td>
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</tr>
<tr>
<td>Sargan test (\hat{\rho}\text{(p-value)})</td>
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</tr>
<tr>
<td>Threshold level of Financial Development (private credit in %GDP)</td>
<td>58</td>
</tr>
</tbody>
</table>

* \(\beta_3 + \beta_4DF\) from equation (4).

The regressions also include dummy variables for the different time periods that are not reported.

* \(p<0.1\); ** \(p<0.05\); *** \(p<0.01\) indicate significance at the 10%, 5% and 1% level in the first-stage regression respectively.

a The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation.

b The null hypothesis is that the instruments used are not correlated with the residuals.

\[ \frac{\partial y}{\partial F} = \beta_3 + \beta_4DF \]
Table 8. GMM-System Estimation of: sample of 18 MFIEs

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>Two Step GMM-System</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Lagged dependant variable</td>
<td>0.569***</td>
</tr>
<tr>
<td></td>
<td>(4.212)</td>
</tr>
<tr>
<td>Inflation volatility</td>
<td>0.000412</td>
</tr>
<tr>
<td></td>
<td>(0.824)</td>
</tr>
<tr>
<td>Trade volatility</td>
<td>0.106</td>
</tr>
<tr>
<td></td>
<td>(1.097)</td>
</tr>
<tr>
<td>Exchange rate volatility</td>
<td>0.0426**</td>
</tr>
<tr>
<td></td>
<td>(2.406)</td>
</tr>
<tr>
<td>Government spending volatility</td>
<td>3.541</td>
</tr>
<tr>
<td></td>
<td>(1.393)</td>
</tr>
<tr>
<td>Private credit</td>
<td>-0.0603***</td>
</tr>
<tr>
<td></td>
<td>(-4.498)</td>
</tr>
<tr>
<td>Net private capital flows</td>
<td>0.0402**</td>
</tr>
<tr>
<td></td>
<td>(2.225)</td>
</tr>
<tr>
<td>Credit*net capital flows</td>
<td>-0.0309</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.00140</td>
</tr>
<tr>
<td></td>
<td>(-0.0802)</td>
</tr>
</tbody>
</table>

Observations: 126
Countries: 18
Serial correlation testa (p-value): 0.9668 0.5159 0.8469 0.7017
Sargan testb (p-value): 0.9953 0.9805 0.9805 0.9907

t-stat in parentheses.
The regressions also include dummy variables for the different time periods that are not reported.
* p<0.1; ** p<0.05; *** p<0.01 indicate significance at the 10%, 5% and 1% level in the first-stage regression respectively.
a The null hypothesis is that the errors in the first-difference regression exhibit no second-order serial correlation.
b The null hypothesis is that the instruments used are not correlated with the residuals.
### List of countries

<table>
<thead>
<tr>
<th>Sample</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed countries</td>
<td>Austria, Belgium, France, Germany, Italy, Netherlands, the United Kingdom, Ireland, Spain, Finland, Denmark, Greece, Portugal, Sweden, Norway, the USA, Canada, Australia, New-Zélande, Japan.</td>
</tr>
<tr>
<td>Developing countries</td>
<td>South Africa, Mexico, Argentina, Brazil, Chile, Colombia, Venezuela, Peru, Singapore, Thailand, Philippine, Indonesia, Malaysia, R. Korea, Egypt, Pakistan, Turkey, Morocco.</td>
</tr>
</tbody>
</table>

### List of variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth Volatility</td>
<td>Standard deviation of GDP per capita in log per 5 years unit.</td>
<td>WDI</td>
</tr>
<tr>
<td>Inflation Volatility</td>
<td>Standard deviation of inflation rate in per 5 years unit.</td>
<td>WDI</td>
</tr>
<tr>
<td>Trade Volatility</td>
<td>Standard deviation of trade ((X+M/GDP)) per 5 years unit.</td>
<td>WDI</td>
</tr>
<tr>
<td>Government spending Volatility</td>
<td>Standard deviation of government consumption share of GDP per 5 years unit.</td>
<td>WDI</td>
</tr>
</tbody>
</table>
| Exchange rate stability            | To measure exchange rate stability, Aizenman used annual standard deviations of the monthly exchange rate between the home country and the base country are calculated and included in the following formula to normalize the index between 0 and 1:  \[
    ERS = \frac{0.01}{0.01 + \text{sdev}(\Delta (\log(\text{exch rate})))} \]  | Aizenman, J., M.D. Chinn, and H. Ito. 2008. |
| Private credit to GDP              | Private Credit by Deposit Money Banks and other Financial Institutions to GDP. | WDI, Financial Structure Database, Levine (2009). |
| Net private capital flows          | NPCF=Total assets - Total liabilities where: Total assets= FDI assets+portfolio equity assets+debt assets+derivatives assets+FX reserves Total liabilities= FDI liabilities+portfolio equity liabilities+debt liabilities+derivatives liabilities | Lane, Philip R., and Gian Maria Milesi-Ferretti (2007). |
Appendix of figures
WHAT SHOULD WE KNOW ABOUT MOMENTUM STRATEGIES?
THE CASE OF THE TUNISIAN STOCK MARKET

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Abstract
In this paper, we examine the profitability of various momentum strategies in the Tunisian stock market over the period April 2003 to March 2010. Also, we verify the stability of momentum return in time. Furthermore, we test for possible seasonality in the momentum profit, and then, we assess whether the profit of momentum strategy can be explained by the CAPM and the Fama and French model. For the whole sample period, we find that all momentum strategies produce significant profits. Also, we report the persistence of the profitability of momentum strategy during the two sub-periods. Furthermore, we document that the January momentum profit is higher than the momentum profit in other calendar months, and then, we find that the CAPM and the Fama and French model fail to fully explain the profit of momentum strategy.

Keywords: Momentum strategies, Seasonality, CAPM, Fama and French model, Market efficiency, Tunisian stock market.

1. INTRODUCTION

The weak form of the efficient market hypothesis postulates that investors cannot predict future stock prices using historical information, and no abnormal returns can be obtained from
the market. However, numerous studies have uncovered many price anomalies that diverge to the classic asset pricing model and efficient market hypothesis. The anomaly that has gained the most attention recently is the momentum phenomenon that is posited by Jegadeesh and Titman (1993). The momentum phenomenon suggests that stocks that performed well (poorly) over the past 3 to 12 months continued to perform well (poorly) over the following 3 to 12 months.


A variety of explanations have been put forward to justify the existence of momentum effect in equity markets. Sehgal and Balakrishnan (2008), Galariotis (2010) and Cheng and Wu (2010) argued that the profitability of momentum strategies is a fair compensation for the risk. They showed that the Fama and French three-factor model can fully capture momentum profitability. However, Jegadeesh and Titman (2001), Mengoli (2004) and Li et al. (2008) found that momentum profitability does not diminish, after controlling for the risk inherent in the three-factor model of Fama and French (1993). Other researchers found that momentum profits can be influenced by company level characteristics. Hong et al. (2000) reported that momentum is more prevalent in small firms with low analyst coverage. Lee and Swaminathan (2000) found that stocks with high turnover have higher momentum than stocks with low turnover. Chui et al.
(2003) documented significant momentum profits in stocks of low book to market ratio, small-capitalization and high turnover firms. Moskowitz and Grinblatt (1999) argued that momentum is related to a firm’s industry. Once the industry effect is controlled, momentum profits become insignificant. Also, behavioral models have suggested that underreaction of stock prices to new information can lead to momentum effect. Du (2002) argued that when traders with low level of confidence are too slow to make decisions, underreaction arises. Delays in acting upon information cause the effects of new information to persist generating a short-term continuation effect.

To the best of our knowledge, there is no published study exploring momentum strategies in the context of the Tunisian stock market. Therefore, the objectives of this study are to examine the profitability of various momentum strategies in the Tunisian stock market over the period April 2003 to March 2010, verify the stability of momentum return in time, test for possible seasonality in the momentum profit and assess whether the profit of momentum strategy can be explained by the CAPM and the Fama and French model.

This paper is organized as follows: section 2 presents the Tunisian stock market and data used in this study. Section 3 discusses the methodologies. Empirical results are reported and discussed in section 4, and finally, section 5 contains the conclusion.

2. MARKET AND DATA

The Tunisian Stock Exchange (TSE) is a small but active African Stock Exchange. It was set up in 1969 and currently has over than 50 firms listed. TSE has a single market index. Tunindex is a market capitalization weighted index, launched on December 31, 1997. It covers listed companies with minimum period of quotation of six months. Trading is carried out from 8:30 a.m. to 11:30 a.m. from Monday to Friday. Since 1996, the Tunisian Stock Exchange has used an automated trading system; known as SUPERCAC UNIX developed by Euronext. This system assures a high degree of price lucidity.

Our sample consists of 31 stocks listed on the Tunisian stock exchange with complete data for the period April 2003 to March 2010 (Note 1). Daily closing prices, dividends, market capitalizations and book values are obtained from the web page of the Tunisian Stock Exchange (www.bvmt.com.tn). Return on a risk free asset is estimated from the TMM (monthly money market rate) and obtained from the web page of the central bank of Tunisia (www.bct.gov.tn).

To calculate the monthly returns of stocks listed on the Tunisian Stock Exchange, we used daily closing prices adjusted for capitalization changes.

The monthly return of stock i is given by:

\[ R_{it} = \frac{F_{it} + DIV_{it} - F_{i(t-1)}}{F_{i(t-1)}} \]  

(1)

Where, \( F_{it} \) is the average closing price of stock i over month t, \( F_{i(t-1)} \) is the average closing price of stock i over month t-1 and \( DIV_{it} \) is the dividend distributed by stock i for month t.

The market return on month t \( \left( R_{m,t} \right) \) is given by:

\[ R_{m,t} = \frac{\sum_{i=1}^{n} R_{it}}{n} \]  

(2)

Where \( R_{it} \) is the return of stock i on month t and n is the number of firms listed on month t.
3. METHODOLOGIES

3.1 Portfolio formation

To examine the profitability of momentum strategies, we follow the methodology of Jegadeesh and Titman (1993) (Note 2). This consists in identifying winner and loser portfolios according to their past performance. In more detail, at the beginning of each month \( t \), all stocks are ranked in ascending order on the basis of their past \( J \)-month cumulative returns (\( t-J \) to \( t-1 \)) for \( J= 3, 6, 12 \) months. Based on these rankings, all stocks are sorted into 3 equally weighted portfolios. We choose to group the stocks into 3 portfolios to ensure that the momentum portfolios are well diversified. The first portfolio (loser portfolio), \( L \), includes 10 stocks with the lowest past \( J \)-month cumulative returns, while, the third portfolio (winner portfolio), \( W \), includes 10 stocks with the highest past \( J \)-month cumulative returns. These portfolios are then held for \( K \) months (\( t \) to \( t+K-1 \)) for \( K= 3, 6, 12 \) months. The return on the momentum portfolio is measured as the difference between the return of the winner portfolio (W) and the return of the loser portfolio (L).

3.2 Risk adjusted portfolio returns

Traditionally, performance has been calculated by regressing a portfolio’s returns on a set of systematic risk factors emanating from the capital asset pricing model (CAPM) or the Fama and French model, which can be expressed respectively as

\[
R_{p,t} = \alpha_p + \beta_p (R_{m,t} - R_{f,t}) + \varepsilon_{p,t}
\]

(3)

\[
R_{p,t} = \alpha_p + \beta_p (R_{m,t} - R_{f,t}) + \varepsilon_p \text{SMB}_t + \varepsilon_p \text{HML}_t + \varepsilon_{p,t}
\]

(4)

Where \( R_{p,t} \) is either the return on the momentum portfolio or the return of the winner and loser portfolios in excess of the risk-free-rate; \( R_{m,t} \) is the return of market portfolio; \( R_{f,t} \) is the risk-free-rate; \( \text{SMB}_t \) and \( \text{HML}_t \) are respectively the Fama and French size and book to market equity factors; \( \alpha_p, \beta_p, \varepsilon_p \) and \( \varepsilon_{p,t} \) are the parameters to be estimated and \( \varepsilon_{p,t} \) is a random error term. The performance of the portfolios is then evaluated by examining the significance of the coefficient \( \alpha_p \) in the CAPM and the Fama and French model.

To investigate the size and book to market (BM) effects, we follow the methodology of Fama and French (1993). In more detail, at the end of March of each year (Note 3), all the sample stocks are ranked on the basis of size (the end of previous year market capitalization) and sorted into two groups: 50% (Small, S) and 50% (Big, B). The stocks are also independently ranked according to the end of previous year book to market ratio and then sorted into three groups: 30% (Low, L), 40% (Medium, M) and 30% (High, H). Six portfolios (S/L, S/M, S/H, B/L, B/M and B/H) are formed by the intersection of these two successive partitions. The S/L portfolio contains stocks that are both in the small size group and in the low book to market ratio group. The B/H portfolio includes stocks that are both in the big size group and in the high book to market ratio group and so on.
is the difference, for each month, between the average return on the three small portfolios (S/L, S/M, S/H) and the average return on the three big portfolios (B/L, B/M, B/H).

\[
SML_m = \frac{1}{3}(R_{S/L} + R_{S/M} + R_{S/H}) - \frac{1}{3}(R_{B/L} + R_{B/M} + R_{B/H})
\] (5)

Similarly, \(HML_m\) is the difference, for each month, between the average return on the two value portfolios (S/H, B/H) and the average return on the two growth portfolios (S/L, B/L).

\[
HML_m = \frac{1}{2}(R_{S/H} + R_{B/H}) - \frac{1}{2}(R_{S/L} + R_{B/L})
\] (6)

4. EMPIRICAL RESULTS

4.1 Profitability of momentum strategies

Table 1 presents average monthly returns of winner (W), loser (L) and momentum (W-L) portfolios. Momentum portfolios are formed based on the past J-month cumulative return and are held for K months, where J = 3, 6, 12 and K = 3, 6, 12. As can be seen, the average monthly returns on the winner and the loser portfolios are positive and statistically significant across all ranking and holding periods. Also, all momentum strategies (buying past winners and selling past losers) produce significant profits. Across strategies, the momentum portfolios yield an average return of 0.92% a month, with a range from 0.70% for the (J = 12, K = 12) strategy to 1.29% for the (J = 6, K = 3) strategy. In other words, the (J = 12, K = 12) strategy achieves the lowest profit, while the (J = 6, K = 3) strategy attains the highest profit. Our findings are consistent with the results previously reported in the literature (Foster and Kharazi, 2008; Naughton et al. 2008 and Rastogi et al. 2009).

As shown in Figures 1, 2 and 3, the average monthly returns on momentum portfolios decrease as the holding period increases, regardless of the length of ranking period. For example, considering the ranking period of 6 months (J = 6), the momentum profit decreases monotonically from 1.29% to 0.81% as the holding period increases. Then, the average monthly momentum profit appears to be affected too much by the length of holding period. Our findings are similar to the results that obtained by Assoé et al. (2002), but are quite different from those of Li et al. (2008).

4.2 Evidence on the stability of momentum return

To verify the persistence of the profitability of the (J = 6, K = 6) strategy in time (Note 4), we divide the whole sample period April 2003 to Mars 2010 into two sub-periods. The first sub-period is between April 2003 and June 2007 and is characterized by stability for the Tunisian stock market. The second sub-period July 2007 to Mars 2010, includes the global financial crisis.

Table 2 presents the average monthly return for momentum portfolio for the (J = 6, K = 6) strategy in the two sub-periods. From this table, we note that during the two sub-periods, the return of the momentum portfolio is positive and significant. Also, the momentum return for the first sub-period (April 2003- June 2007) is much lower than momentum return for the second sub-period (July 2007- Mars 2010). During the first sub-period, the (J = 6, K = 6) strategy generates an average monthly return of 0.75% with a T-statistic of 2.80. However, during the second sub-period, the (J = 6, K = 6) strategy generates an average monthly return of 2.69% with
a T-statistic of 6.83. This result can be explained by the decreasing liquidity of the Tunisian stock market during the crisis period.

4.3 Seasonality in momentum profit

Jegadeesh and Titman (1993, 2001), Assoë et al. (2002) and Chordia and Shivakumar (2006) document that the winners significantly outperform losers in all months except January when profits are lower or negative compared to other months. Their findings are consistent with the tax-loss-selling hypothesis, according to which investors wait until the tax-year end to sell poorly performing stocks in order to realize capital losses for tax purposes. Investors then buy stocks after the first of the year to re-establish their portfolios. Hence, this section tests for possible seasonality in the momentum profit of the (J= 6, K= 6) strategy.

Table 3 reports the momentum profit of the (J= 6, K= 6) strategy in January and outside January. As can be seen, the January momentum profit is higher than the momentum profit in other calendar months.

4.4 Evidence of abnormal returns

Table 4 presents coefficient estimates of the CAPM (3) and the Fama and French model (4) for the winner, loser and momentum portfolios of the (J= 6, K= 6) strategy. In line with previous research (Jegadeesh and Titman, 2001; Mengoli, 2004; Li et al. 2008), the results indicate that the CAPM and the Fama and French model fail to fully explain momentum profit of the (J= 6, K= 6) strategy. Regardless of the model, the \( \beta_{\text{m}} \) coefficients of the momentum strategy in equations (3) and (4) are positive and statistically significant.

The factor loading on \( R_{\text{mk}} \) for the CAPM in Table 4 suggests that the winners are more sensitive to the market factor than are the losers. Analytically, the \( \beta_{\text{m}} \) loading of winners for the (J= 6, K= 6) strategy is 1.4755 compared to 1.0183 for losers. Due to a difference in the loadings of the winner and the loser portfolios, the momentum strategy has positive loading on \( R_{\text{mk}} \).

The factor loadings on \( R_{\text{mk}} \), \( \text{SMB}_{\text{mk}} \) and \( \text{HML}_{\text{mk}} \) for the Fama and French model in Table 4 indicate that the winners have growth characteristics (\( \beta_{\text{g}} < 0 \)) and are tilted towards big-capitalization stocks (\( \beta_{\text{mk}} < 0 \)) with high market risk (\( \beta_{\text{m}} > 0 \)). The losers have value characteristics (\( \beta_{\text{g}} > 0 \)) and are tilted towards small-capitalization stocks (\( \beta_{\text{mk}} > 0 \)) with high market risk (\( \beta_{\text{m}} > 0 \)). Due to a difference in the loadings of the winner and the loser portfolios, the momentum strategy has positive loading on \( \text{SMB}_{\text{mk}} \) and negative loading on \( \text{HML}_{\text{mk}} \) and is value-neutral.

5. CONCLUSION

In this paper, we examine the profitability of various momentum strategies in the Tunisian stock market over the period April 2003 to March 2010. Also, we verify the stability of momentum return in time. Furthermore, we test for possible seasonality in the momentum profit, and then, we assess whether the profit of momentum strategy can be explained by the CAPM and the Fama and French model.

Using the methodology of Jegadeesh and Titman (1993), we find that all momentum strategies produce significant profits over the whole sample period. Our findings are in line with Foster and Kharazi (2008), but in contrast with Du et al. (2009). Also, we report the persistence of the profitability of momentum strategy during the two sub-periods. Furthermore, we document
that the January momentum profit is higher than the momentum profit in other calendar months, and then, we find that the CAPM and the Fama and French model fail to fully explain the profit of momentum strategy.

REFERENCES


Notes
Note 1. The thirty-one companies selected are: AB, ATB, ATL, ATTJARI BANK, BH, BIAT, BNA, BT, BTE, CIL, LSTR, MAG, MNP, SFBT, SIAME, SIPHAT, SOMOC, SOTET, STPIL, SPDIT, STB, TINV, TAIR, TLS, UIB, AL, TJL, STEQ, STIP, MGR and UBCI.

Note 2. This methodology has been used by Rouwenhorst (1998), Naughton et al. (2008) and Bettman et al. (2009).

Note 3. In Tunis Stock Exchange, listed firms are expected to submit their annual reports three months into the new tax-year. March is the deadline for all firms to announce their annual reports.

Note 4. We employ the (J= 6, K= 6) strategy to facilitate comparison with the extant literature.

Table 1: Average monthly returns of winner (W), loser (L) and momentum (W-L) portfolios for different ranking and holding periods

<table>
<thead>
<tr>
<th>Ranking period</th>
<th>Portfolios</th>
<th>Holding period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>K=3</td>
</tr>
<tr>
<td>J=3</td>
<td>Winner</td>
<td>0.0152***</td>
</tr>
<tr>
<td></td>
<td>(3.89)</td>
<td>(5.33)</td>
</tr>
<tr>
<td></td>
<td>Loser</td>
<td>0.0062**</td>
</tr>
<tr>
<td></td>
<td>(2.29)</td>
<td>(2.79)</td>
</tr>
<tr>
<td></td>
<td>Momentum</td>
<td>0.0090**</td>
</tr>
<tr>
<td></td>
<td>(2.25)</td>
<td>(3.45)</td>
</tr>
<tr>
<td>J=6</td>
<td>Winner</td>
<td>0.0193***</td>
</tr>
<tr>
<td></td>
<td>(4.38)</td>
<td>(5.42)</td>
</tr>
<tr>
<td></td>
<td>Loser</td>
<td>0.0064**</td>
</tr>
<tr>
<td></td>
<td>(2.26)</td>
<td>(3.06)</td>
</tr>
<tr>
<td></td>
<td>Momentum</td>
<td>0.0129***</td>
</tr>
<tr>
<td></td>
<td>(3.08)</td>
<td>(3.67)</td>
</tr>
<tr>
<td>J=12</td>
<td>Winner</td>
<td>0.0172***</td>
</tr>
<tr>
<td></td>
<td>(3.47)</td>
<td>(3.98)</td>
</tr>
<tr>
<td></td>
<td>Loser</td>
<td>0.0067**</td>
</tr>
<tr>
<td></td>
<td>(2.08)</td>
<td>(2.06)</td>
</tr>
<tr>
<td></td>
<td>Momentum</td>
<td>0.0105**</td>
</tr>
</tbody>
</table>
Figure 1: Average monthly returns of momentum strategies for a ranking period of 3 months
Figure 2: Average monthly returns of momentum strategies for a ranking period of 6 months

Figure 3: Average monthly returns of momentum strategies for a ranking period of 12 months

Table 2: Average monthly return for momentum portfolio for the \((J= 6, K= 6)\) strategy in the two sub-periods

<table>
<thead>
<tr>
<th></th>
<th>First sub-period</th>
<th>Second sub-period</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 months</td>
<td>0.014</td>
<td>0.010</td>
</tr>
<tr>
<td>6 months</td>
<td>0.012</td>
<td>0.008</td>
</tr>
<tr>
<td>12 months</td>
<td>0.006</td>
<td>0.004</td>
</tr>
</tbody>
</table>
April 2003- June 2007 | July 2007- Mars 2010
---|---
0.0075*** | 0.0269***
(2.80) | (6.83)

*** denotes statistical significance at the 1% level.
T-statistics are in parentheses

Table 3: Momentum profit of the (J= 6, K= 6) strategy in January and outside January

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February - December</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.0144***</td>
<td>0.0097***</td>
</tr>
<tr>
<td></td>
<td>(4.62)</td>
<td>(3.26)</td>
</tr>
</tbody>
</table>

*** denotes statistical significance at the 1% level.
T-statistics are in parentheses

Table 4: Coefficient estimates of the CAPM and the Fama and French model

<table>
<thead>
<tr>
<th></th>
<th>CAPM</th>
<th>Fama and French model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$\alpha_p$</td>
<td>$\beta_p$</td>
</tr>
<tr>
<td><strong>Winner</strong></td>
<td>0.0025 (1.48)</td>
<td>1.4755*** (15.71)</td>
</tr>
<tr>
<td><strong>Loser</strong></td>
<td>-0.0043*** (-2.90)</td>
<td>1.0183*** (12.27)</td>
</tr>
<tr>
<td><strong>Momentum</strong></td>
<td>0.0068** (2.35)</td>
<td>0.4572*** (2.83)</td>
</tr>
</tbody>
</table>

*** and ** denote statistical significance at the 1% and 5% level respectively.
T-statistics are in parentheses.
EMPIRICAL ANALYSIS OF NON-PERFORMING LOANS IN THE CASE OF TUNISIAN BANKS

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Abstract
This paper empirically analyzes non-performing loans in the case of Tunisian banks during the period 1996-2007. We first use data envelopment analysis (DEA) to estimate the cost efficiency for each bank in sample. Then, we employ a Granger causality approach to test four hypotheses corresponding to four distinct modes of management behavior, which are identified through the intertemporal classification of relationships between non-performing loans, cost efficiency and capitalization. Our results show that there is no empirical evidence of a significant causality relationship between non-performing loans and cost efficiency. They show, in addition, that only the moral hazard behavior hypothesis is verified in the case of Tunisian banks. Alternatively, we use GMM dynamic panel estimators. The findings are in accordance with our previous results obtained following the Granger causality framework.

Keywords: Non-performing loans, Cost efficiency, Capitalization, Management behavior, Tunisian banks.

1. INTRODUCTION

The last decades were characterized by deep changes in banking environment everywhere in the world. Indeed, many countries implemented various financial liberalization measures which resulted in banking deregulation. Moreover, financial innovation, progress in communication and information technologies changed economic agent’s behavior and allowed financial institutions to provide a wide range of financial products and services.

Although these changes intensified competition in the credit market and therefore negatively affected bank’s market shares and incomes, banks followed different strategies (consolidation, diversification, innovation) which enabled them to face competition pressures and to preserve their place in the economy (Boyd and Gertler 1994; Litan and Rauch, 1998; Hackethal, 2001; Allen and Santomero, 2001).
In fact, the fundamental role of banks consisting in financial intermediation between economic agents remains important in many economies. Households and companies in developed and developing countries finance their investments most frequently by bank loans. This is particularly true in the case of Tunisia since the financing of the economy is almost entirely provided by the banking system (Myard and Alpert, 2003; APTBEF, 2008) (Note 1).

Given their importance, several studies have empirically examined bank loans. Some of them have focused particularly on non-performing loans (Note 2) and their impact on bank performance (Berger and Humphrey, 1992; Berger and De Young (1997); Fan and Shaffer, 2004; Girardone et al., 2004; Karim et al., 2010, etc.). Moreover, some studies reveal that Tunisian banks suffer from high rates of non-performing loans during the last years. The Fitch Ratings report, presented by Dow and Trabelsi (2003), shows that the proportion of non-performing loans in Tunisian banks total liabilities (loans + off-balance sheet commitments) is 21% for commercial banks and 28% for development banks which indicates poor quality of assets held by Tunisian banks. Other recent studies (Zammit, 2009) conclude that for various reasons (government policies, bank management, etc.) the problem of non-performing loans persists in the case of the Tunisian banking sector.

This motivates us to analyze non-performing loans in the case of Tunisian banks. We particularly try to explain how bank-specific factors can influence levels of non-performing loans. We focus also on the possible effects of non-performing loans on bank performance. To do this, we follow the empirical methodology of Berger and De Young (1997) in order to study the eventual causality relationships between non-performing loans and banks-specific variables (efficiency, risk, capitalization) taking into account the possible effects of changes in regulation and technology which currently characterizes the Tunisian banking environment.

The remainder of the paper is organized as follows. Section 2 includes a brief review of the literature related to non-performing loans. Section 3 presents empirical methodology followed to study non-performing loans in the case of Tunisian banks. We present empirical results in Section 4 and conclude in section 5.

2. BRIEF LITERATURE REVIEW

In the last years, the issue of non-performing loans has received considerable interest from researchers and experts. This is explained in particular by the fact that large amounts of non-performing loans can immediately lead to bank failure.

Several researches on the causes of bank failures find that asset quality (evaluated by the importance of non-performing loans in total loans) is a statistically significant indicator of bank insolvency and that failing banking institutions always record high level of non-performing loans during the period which precedes failure (Barr et al., 1994, Dermirguc-Kunt and Detragiache, 1998; Dermirguc-Kunt et al., 2000, etc.).

Keeton (1999) examines the impact of bank credit policy on non-performing loans in the case of American banks between 1982 and 1996. The results found suggest that a strong correlation exists between bank credit growth and non-performing loans.
To explain these results, Keeton (1999) suggests that banks management can adopt a credit policy which supports an increased in credit distribution in order to maximize interest income, main source of bank revenue. Thus in several American states there were a fast credit growth associated with the use of lower credit standards which contributed to higher loan losses.

Similar results were found by studies on other banking sectors. Fernandez De Lis et al. (2000) notes that, during periods of economic growth, financial institutions engage in market share conquest campaigns. To successfully conquer more market shares in a competitive environment, several banks have agreed to extend loans to lower credit quality borrowers. In addition, many studies examined the relationship between non-performing loans and bank efficiency. Most of the findings suggest that banks in situation of bankruptcy show high levels of inefficiency and are located far from efficiency frontier (Berger and Humphrey, 1992; Wheelock and Wilson, 1995).

Other studies (Kwan and Eisenbeis, 1995; De Young, 1998) find that even for the banks which are not in situation of bankruptcy, non-performing loans have a significant negative impact on their levels of efficiency. By using a translog cost function, Tsai and Huang (1999) find a negative relationship between asset quality and efficiency in Taiwan’s banking industry. They explain this result by losses in value due to problem loans held by Taiwanese banks.

Recent studies on banking efficiency have taken into account asset quality approximated by the importance of non-performing loans in total loans. Results show that the omission of non-performing loans in any empirical approach on banks efficiency could lead to an incorrect estimation (Altunbas et al., 2000; Fan and Shaffer, 2004; Girardone et al., 2004).

By taking into account factors like credit risk and asset quality in cost efficiency estimation, Altunbas et al. (2000) find that non-performing loans are positively related to inefficiency levels of Japanese commercial banks between 1993 and 1996. This result is also consistent with the results of Hughes and Mester (1993) for American banks and Girardone et al. (2004) for Italian banks. These results indicate that more efficient banks are more able to manage credit risk and thus to increase asset quality than inefficient banks. Karim et al. (2010) show that this result is particularly true since a great proportion of non-performing loans in credit portfolio held by a bank means that it must incur additional costs associated with the processes of evaluation, control and credit recovery.

In addition, literature shows that a number of studies have examined the intertemporal relationships between non-performing loans and various banks-specific variables. They tested various hypotheses each one corresponds to a different management behavior. By using a panel data of American commercial banks during the period 1989-2004, Berger and De Young (1997) employ Granger-causality techniques to study eventual relationships between non-performing loans, efficiency and capitalization. They have found the following results:

- An exogenous increase in non-performing loans Granger-causes low levels of bank cost efficiency (Bad luck hypothesis);
- An exogenous decrease in non-performing loans Granger-causes high levels of non-performing loans (Bad management);
- Among the most efficient banks, an exogenous increase in cost efficiency Granger-causes high levels of non-performing loans (Skimping behavior);
- Among the least capitalized banks, an exogenous decrease in capitalization Granger-causes high levels of non-performing loans (Moral hazard behavior);
Williams (2004) followed the methodology of Berger and De Young (1997) and applied it for a sample of European banks over the period 1990-1998. The results show that these banks suffer from bad management and that the most efficient banks do not adopt a skimping behavior. For the other modes of management behaviors the results are statistically weak.

The same methodology was applied by Rossi et al. (2005) for a sample of banks operating in Central and Eastern Europe countries over the period 1995-2002. Their results show that there is a negative correlation between non-performing loans and cost efficiency. According to them, negative correlation is due to exogenous factors (business conditions, criminality, etc.) which are beyond the control of bank management (Bad luck hypothesis). In order to minimize the impact of these external factors, they presented the following recommendations:

- Strengthening regulation and bank supervision;
- Increasing credit portfolio diversification;
- Promotion of mergers with foreign banks;
- Improving capitalization in order to increase bank’s ability to absorb shocks.

3. METHODOLOGY

3.1 Econometric modeling and research hypotheses

To analyze non-performing loans in the case of Tunisian banks, we adopt the Granger causality framework used by Berger and De Young (1997) in their study of American banks. We test four hypotheses each one corresponds to a different management behavior which can be identified through the estimation of intertemporal relationships between non-performing loans and bank-specific variables. We consider a model composed of the following two equations:

$$ LLP_{i,t} = f_1(LLP_{i,\text{lag}}; EFF_{i,\text{lag}}; CAP_{i,\text{lag}}; LTA_{i,\text{lag}}; \text{YEAR}_t) + \epsilon_{1i,t} $$

$$ EFF_{i,t} = f_2(LLP_{i,\text{lag}}; EFF_{i,\text{lag}}; CAP_{i,\text{lag}}; LTA_{i,\text{lag}}; \text{YEAR}_t) + \epsilon_{2i,t} $$

The structure of Equations (1)-(2) shows that each dependent variable is regressed on annual lags of it and the other explanatory variables.

Equation (1) tests three different hypotheses. The first one is “Bad management hypothesis” which suggests that low levels of cost efficiency Granger-cause high amounts of non-performing loans. A priori Bad management predicts a negative relationship between loan loss provision and lagged cost efficiency. According to Berger and De Young (1997), under this hypothesis low measured cost efficiency is a signal of poor management practices. Indeed, bad managers do not practice adequate loan control and monitoring because they may:

- have poor skills in credit scoring and therefore select loans with low or negative net present values.
- not control enough customers to ensure that they behave in accordance with credit agreements.
- focus on their own interest and not on the interest of shareholders as explained in the agency theory literature (principal-agent relationship). (Peristiani and Wizman, 1997; Berger and Hannan, 1998).
Therefore, Equation (1) tests “Skimping behavior hypothesis” which suggests that high levels of cost efficiency Granger-cause high amounts of non-performing loans. A positive relationship between loan loss provision and lagged cost efficiency is predicted.

Berger and De Young (1997) show that under this hypothesis, bank managers may be tempted to maximize long-run profits by reducing costs in the short run. To do this, bank managers may skimp on the resources devoted to screening loan customers, appraising collateral, monitoring and controlling borrowers. In these conditions, banks appear to be cost efficient in the short run and to have unaffected stock of non-performing loans, but by the time, a higher proportion of borrowers become delinquent on their loans. Thus, skimping behavior implies a positive Granger-causation from cost efficiency to non-performing loans.

Equation (1) tests also “Moral hazard behavior hypothesis” which suggests that low bank capitalization causes high non-performing loans. Under this hypothesis, managers of thinly capitalized banks are less risk averse so they are more motivated to increase risky lending in order to improve interest income. In this case, bank will be more exposed to credit risk and it is expected that the non-performing loans are more important in next periods (Berger and De Young (1997).

According to Williams (2004) this management behavior can be explained by the fact that the upside risk of low capitalization outweighs the downside risk. Thus, expected return is positively related to the amount of risk assumed by bank management whilst the bank has relatively less capital to lose in the event of default.

Moreover, Equation (2) allows us to test “Bad luck hypothesis” which suggests that external events increase problem loans for the bank resulting in high level of non-performing loans which Granger-causes a decrease in bank cost efficiency. Williams (2004) notes that bank management must allocate additional resources to deal with this adverse situation, which in turn raises operating costs. Several reasons are presented by Williams (2004) to show how operating costs could increase, like: controlling and monitoring of delinquent borrowers; valuating collateral; maintaining the level of stability required by bank regulators; allocating extra resources to protect the quality of existing loans.

3.2 Data and variables

We used data based on balance sheets and income statements of banks published by the APTBEF for a sample including the ten largest Tunisian banks during the period 1996-2007. In addition, the variables used in the different regressions are as follows:

- **Non-performing loans (LLP)**, measured by the ratio of loans loss provision-to-loans which is an indicator of bank assets quality;
- **Efficiency (EFF)**, or cost efficiency which is a measure of how close a bank's actual cost is to what a best-practice institution's cost would be for producing an identical output bundle under comparable conditions (Vennet, 2002). To measure bank cost efficiency we use a non-parametric efficiency method called “Data Envelopment Analysis DEA (Note 3)”.
- **Capital (CAP)**, measured by the ratio of equity-to-total assets, is a measure of bank capitalization. It indicates the size of bank’s financial cushion for absorbing losses meaning from the credit portfolio (Williams, 2004).
In order to take into account bank credit risk and other factors related to bank environment, we specify two control variables for each equation, as follows:

- **Credit Risk (LTA)**, measured by the ratio of loans-to-assets, supposed to provide an estimation of bank credit risk;
- By following the recommendations of Berger and De Young (1997), we use a trend variable (YEAR) to control for effects of regulatory and technological changes.

### 3.3 Estimating cost efficiency

#### 3.3.1 DEA method

Charnes et al. (1978) and Banker et al. (1989), define DEA method as: “a linear programming algorithm where the efficient frontier is approximated – in a non-parametric way – through an envelope of hyperplanes in the input/output space. The distance between each observed production plan and this approximation of the frontier is then used as a measure of inefficiency” (Resti, 1997).

The purpose of DEA is to construct a non-parametric envelopment frontier over the data points such that all observed points lie on or below the production frontier (Coelli, 1996).

Assume there is data on $K$ inputs and $M$ outputs on each of the $N$ banks also called Decision Making Units (DMU’s). Vectors $x_i$ and $y_i$ are respectively vectors of inputs and outputs of the $i$-th DMU. The $K \times N$ input matrix, denoted $X$, and the $N \times M$ output matrix, denoted $Y$, represent the data of all DMU’s.

Following Coelli (1996), the best way to introduces DEA is via the ratio form. We would like to obtain a measure of all outputs over all inputs, such as $u'y_i/v'x_i$, where $u$ is an $M \times 1$ vector of output weights and $v$ is an $K \times 1$ vector of input weights. To select optimal weights we specify the mathematical programming problem:

$$\max_{u,v}(u'y_i/v'x_i),$$

subject to

$$\frac{u'y_i}{v'x_i} \leq 1, \quad j = 1,2,\ldots,N,$$

$$u,v \geq 0.$$  \hspace{1cm} (1)

This problem involves finding optimal values for $u$ and $v$, such that the efficiency measure of the $i$-th DMU is maximized, subject to the constraint that all efficiency measures must be less than or equal to one.

One problem with particular ratio formulation is that it has an infinite number of solutions. That is, if $(u^*, v^*)$ is a solution, then $(\alpha u^*, \alpha v^*)$ is another solution, etc.
To avoid this we can impose an additional constraint in order to obtain the following multiplier form of the previous linear programming problem:

$$\max_{\mu, v}(\mu'y_i),$$

$$\text{st } v'x_i = 1,$$
$$\mu'y_i - v'x_j \leq 0, \quad j = 1, 2, \ldots, N,$$
$$\mu, v \geq 0. \quad (2)$$

Using the duality in linear programming, Coelli (1996) show that we can derive an equivalent envelopment form of the problem above:

$$\min_{\theta, \lambda} \theta,$$

$$\text{st } -y_i + Y\lambda \geq 0,$$
$$\theta x_i - X\lambda \geq 0,$$
$$\lambda \geq 0. \quad (3)$$

Where $\lambda$ is a $N \times 1$ vector of constants, $\theta$ is a scalar that measures the efficiency score for the i-th DMU. According to the definition of Farell (1957), $\theta \leq 1$ and a value of 1 indicates a point on the efficiency frontier.

Coelli (1996) show that if we have input and output price information, we can run the following cost minimization DEA:

$$\min_{\lambda, x_i^*} w_i'x_i^*,$$

$$\text{st } -y_i + Y\lambda \geq 0,$$
$$x_i^* - X\lambda \geq 0,$$
$$N1'\lambda = 1,$$
$$\lambda \geq 0. \quad (4)$$

Where $w_i$ is a vector of input prices for the i-th DMU and $x_i^*$ is the cost-minimizing vector of input quantities for the i-th DMU, given the input prices $w_i$ and the output levels $y_i$.

Cost efficiency (CE) is calculated by the ratio of minimum cost to observed cost:

$$CE = w_i'x_i^*/w_i'x_i.$$ 

3.3.2 Variables used for Cost efficiency estimation

We adopt the intermediation approach. It assumes that the bank collects deposits to transform them, using capital and labor, into loans. We argue our choice by the fact that this method is widely used in the earlier literature (Isik and Hasan, 2002; Weill, 2003; Amel et al. 2004, Fethi and Pasioras, 2010).

To estimate the cost frontier we include two outputs: total loans (all loans granted to clients) and investment assets (securities for trading and securities held to maturity).
We also include three inputs: labor (number of employees), physical capital (fixed assets) and borrowed funds (funds borrowed from central bank and other banks, client’s deposits, other borrowings and special resources). Moreover, we include input prices which are determined as follows:

- Price of labor: calculated as total expenses for employees divided by the number of employees;
- Price of physical capital: calculated as overheads divided by the book value of fixed assets;
- Price of borrowed funds: calculated as interest expenses divided by the amount of borrowed funds.

### 3.3.3 Cost efficiency scores

We present in Table 1 below the average cost efficiency scores determined by DEA for Tunisian banks during the period 1996-2007.

<table>
<thead>
<tr>
<th>Years</th>
<th>Cost efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>0.898</td>
</tr>
<tr>
<td>1997</td>
<td>0.888</td>
</tr>
<tr>
<td>1998</td>
<td>0.918</td>
</tr>
<tr>
<td>1999</td>
<td>0.845</td>
</tr>
<tr>
<td>2000</td>
<td>0.885</td>
</tr>
<tr>
<td>2001</td>
<td>0.860</td>
</tr>
<tr>
<td>2002</td>
<td>0.882</td>
</tr>
<tr>
<td>2003</td>
<td>0.895</td>
</tr>
<tr>
<td>2004</td>
<td>0.911</td>
</tr>
<tr>
<td>2005</td>
<td>0.904</td>
</tr>
<tr>
<td>2006</td>
<td>0.888</td>
</tr>
<tr>
<td>2007</td>
<td>0.879</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>0.888</strong></td>
</tr>
</tbody>
</table>

*Source: DEAP Version 2.1*

With an average cost efficiency score of 88.8%, average production costs of Tunisian banks during the period 1996-2007 are higher by 11.2% compared to the minimum possible costs given the same business conditions.
4. EMPIRICAL RESULTS

4.1 Statistics and preliminary tests

We present in Table 2 below descriptive statistics for dependant and explanatory variables used in our estimations.

| Table 2. Descriptive statistics for dependant and explanatory variables |
|-------------------------------------------------------------|----------------|----------------|----------------|----------------|----------------|
| Mean | Median | Maximum | Minimum | Std. Dev. |
| LLP | 0.016210 | 0.013963 | 0.132377 | -0.001338 | 0.016647 |
| EFF | 0.883800 | 0.883000 | 1.000000 | 0.703000 | 0.051508 |
| LLP (-1) | 0.015130 | 0.013924 | 0.126365 | -0.001338 | 0.012392 |
| EFF (-1) | 0.886518 | 0.883500 | 1.000000 | 0.703000 | 0.052686 |
| CAP (-1) | 0.095333 | 0.092266 | 0.174818 | 0.046069 | 0.027458 |
| LTA (-1) | 0.701640 | 0.728008 | 0.850344 | 0.374975 | 0.095703 |

Considering the standard deviations presented in the Table 2, it is clear that there was no large variability of most variables used in the period 1996-2007.

In addition, correlation analysis performed using the correlation matrix shows that the correlation coefficients between the explanatory variables used are low. These results are shown in Table 3 below:

| Table 3. Correlation matrix |
|-----------------------------|----------------|----------------|----------------|----------------|----------------|
| LLP (-1) | EFF (-1) | CAP (-1) | LTA (-1) | YEAR |
| LLP (-1) | 1.000000 | | | | |
| EFF (-1) | -0.2015** | 1.000000 | | | |
| (0.0348) | | | | | |
| CAP (-1) | -0.1469 | 0.2471*** | 1.000000 | | |
| (0.1256) | (0.0093) | | | | |
| LTA (-1) | -0.1380 | -0.0657 | 0.3375*** | 1.000000 | |
| (0.1506) | (0.4952) | (0.0003) | | | |
| YEAR | 0.0991 | -0.0408 | 0.1311 | 0.3363*** | 1.000000 |
| (0.3030) | (0.6723) | (0.1722) | (0.0003) | | |

Probability of t-statistics is in parentheses (); ***, ** and * indicate significance at 1%, 5% and 10% levels, respectively.
Furthermore, we apply the Hausman specification test (Note 4) which is a classical test of whether the fixed or random effects model should be used. This test has a probability of less than 1%, which indicates that we should estimate a fixed effects model.

4.2 Results

Equations (1) and (2) were estimated for a sample of Tunisian banks using data from 1996 to 2007. An F-test procedure supported the specification of one lagged period in each model. Details of these results are given in Table 4 below:

Table 4. Estimation results of equations (1)-(2) for Tunisian banks during 1996-2007

<table>
<thead>
<tr>
<th></th>
<th>LLP Equation (1)</th>
<th>EFF Equation (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient  Std Error</td>
<td>Coefficient  Std Error</td>
</tr>
<tr>
<td>Intercept</td>
<td>-0.009090  0.018391</td>
<td>1.273197***  0.111745</td>
</tr>
<tr>
<td>LLP (-1)</td>
<td>0.639541***  0.206271</td>
<td>-0.158578  0.153548</td>
</tr>
<tr>
<td>EFF (-1)</td>
<td>0.013472  0.011259</td>
<td>-0.440110***  0.116543</td>
</tr>
<tr>
<td>CAP (-1)</td>
<td>-0.153674**  0.068460</td>
<td>0.470871  0.294328</td>
</tr>
<tr>
<td>LTA (-1)</td>
<td>0.019042  0.014389</td>
<td>-0.111958*  0.062137</td>
</tr>
<tr>
<td>YEAR</td>
<td>0.000811**  0.000314</td>
<td>0.004491  0.002776</td>
</tr>
<tr>
<td>AR(1)</td>
<td>-0.761536***  0.239127</td>
<td>0.467250***  0.070501</td>
</tr>
<tr>
<td>R (adj)</td>
<td>0.124595</td>
<td>0.593889</td>
</tr>
<tr>
<td>Fisher-statistic</td>
<td>1.939370**</td>
<td>34.64654***</td>
</tr>
</tbody>
</table>

***, ** and * indicate significance at 1%, 5% and 10% levels, respectively. To deal with the problem of first-order autocorrelation we estimate models with AR (1) disturbances.

Results of the estimation of equation (1) presented in Table 4, show that there is a weak statistical support to the presence of bad management behavior or skimping behavior in the case of Tunisian banks during the period of study. There is no empirical evidence of a significant causal relationship between non-performing loans (LLP) and lagged cost efficiency EFF (-1).

Results show also that lagged capitalization coefficient is found to be significantly negative at the five percent level of significance, which is strong statistical evidence that Tunisian banks exhibit characteristics of moral hazard behavior.

A priori, Tunisian thinly capitalized banks assume additional portfolio risk, which eventually Granger causes an increase in loan loss provision during the next period. It is also important to note that the variable YEAR positively affects the amount of loan loss provision (positive coefficient significant at 5% level). A priori, macroeconomic environmental factors including regulatory and technical changes contribute to non-performing loans increase in Tunisian banking sector during the period 1996-2007.

In order to test bad luck hypothesis, we estimate equation (2) using data on Tunisian banks between 1996 and 2007. Results show that lagged non-performing loans LLP (-1) has no statistically significant effect on cost efficiency (EFF). There is no statistical evidence that increase in loan loss provision Granger causes a decrease in bank cost efficiency, which implies that Tunisian banks management didn’t suffer from bad luck during the period 1996-2007.
Following Berger and De Young methodology, we check the robustness of our previous results by re-estimating equation (1) using a sub-sample of the least capitalized Tunisian banks, which is defined as banks with equity-to-assets below the sample median in the first lagged period. Results are presented in Table 5 below:

Table 5. Estimation results of equations (1) for a sub-sample of thinly capitalized Tunisian banks during 1996-2007

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.012399</td>
</tr>
<tr>
<td>LLP (-1)</td>
<td>0.573108</td>
</tr>
<tr>
<td>EFF (-1)</td>
<td>0.023649*</td>
</tr>
<tr>
<td>CAP (-1)</td>
<td>-0.223979**</td>
</tr>
<tr>
<td>LTA (-1)</td>
<td>0.016396</td>
</tr>
<tr>
<td>YEAR</td>
<td>0.001433***</td>
</tr>
<tr>
<td>AR(1)</td>
<td>-0.846015**</td>
</tr>
<tr>
<td>R (adj)</td>
<td>0.150675</td>
</tr>
</tbody>
</table>

Fisher-statistic 2.020085**

***, ** and * indicate significance at 1%, 5% and 10% levels. To deal with the problem of first-order autocorrelation we estimate models with AR (1) disturbances.

In fact, the estimated coefficient of lagged capitalization is negative and statistically significant at 1% level for the sub-sample of undercapitalized banks. Thus, there is evidence of strong and negative relationship between lagged capitalization CAP (-1) and non-performing loans. These results support the moral hazard behavior hypothesis in the case of Tunisian banks.

We found that recent studies (Podpiera and Weill, 2008, Rossi et al., 2009, Dimitrios et al. 2010) have extended the Granger causality framework used by Berger and De Young (1997) and Williams (2004) by applying generalized method of moments (GMM) dynamic panel estimators instead of Least Squares panel estimators. According to these studies, lagged dependent variables LLP (-1) and EFF (-1) introduced in the equations (1) and (2) are correlated with the bank specific effects, so OLS estimation method will produce biased and inconsistent parameters estimations.

In order to eliminate bank specific effects, we use the GMM estimation of Arellano and Bond (1991), which is based on the first difference transformation of equations (1) and (2), as follows:

$$\Delta y_{it} = \alpha \Delta y_{i,t-1} + \beta (L) \Delta X_{it} + \Delta \epsilon_{it}$$

Where $\Delta$ is the first difference operator. $y_{it}$ is dependent variable, which is LLP in equation (1) and EFF in equation (2). $\beta (L)$ is the 1xk lag polynomial vector, $X_{it}$ is the kx1 vector of explanatory variables other than $y_{i,t-1}, \epsilon_{it}$ are the errors terms. We use $y_{i,t-2}$ as an instrument for the dependant variables and current and lagged values of $X_{i,t-1}$ as valid instruments of the explanatory variables in the equations (1) and (2).
Our results, presented in Table 6 below:

<table>
<thead>
<tr>
<th></th>
<th>ΔLLP Equation (1)</th>
<th></th>
<th>ΔEFF Equation (2)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>Std Error</td>
<td>Coefficient</td>
<td>Std Error</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.0011604**</td>
<td>0.000523</td>
<td>0.001274</td>
<td>0.001252</td>
</tr>
<tr>
<td>ΔLLP (t – 1)</td>
<td>-0.470803**</td>
<td>0.143502</td>
<td>-0.013124</td>
<td>0.358654</td>
</tr>
<tr>
<td>ΔEFF (t – 1)</td>
<td>0.028906</td>
<td>0.03851</td>
<td>-0.060207</td>
<td>0.102503</td>
</tr>
<tr>
<td>ΔCAP (t – 1)</td>
<td>-0.324269**</td>
<td>0.137572</td>
<td>-0.277794</td>
<td>0.344357</td>
</tr>
<tr>
<td>ΔLTA (t – 1)</td>
<td>-0.024021</td>
<td>0.034386</td>
<td>-0.012892</td>
<td>0.085643</td>
</tr>
<tr>
<td>Sargan test</td>
<td>48.51 (0.0006)</td>
<td></td>
<td>35.68 (0.0237)</td>
<td></td>
</tr>
<tr>
<td>AR(1) p-value</td>
<td>-4.20 (0.0000)</td>
<td></td>
<td>-3.84 (0.0001)</td>
<td></td>
</tr>
<tr>
<td>AR(2) p-value</td>
<td>1.14 (0.2525)</td>
<td></td>
<td>1.48 (0.1395)</td>
<td></td>
</tr>
</tbody>
</table>

***, ** and * indicate significance at 1%, 5% and 10% levels, respectively

These results show that changes in non-performing loans don’t Granger-cause changes in cost efficiency. However, we observe a statistically significant negative effect of capitalization on non-performing loans. These findings are in accordance with our results obtained following the methodology of Berger and De Young and Williams (2004).

5. CONCLUSION

In doing their fundamental role of financial intermediation, banks are exposed to credit risk that arises when borrowers do not cover the amount of credits received from the bank. Although banks have the capacities and skills needed to monitor and to control loans and borrower’s behavior, they may found themselves with large amounts of non-performing loans.

The reviewed literature reveals that several studies have examined the causes and consequences of non-performing loans. Keeton (1999) showed that for example banks could have high amounts of non-performing loans due to their credit policy, which consists in increasing credit supply in the order to maximize interest revenue at the expense of assets quality. Barr et al. (1994), Dermiguc-Kunt and Detragiache (1998), Dermiguc-Kunt et al. (2000), etc. explain bank failures by accumulation of large amounts of non-performing loans. In addition Tsai and Huang (1999), Altunbas et al. (2000), Fan and Shaffer (2004) and Girardone et al. (2004) find a significant relationship between non-performing loans and bank efficiency.

In order to extend this literature, we have empirically studied non-performing loans in the case of Tunisian banks over the period 1996-2007. To do this, we followed the methodology of Berger and Young (1997). It consists in estimating four hypotheses corresponding in different causality relationships between non-performing loans, efficiency and capitalization. Non-performing loans and capitalization are measured by accounting ratios. However, Data envelopment analysis (DEA) method was employed to estimate scores of cost efficiency for all Tunisian banks between 1996 and 2007.
The results found show that there is a statistical evidence of an inverse causality relationship between bank capitalization and non-performing loans. Low capitalization Granger-causes an increase in loan loss provision. Thus, “moral hazard behavior hypothesis” is verified in the Tunisian case over the period 1996-2007. Our results are consistent with those of Berger and De Young (1997) for American banks.

We conclude that managers of Tunisian thinly capitalized banks are less risk averse. Thus, they are motivated to increase risky lending in order to improve bank interest income. According to Berger and De Young (1997), these managers respond to moral hazard incentives by increasing the riskiness of bank loan portfolio, which results in high non-performing loans on average in the future.

Following Podpiera and Weill, 2008, Rossi et al, (2009) and Dimitrios et al. (2010), we re-estimated equation (1) and (2) with GMM dynamic panel estimators in order to address the eventual econometric problems induced by unobserved bank-specific effects and joint endogeneity of the explanatory variables. Results allowed us to confirm the previous findings. Thus, we conclude that there is no statistical evidence in favor of bad management, skimping behavior and bad luck hypotheses. However, our findings are in accordance with the moral hazard behavior hypothesis in the Tunisian case between 1996 and 2007.

It is also important to note that the introduction of a trend variable (YEAR) in the estimations reveals that factors related to business conditions, like regulatory changes and technological advances seem to contribute to the increase of non-performing amounts in the case of Tunisian banks during the period 1996-2007. In order to avoid exposing banks to credit risk and then to assure banking sector stability, we recommend to the Tunisian monetary authorities to make more efforts in order to strengthen bank capitalization.

REFERENCES


Notes


Note 2. Non-performing loans are problem loans held by banks. According to the Tunisian Central Bank (BCT circulars No 91-24 of December 17, 1991 and No 2001-12 of May 4 2001) this credits are divided into four classes going from the least risky to the most risky, named : Class1: credits requiring particular monitoring, Class2: uncertain credits, Class3: alarming credits, Class4: compromised credits.

Note 3. We use DEA method because there is no consensus in the literature on an improved frontier efficiency method (Bauer et al., 1998). In addition, Alam (2001) and Van Biesebroeck (2007) show that DEA method has the advantage of not requiring an a priori functional form of the production process of the bank.

Note 4. The Hausman test is conducted using STATA 9.2. The probability found is Prob >chi2 = 0.0078.
IMPACT OF DECISION-MAKING REASONING ON THE CREDIT RISK MANAGEMENT

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Faculty of Economic Sciences and Management of Sousse – Tunisia

Abstract:
Banks responsible are attracted by the prospects of activity rationalization such as the risk quantification, and by productivity and reactivity potential profits. Indeed, we attend simultaneously to the renewal of risk management statistical tools and the emergence of new qualitative methods. However, these new instrumental logics are not without incidence on the structuring and the organization working procedure. Based on the example of two banks adopting two contrasted orientations for managing credit, we will try to understand the use reality of these instruments and the training processes ensuring their cohesion with organizational dynamics. This will lead us, to propose an elementary typology of bank management modes, a typology that crossing risk modeling process with use logic of new tools.

INTRODUCTION

A CLINICAL RESEARCH

This paper exposes a clinical research realized in two different banks: a specialized small bank and a large bank with a network. With analyzing the design project of risk management tools in these two banks, we want to understand how “the tool” can constitute a collective interaction system, coordinating the actors and their exploration efforts, and confronting their interpretation diagrams.

Our objective was double:

• Study the tool reasoning and their interaction with organizational structure, productivity and reactivity constraints to the two projects.
• Analyze the emergence’s conditions of training processes and their impact on the knowledge dynamic’s actors of each bank.

AN UNDERSTANDING METHODOLOGY

We chose to adopt a qualitative approach [Yin (2009)] that encircles its studies subject by successive stages through the observation, the comparison and the interpretation of the multiple processes of interaction and of exchange inside the system of action. The comprehension of relational processes, of organizational dysfunction, as well as the examination of the facts and
perceptions which the actors attach to the actions, fully justify the recourse to this research strategy. We adopted prospect multi-actors: we carried out several interviews to collect conscious or unconscious opinions [Thiéart (2006)]. We also treated the arguments and the against-arguments, contradictions of the same speech in order to locate rationalities. We reached a level of information ensuring theoretical saturation principle. According to the ethnographic process, we privileged the “in situ” observation [Yin (2009)]: an intensive presence enabled to follow the conception and the use of the credit risk management tools, to identify the specificity of each bank activity, to analyze the operational behaviors and to understand the cognitive and organizational changes. Our study cases allow apprehending the various phases of a management process articulating training process and tools reasoning.

A multilevel organizational analysis

The comparative analysis of the two sites allows understanding the rationalization conditions of a given tool. It makes possible to realize that:

- A management practice answering a strategic opportunism tends under the action of some actors to spread to constitute a model or a mode of banking risk management.
- The adjustments and modes of negotiation necessary to make management tool as a determinant of the organizational training and dissemination of knowledge.

Questioning the management philosophy of tools making means to elucidate the methods according to which thought arrangements and real arrangements are confronted. This questioning meets the debate on the problem of rationality principle which was at the base of the formalization of these tools, and on the emergence of a philosophy of the organized action which continuously binds the tool construction to the organization itself. It highlights the difficulty in articulating the bonds between tool’s logic and organization. It finally makes possible to look further into the concept of management tool.

Management tools cross various logics:

- The first regards the tool as a whole of reasoning and knowledge connecting in a formal way a certain number of variables resulting from the organization,
- The second who qualifies it as a location tool, incentive, collective training; that related to its capacity to formalize the organized activity.

But before looking further into these analyses, we will reconsider the strong bond between the type of rationality and the coordination of the organizations. According to the economic theory and the theory of the organizations, it is the concept of coordination of the efforts or rule which constitutes the important principle of effectiveness [Williamson (1983)]. The evolution of the nature of this relation stimulates processes of training whose result appears by a mode of production of rules and figures of differentiated actors. These modes of production of rules and actors (or coordination principles) are based on new systems of relations and distribution of the knowledge between actors.

Then, we will show that the management tools of the risks, and more particularly the use which is made by it in the two sites, constitute a support with the collective action. Indeed, the management tool can help, not only to perfect the organizational variables in which the trades evolve but also to transform their basic knowledge. From this point of view, the effectiveness of the companies depends less from theirs instrumentation manager than from the training and relational mechanisms built within the group.
Finally, we will propose an elementary typology of the credit risk management modes and we will discuss the conditions of a successful instrumentation.

I. ORGANIZED ACTION AND RATIONALITY: BASIC CONCEPTS

The positive admission of the organization differently than as a collection of contracts goes up with the radical thesis of H.A. Simon (1959). The substitution of procedural rationality to substantial rationality resulted in the extension of the standard theory [Favereau (1989)] and by the revival of the debate “coordination by the market/coordination by the organization”. By demonstrating that the comprehension of the organization passes initially by the comprehension of the resolutely processes of the actors, and that the organizational coordination is not reducible to the instrumentalism of contractual arrangements, H.A Simon hustles the concept of effectiveness. This last is not the correspondence between an awaited result and means but perhaps between the training and coherence [Argyris (2008)].

I. 1. CONCEPTS OF ORGANIZATIONAL RATIONALITY AND COORDINATION

The majority of the authors affirm that the work of Simon accelerated the evolution of the firm theory. Simon directs the debate “coordination by the market” vs “coordination by the organization” so as to grant to the organization a central place and no subordinate to the market or the contract. We will reconsider successively on the evolution of the rationality concept and the methods of coordination within the organization.

I. 1. 1. SUBSTANTIAL RATIONALITY VS PROCEDURAL RATIONALITY

In his research, Simon (1978) has allotted a central place to the couple “substantial rationality/procedural rationality”. Is “rational”, the homo economicus behavior of the traditional firm theory as regard to certain objectives and certain specific constraints. These behaviors were “optimisator” type and the constraints were exogenic to the decision maker. One presupposed substantial eliminates the limits which will find a place in the cognitive processes of the decision maker: the environment (reality) is object and the limits of the decision maker are related to his possibilities of calculation [March (1978)].

The substantial rationality of the decision maker thus qualifies his choices and is appreciated in terms of awaited result independently from the way in which the decision was elaborate. The internal environment of the decision maker or his capacity to build a plausible reality is completely ignored.

According to the procedural conception, the decision is not separated from its building processes. Is qualified of procedural, the conception which emphasizes the deliberative aspect of the decision, an aspect which does not operate only on data, but consists in an objects invention [Mongin (1986)]. Conversely to the substantial version, the whole of the possible choices is not given; it is to be built [Favereau (1989)]. According to this point of view, Moigne (1990) advances that before being an exercise of problem-solving; the decision is a process of identification and formulation. Consequently, the relevant methodology is not normative type but descriptive/positive type [Simon (1978)].
THE DOUBLE NATURE OF COORDINATION

This inversion reveals the failure of the incentive models of execution behaviors. Being considerably more complex, only a rule/convention ensures the incentives to adhesion behaviors. In addition to its instrumental dimension, the rule constitutes a collective cognitive device. This thesis joined the “Weber” analysis which demonstrates that there is a strong bond between the rationality type and the collective nature. Management theories are more empirical: it insists on the fact that the coordination of the firm is not any more a simple business of “contractor”. It requires also producing “experts” of rules. These theories note that one of the major problems of the organization management was the tension between staff and line. H. Mintzberg (1982) in his work to synthesize organizational types was identifying five kinds of coordination. We can easily note that some of these types are defined by a relational model, and by a collective recognition of a certain distribution of knowledge between the actors. We will thus defend the idea that any mode of coordination does not escape to this double nature: it inevitably bases on the more or less coherent interaction between a relational model and on a particular distribution of knowledge.

I. 2. PRESCRIPTIVE REASONING VERSUS CONSTRUCTIVE REASONING

Many authors insist on the idea that the companies does not only formed from human, subjects, but also from knowledge and rules, from information on its function system. Simon (1959) considers that the flood of information which informs and supports the decision-making process is the essential element of the organization. This flood is presented like a means of minimizing the constraints of limited rationality and an attempt to confer more rationality on the organizations. Accordingly, the model of instrumental rationality offers to the actors a suitable representation of the current situation and specifies the possible ways of improvement. However, quickly many works throw back the rationality principle relating to management tools and supposed the existence of stable preferences of an individual, resumed in a single criterion [Sfez (2008)]. But before analyzing the questioning of instrumental rationality, we will reconsider the tool reasoning: prescriptive/normative and constructive/descriptive [Bell, Raiffa and Tversky (2007)].

I. 2. 1. RULE CONFORMATION VS RULE CONSTRUCTION

The most conceptual distinction in traditional decision theory was between normative and descriptive models, the terms “normative” and “prescriptive” are often employed like synonyms of the same attitude. But, the border between the descriptive and normative theories is also fuzzy. Yet all descriptive theorists have an implicit normative interest to the decisional behavior [Villasis (2011), French (1988)].

According to Bell, Raiffa and Tversky (2007), the descriptive models are evaluated according to their empirical validity (or to their degree of correspondence with the choices observed), and the normative models according to their theoretical adequacy (according to its possibility of result to rational choices), while the prescriptive models are evaluated according to its pragmatic value (or according to its capacity to make better decisions). Difficulties remain to distinguish the constructivism from prescriptive ways because of their interconnections. And yet, the difference is fundamental. Indeed, by borrowing a constructive way, a man helps to build a model of value judgments by the search of working hypotheses to
make recommendations. In a prescriptive way an analyst starts by describing and made regulations on the basis of normative assumption validated by described reality. That’s way Bouyssou [2011] includes under “descriptive” designation any approach other than the constructive one. According to this author, constructivism is associated with the process of decision-making aid.

I. 2. 2. INSTRUMENTAL RATIONALITY VS ORGANIZATIONAL RATIONALITY

Face to the difficult distinction between descriptive and normative logics, Boyssou (2011) affirms that the tool management has two kinds: that which consists of normalizing the behaviors and that which consists to create and propagate knowledge. The same author recognizes that knowledge replaces the conformation, which was visible initially when the model of instrumental rationality was diffused within the organizations. In another way, the economic theories, by clarifying the phenomena of instability in the decisional behaviors because of separation between owners and managers, confirmed the failure of the concept of instrumental rationality [Jensen (1993)]. Yet, we can estimate that the effectiveness of the companies depends less on theirs instrumentation manager then on their relational mechanisms. This discuss utilizes jointly the actors and the devices which surround them, the first playing on the seconds to achieve their objectives. In this direction, the power relations are constitutive of the system in which they are spread and at the same time create it.

Thus, we conceive easily that such an interpretation of the organizational facts hustles the functional model of instrumental rationality: on the one hand the creation of the tools is structured and filtered by the actor plays; on the other hand their use becomes conditioned by the effects of transparency which they produce. Indeed, we attend the emergence of a philosophy of the organized action which continuously binds the construction of the instrumentation to that of the organization itself. Current research [Hatchuel (2010); Chabaud (2003)] concentrated on the analysis of the significance even tools, on their modes of constitution and the way in which they operate concretely inside the organizations. These works show that, in the current context, the degrees of freedom on the tools management themselves are undoubtedly less important than those existing on the various ways to carry out them in the complex organized action. Thus, we pass from a tool conception turned towards conformation in the form of regulation and standardization of the behaviors to an exploration and knowledge conception. The tool management constitutes a provisional representation, around which the actors undertake by cross trainings the exploration of the bonds which link them, of the conditions of their activities and the ways by which they can evolve. Consequently, the production of knowledge on the objects or services produced appears increasingly dependent on the organizational devices likely to be set up to stimulate and capitalize this production.

I. 3. THE RATIONALIZATION AND THE ORGANIZATIONAL TRAINING

We saw that it is through this effort of coordination that the actors build their own legitimacy and then the rules which they will have to produce or to use. What is will build here is less one process of reputation that a process of epistemological observation [Hatchuel (2010)]. Thus, from coordination like construction by common contexts, we passed to a mode of distributed interference, which let the actor to maintain his capacities of research and training [Noblet (2010); Senge (1999)]. The rule relates less to the contents of the action than on the structuring of the collective. If interpretation is hypothetically unethical, the collective training is saturated, it is the rule necessary to learn (individual training). On the other hand, if the margin is
considerable, not only the collective training is not saturated but it begins to start [Hatchuel (2010)]. Consequently it would be interesting to understand the particular dynamics of knowledge which was the source of these rationalizations, because it also informs us about the conditions of their survival.

I. 3. 1. THE VARIOUS APPROACHES OF THE ORGANIZATIONAL TRAINING
Most training operates an explicit classification of the training levels: adaptive training and generative training, training by exploitation and training by exploration [Noblet (2010)]. The traditional distinction is that of Argyris (1982): training “with simple loop” and training “with double loop”. The first is based on the consolidation of the knowledge and existing competences [Mahé (2010)]. The training is carried out then thanks to a repeated practice which makes it possible to accumulate individual experiments. The second can be approached like an acquisition of knowledge. This training results in a transformation of the existing knowledge, the renewal of the use theories in the organization and the development of new frameworks of interpretation [Burgeon (2010)]. This author exceeds this distinction and defines the effective training as a combination of behavioral and cognitive changes.

I. 3. 2 INDIVIDUAL TRAINING VS COLLECTIVE TRAINING
It is advisable to announce that the organizational training is another thing that a process of adjustment to reality or an adaptive evolution which would occur naturally in all associations. Indeed, the location of the knowledge is not separable of their distribution in a collective. Reciprocally, the dynamics of the knowledge disturbs this distribution and operates displacements of the action. Thus, we understand better the debate which separates individual training and collective training [Tebourbi (2010)]. The collective training is not an agglomeration of independent individual trainings, contrary individual training is one limiting figure of the collective training process. In this case, each actor can create different knowledge but the processes of knowledge formation interfere. It is this process of interference which orders also the boundaries of coordination and co-operation. This dynamic of mutual comprehension is essential for the collective training: it does not require existing that the actors have the same knowledge [Argyris (2002)].

II. AN EXPLORATORY STUDY IN THE BANKING INDUSTRY
Our experimentation is established within the framework of the optimization vagueness of the banking performances. Uncertainty increases revealed the capacity of the statistical tools to quantify the credit risks and to determine the customer behaviors. Consequently we attend the emergence of more qualitative approaches placing the actor in the middle of a process of reasoning assistance.

II. 1. THE PRESENTATION OF THE RISK MODELING PROCESS
In the two studied cases, the design and the development of tools to manage risks answer the same managerial strategy of activity rationalization. The objective is to adapt the techniques of risk modeling to the new constraints of the credit activity: on the one hand, it aims improving the use of the statistical tools, type “scoring”, used in the stable markets (individual customers) ; on the other hand, to develop and exploit new qualitative method in the dubious markets (small companies market). We will show how logics related to the design of the two tools institute a
technical and organizational flexibility which improves the process of decision-making. The initiation of new logical statistics of delegation control reduces the opportunist behaviors of the actors in the first case of study. In the second, the difficulty in evaluating the risks, due to the weakness of knowledge available, is relativized by the development of a tool based on the expertise and the reasoning assistance.

II. 1.1. WILLINGNESS TO REDUCE THE OPPORTUNIST USES OF THE CREDIT SCORING
The first project of rationalization is developed in a bank specialized in home loan to individual customers (Bank X). To determine the risks incurred during the acceptance of a loan, the persons in charge worked out an instrument allowing quantifying the risk. To each potential borrower, they associate a grid of risk evaluation. The personnel of the various agencies of the bank filled a certain number of objective headings (returned, age, debt, etc), so that a simple module of calculation proposed the total note to them in an automatic way. The subjacent model of causality making possible to pass from the characteristics of the customers to their total evaluations was founded on the statistical analysis of an important sample of application passed by which risk indicators were connected to the characteristics. The stakes and the problems associated with this new tool let appearing some opportunist behaviors because of the mechanical control exerted on the decentralized agencies. Indeed, the evaluation use of application accepted by the agencies as control way encourages the actors to optimize the judgment related to them while trusting only the tool. However, intrinsic qualities of the tool do not enable it to have a complete vision (all the criteria cannot be seized) and activate (the criteria are supposed to be static) of the application.

II. 1.2. A NEED FOR INTERPRETATION AND INFORMATION JUDGMENT
The second project is led in a large bank with a network and aims to make an instrument of risk evaluation related to the professional customers in phase of creation (Bank Y). The specificity of the activity calls a very different risk modeling from the first studied case. The apprehension of the risk requires adopting jointly: an economic argument to evaluate the viability of the business, a social reasoning to check the solvency, and finally an individual reasoning to judge the contractor quality of the prospective customer. This rough information, if they exist, requires an interpretation whose relevance depends on the competences and perceptions of responsible. Precisely, the stake was double: it was a question of designing a tool for the basic decision makers to boost the production while controlling its quality. To answer this request, the persons in charge of the project focus on a risk evaluation tool based on expertise. Then the step turned toward the formalization of a standard reasoning to analyze an application, reasoning which was consequently to be entirely transparent and understandable for a basic responsible. Concretely, the tool is appeared as a general diagram of analysis based on a hierarchical structuring of the risk criteria (basic criteria, composed of information and judgments, are aggregate in intermediate criteria then in synthesis to make a total evaluation of the application) and on a modeling of the aggregation’s principles. Thus, if one of the synthesis criteria is considered to be “insufficient”, the total evaluation of the application becomes itself “insufficient”. The refusal of the application will not be therefore automatic, the decision remains to the local responsible.
II. 2. DIAGNOSIS OF THE TWO RATIONALIZATION PROCESSES
While having determined the nature of the problems facing the two banks responsible, we will analyze their rationalization method. We will see that, into the spite of a common objective, the two processes resulted in two different processes and have led to different results.

II. 2. 1. DECISION-MAKING AID AND A REINFORCEMENT OF THE DELEGATION CONTROL (CASE OF BANK X)
According to Mintzberg (1982), the traditional mode of risk management seems to oscillate between the standardization logic of the operations associated with a bureaucratic functioning and the standardization logic of the results associated with a regional decentralization (each entity have the choice autonomy of its means in exchange of the achievement of the total results). This intermediate positioning is explained, on the one hand, by the absence of tool allowing a sufficient standard of the acceptance of the application, and, on the other hand, to judge at the appropriate time quality of a production carried out as a delegation. In this context, the stake of the credit scoring can be summarized in the use choice of one within these logics. This arbitration is problematic, in particular for the managers of the bank (X), because the new instrument potentially contains these two logics of use. The question was: is the tool prescribes the decision or simply contributes to the decision-making?

In spite of the existence of a handling risk of basic information, the manager of the bank (X) chose to keep the delegation by specifying that the grid of notation should help and not prescribe the decision. If we add that the direction was especially interested by the possibility of immediately evaluating of the average quality of a production over a given period, we highlight an essential change gotten by the new indicator: to provide a quantitative and immediate measurement of the production quality, quality which traditionally appeared only after several years. Thus, the mode of use selected corresponds overall to a decision-making aid, with maintenance and even reinforcement of the delegation, this reinforcement is being possible thanks to the quality control of the loans, offered by the new tool. Indeed, it was not necessary any more to maintain traditional control “a posteriori” of all accepted applications.

As well as this suppression conflict with work practices of head office, and it supposed a good reliability of the instrument, this evolution represented in fact an important reconsideration of cutting logic of the central services. In return of the control suppression, a structural reform was decided, which comprised in particular a regrouping of the services “engagements and unpaid”, aiming to better determining the payment incidents. This new structure thus seeks well to be coherent with the new logical statistics of risk management, evolution permitted by the design of “credit scoring” toll.

Progressively, the development of the statistical methods applied to all banking activities and the need for a periodic update of each notation grid, justified the creation of a service charged with making and the management of these indicators. In addition to the awaited benefit of the creation of this function (internal capitalization of the risk modeling), the emergence of the service “development and statistics” constitutes a redistribution of the relational play between the head office and the regional entities. This service takes the position of mediator between these two groups of actors, and its responsibility in the appearance or the suppression of the perverse effects becomes dominant.

To summarize, we can notice that the perverse effects related to the rationalization process were avoided for a double reason. The first is linked to the effects keeping of the delegation, which even could be reinforced thanks to the use of the credit scoring like additional indicator in the
judgment of the production quality. The second is due to the evolution of the actor mission definition “development and statistics” enabled him not to be confined in an “instrumental” role, which supported the development of a relevant representation of the role of the risk evaluation instruments within a total strategy of activity development.

II. 2. 2. CAPITALIZATION OF KNOWLEDGE AND KNOW-HOW: CASE OF BANK Y
In the bank (Y), the obligation to interpret the data available and the inexistence of a standard procedure, based on the important risk analysis criteria, don’t allow drawing a general policy of application acceptance. Consequently, the process of rationalization was directed towards the formalization of a standard reasoning of application analysis, reasoning based on the exploitation and the development of the experience of the actors.

To initiate a know-how dynamics, the responsible don’t seek to model the judgment construction. Only a detailed list of the elementary criteria (or “basic criteria”) was drawn up to constitute an interview guide. Indeed, managers judged that the actors should be able to build their judgment by mobilizing other not listed basic criteria.

In addition to its potentialities as an evaluation aid of the application, the tool should familiarize the actors with the risk concept. Through the interview, belonging to the tool, the head office wanted to make a discussion or confidence relations between the banks and the customer, rather than a series of questions and answers which would be likely to harm the marketing policy of the bank. In addition, the tool clarifies the method of acceptance of the professional application to converge towards a clarification of the organizational plays between the hierarchy and the base. It played an important part in structuring the discussions. It makes it possible in particular to understand very quickly, in the event of dissension on the total evaluation, the origin of this dissension, i.e. on which intermediate criteria the opinions are divergent.

Finally, even if it always returns to the hierarchy to slice, the use of the tool seems to facilitate the discussion and allow the confrontation of the points of views. We can provide that all the tangent application would be examined in committees of risk for a more collegial decision.

This cartography of the possible uses of the tool shows that this last potentially has the advantage of creating a total dynamics within organization. This dynamic should encourage an organizational training as well as by teaching (thanks to the formation by the tool) and by the action (thanks to the use of the tool as a discussion structuring, memorizing, etc).

II. 3. THE SPECIFICITY OF THE TRAINING PROCESSES OF THE TWO TOOL MANAGEMENT
The two projects of installation of the risk modeling tool show that it is not only a question to understand the organization, i.e. the coordination shapes or delegation to be established, but also the contents of the knowhow. Although the two studies cases presented can both be referred to this logic of training associated with a decision-making aid process, and this in opposition to a prescriptive logic, we suspect that the processes and the stakes related to the training remain nevertheless very different.

Indeed, in the first case the notation grid offers to it only a first evaluation of the quality of the application. The actors must then supplement and refining this evaluation by the taking into account additional information.

On the other hand, in the case of the reasoning assistance (professional customers), the tool proposed does not offer any evaluation autonomy. Only an actor himself considered as an expert can give life to the tool, if it agrees to press his reasoning on the framework proposed and thus to format the arguments justifying the decision which it recommends. The expertise contained in
the tool is different from that contained in a statistically notation. Indeed the professional activity needs a correctly interpretation and validation of all the data, whereas a notation grid functions only on “objective” criteria requiring a minimum of interpretation. We deduce that, for real loans, the problem associated with each decision is infinitely less complex than that associated with the decision of entry in relation with a professional. This last seems to be a bet to take in a dubious universe, whereas the first can profit from an estimation of the behaviors of the various categories of borrowers. Consequently, the need or activation of a training dynamics distributed on basic actors is much more extremely in the case of the professionals.

III. A TYPOLOGY OF BANK RISK MANAGEMENT MODE

The two cases above enabled us to apprehend two possible uses of a risk management tool. Indeed, the credit scoring conceived in the bank (X) is aimed at the control of the risks through a control of the delegation. On the other hand, the policy of the bank (Y) is clearly directed towards the assistance with the reasoning and the structuring of the discussions between the levels of delegations. These two examples are very interesting insofar as they enable us to determine the factors of differentiation of the possible configurations of the risk management tools.

III. 1. DIFFERENTIATION CRITERIA

III. 1. 1. Risk modeling process: statistics or expert judgment

A first axis of differentiation relate to the contents of the tool. It opposes the management of the real loans and the consumer credits, with that of the professionals credit: modeling the behaviors of the application by statistical methods in the first case (approaches a posteriori) against modeling the expertise of the decision makers experienced in risk evaluation in the second case (approaches a priori). Let us stress that the control of the risk by a score, therefore by a function of discrimination, constitutes only one case of figure among other forms of behavior modeling. In the same way, the formalization of an expertise by a model of reasoning arranged hierarchically, in the shape of a decision tree is a possibility among others.

III. 1. 2. Implementation mode: regulation or decision-making aid:

The second axis of differentiation relates to the user mode. The case studies show that two user modes can exist. We observe indeed:

• A prescription use, which is generally widespread for the risk management consumer credits (case of the bank Y).

• A decision-making aid use, which was adopted by the bank specialized in real loans (banks X) and for the management of the professional credit (case of the bank Y).

The choice of such or such mode of use returns in particular to the question of knowing if the expertise brought by the tool is enough to make a decision. In the first case, it is clear that one confers to the toll expertise a statute “of complete expertise” [Weber and Scholdz (2010)]. On the other hand, the recourse to the scoring credit only as a decision-making aid means that one regards the toll expertise as being “incomplete”.

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III. 1.3. The Typology Determinants

Three great factors were located as having an impact on the risk management option.

- First of all, uncertainty characterizing the environment of the activity: when environment instability is strong, the statistical methods of forecast are not highly reliable, whence the choice of the expertise modeling is “a priori”. In the same way, it is difficult to utilize a prescriptive tool, since instability calls upon an interpretation of the information (Case of the bank Y).

- Then, the production nature: for the productions described as “unit” or “multi-unit” such as real loans or professionals credit, the decision-making aid is more recommended than prescription. On the other hand, for the productions in “series”, corresponding to a greater standardization, great volumes with weak unit stakes (example: consumer credits), the decision automation is generally adopted.

- Lastly, the availability of information: indeed, in case of absence of a sufficient history, on the already accepted application, which would contain information on the initial profile of the application, the statistical methods of behavior modeling are obviously not very practicable.

Thanks to this clarification of the differentiation factors, we can consider that each square of typology (cf. figure 1) represents in mode of use with which a credit type is not necessarily associated. Thus for example, we can find a real loan managed by a prescriptive credit scoring. We can meet such a configuration in a general bank, where important volumes will need a partial automation. That will also mean that this bank has sufficiently discriminating historical information to be able to confer a statute of complete expertise to a credit scoring.

Beyond the differences shown by our typology, various logics of risk management instrumentation meet up to deduce an action theory for the future as acceptance policy. These last lessons are formalized either by a statistical function of score type, or by acceptance doctrines. For this reason, all these instrumentation logics authorize thus an organizational training. However, we can foresee some differences linked in particular to the subject and temporality.
III. 2. CHARACTERIZATION AND TRAINING DYNAMICS
We will highlight hereafter two great logics of organizational training conveyed by each instrumentation logics of risk management.

III. 2.1 - THE PRESCRIPTIVE RATIONALIZATION
Subjacent philosophy to the use of a prescriptive tool (as illustrated by the square type I and IV) corresponds to the restriction of the training on the conformity and the respect of the acceptance policy defined by the head office. So the training process can be qualified as a concentrated process. The central performance monitoring of the tool allows detecting the opportunity of the grid review: particularly when the variation between the percentage of bad applications, envisaged by the grid and that concretely carried out, is considered important. A sample of application is again studied statistically to give place to a new policy of acceptance which reflects the real risks as well as possible. The procedure of grid conception is complex, the training can be carried out only with certain intervals of time. In the second case, the revision of the expert system used like a black box, intervenes generally only episodically. The process of training is for this reason discontinuous.

III. 2.2. A DECISION-MAKING AID RATIONALIZATION:
Thanks to a use policy of the decision-making aid associated with the standard instrument (type II and III), the bankers can, while being based on the tool expertise, by interpreting it, by confronting it with the application behavior, acquire knowledge in the field of risk evaluation. Moreover, since the toll expertise is regarded as incomplete, they are supposed to supplement it by other analyses; what means that they are considered them also, like learning subjects. In other words, the training process interested as well the head office as the operational actors. The knowledge used in the decision-making can be revised when new problems arise. The training can thus be held for “continuous”.

CONCLUSION:
We will retain initially the idea according to which any logic of rationalization privileges a type of training which indicates its subjects of training and which has its own temporality. It is not a question to proclaim that such organization learns and that such other doesn’t learn, but for a given form of the organization correspond a kind of training. In the great projects of reorganization or new management mode currently implemented within the banks, the problem of the rationalization of the training processes appears to be an increasingly important stake. Indeed, a very similar problems with the cases analyzed above is often associated with many rationalization methods touching complex activities and new requirements of performances. This is the same case for a conception aid method which pass in particular by the modeling of the conception process, by the description of the stages to be traversed, by their methods of validation and actors who must be implied there. These modeling lets structuring and controlling the conception projects by improving coordination and by directing the trainings in an efficient way.
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GOVERNANCE AND BANK RISK-TAKING:
A COMPARISON ANALYSIS BETWEEN COMMERCIAL AND
COORDPERATIVE FRENCH BANKS

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ABSTRACT
The purpose of this paper is to examine and compare the determinants of risk-taking in two financial intermediaries in the French Financial market: 27 French Commercial banks and 19 French Cooperative banks covering the period from 2004 through 2009. We find a significant positive relationship between the ownership concentration and the insolvency risk for two types of banks. For cooperative banks, the board size influences negatively and significantly on the risks. The performance measures, the level of capital and the size of the bank have a negative impact on the risks for two banks. By comparing the two legal form of risk, we conclude that the credit risk in commercial banks is more important than in cooperative banks.

Keywords: Bank Risk-taking, credit risk, Bank governance, ownership, board of directors.

JEL Classification: C33, G21, G32, G34.

1. INTRODUCTION
In recent years, financial system has recognized a recurrence of banking crises due to the excess risk-taking by the managers and the stockholders. They invest in riskier activities in order to maximize their profit to the detriment of the other stakeholders in particular the depositors. Under this process, enhancing corporate governance for banking firms becomes necessary to guarantee the stability of financial system. In 1999, Basel Committee on Banking Supervision has promulgated the principles of good corporate governance in financial entities and requires them to respect it. This contributes to the soundness of the financial system and consequently the development of the economies.

Several studies have focused on corporate governance, yet only few papers focus on banks’ corporate governance (e.g. Macey and O’Hara (2003), Levine (2004), Arun and Turner (2004), Adams and Mehran (2005), Caprio et al (2007)). Banks’ corporate governance is specific compared to the nonfinancial firms. They have two traits that make them special: the opaqueness and the regulation. The first character implies that the information asymmetry is very high in the
banking sector. On the one hand, there is a conflict of interest between the shareholders and managers. Shareholders take more risk to maximize their profit. However, managers would protect their specific human capital and don’t like to invest in riskier project. On the other hand, there is a conflict of interest between the shareholders and depositors due to the deposit insurance system (Merton 1977). Indeed, banks adopt the deposit insurance system to restore the confidence of depositors and avoid the bank runs. Though, the depositors become less incentive to control the shareholders because their capital is protected. While, the shareholders become more incentive to take risk since the loss will be absorbed by capital of depositors. The second specificity of the bank’s governance is the presence of the regulation that creates an additional information asymmetry by introducing a third party the regulator (Macey and O’Hara (2003)). This prevents the shareholders to monitor directly the managers. The main cause of this agency conflict is the excessive risk-taking by different stakeholders. This aggravates the financial situation of bank and some even lead to bankruptcy. In order to limit the excessive risk-taking and subsequently ensure the stability of financial system, it is important to examine the factors that affect the bank risk-taking.


The purpose of this paper is to examine the determinants of risk-taking in two financial intermediaries in the French Financial market: French Commercial banks and French Cooperative banks (hereinafter FCBs and FCOPBs). The study period ranges from 2004 to 2009. Also, we compare the risk-taking behavior of the two French financials entities. Our empirical analysis extends the existing literature in two main directions. As far as it could be ascertained, this is the first study in French market. On the other hand, there is little empirical guidance that compares the risk taking with different ownership structures (cooperative and commercial banks).

The remainder of the paper is structured as follows. Section 2 reviews the empirical literature on the determinants of bank risk-taking. Section 3 presents the methodology of the empirical analysis. Section 4 presents the empirical results. Section 5 concludes.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1 Factors affecting bank risk-taking

Financial literature distinguishes several factors that affect the banking risk. In our study, we focus on the relationship between bank risk and some quantifiable factors: The ownership structure, the profitability and the capital.

2.1.1 The ownership structure

The ownership structure is an important internal control mechanism that can influence the level of the risk. According to the agency theory, two components of the ownership structure may influence the risk: The ownership concentration and the nature of the owners.

The first component, the ownership concentration, has been discussed for the first time by Berle and Means (1932) who assert that the separation of ownership and control may create a conflict of interests between owners and managers. However, Jensen and Meckling (1976) argue that more equity held by managers is important, more their interests converge with those of shareholders. The relationship between the ownership concentration and risk has been the subject
of several researchers (Shleifer and Vishny (1986), Saunders et al (1990), Demsetz et al (1997), Iannotta et al (2007), Marco and Fernandez (2008)). The results that were found are contradictory.

The second component, the nature of the owners, has been less discussed in the financial literature compared to the ownership concentration. Several studies have examined the risk-taking with different ownership structure: Privately owned stock banks, mutual or cooperative banks, government owned banks, saving banks and commercial banks (Fama and Jensen (1983)a,b), O’Hara (1981), Rasmussen (1988), Iannotta et al (2007), Altunbas et al (2007), Marco and Fernandez (2008)). In the French market, the comparison of the two types of banks (FCBs and FCOPBs) in terms of risk-taking allows us to conclude two contradictory results. On the one hand, the default risk of cooperative banks is lower than that in commercial banks since customers are known and consistent (Hansmann (1988, 1996), Hart et Moore (1990), Gurtner et al (2002)). Also, the cooperative banks are less risky than commercial banks because they are specialized in simple and standardized operations (Gurtner et al (2002)). On the other hand, the COPBs are more risky than CBs because the managers are not under control shareholders. In cooperative banks, the ownership of the members is not concentrated as in the case of commercial banks. This encourages managers to be free in their decision making. Moreover, they have a higher specific risk as their customers are homogenous (Gurtner et al (2002)).

Our first two hypotheses are as follow:

**Hypothesis 1:** The ownership concentration influences positively the risk for the commercial banks.

**Hypothesis 2:** Commercial banks take more risk than cooperative banks.

### 2.1.2 The Board of directors

The board of directors has a crucial role in managing and controlling of the activity of the firm. It is an important mechanism of governance. It has an influence on the performance and the bank risk taking. The relationship between risk and board composition has been the object of only one study. Indeed, Pathan (2009) presents an inverse relationship between the size of the board of directors and the risk based on a sample of 212 Bank Holding Companies during the period 1997-2004.

We examine empirically the following hypothesis:

**Hypothesis 3:** The size of the board of directors influences negatively the risk.

### 2.1.3 The Profitability

According to Financial theory, profitability is an increasing function of risk. Banks take more risk to increase their profitability. The relationship between risk and performance has a less of attention of empirical studies in financial sector. Marco and Fernandez (2008) show that increases in Return On Equity (ROE) have a significantly greater effect on the level of risk-taking behavior in commercial banks then saving banks. However, Godlewski (2005) and Bouaiss (2008) find a negative relationship between performance and risk.

Thus, we formulate our fourth hypothesis:

**Hypothesis 4:** The profitability influences negatively the risk.
2.1.4 The Capital

Capital constitutes an important factor that influences the banking risk. A number of theoretical and empirical literatures have examined the impact of capital regulation on the bank risk-taking. No consensus exists in the sign of this relationship.

The first research group suggests a positive relationship between capital and risk. Banks increase their capital proportionally to the risk. Based on the mean-variance approach, Kahane (1977), Koehn and Santomero (1980) and Kim and Santomero (1988) show that capital regulatory encourages the banks to increase their capital and this leads them to have a higher portfolio risk. Bichsel and Blum (2004) find a positive relationship between changes in capital and risk in a sample composed by 19 Swiss banks over the period 1990-2002. The same result has been found by Godlewski (2005) and Altunbas et al (2007) using the simultaneous equations in their models. The second research group supposes that the relationship between capital and risk is negative. Bouaiss (2008) finds a negative and simultaneous effect between capital and risk in a sample composed by the twenty largest European banks. Also, the empirical validation of Pathan (2009), with 1534 observations, reports a negative but not significant relationship between capital and the specific risk.

Based on the financial literature, we suppose the following hypothesis:

**Hypothesis 5:** The capital influences negatively the risk.

2.1.5 The size of the bank

The banking risk is influenced by an important factor: the size of the firm. Big banks have better diversification opportunities and resist to crises. However, the coordination between the shareholders in larger banks is very difficult because the number of employees is very important. Also, they invest in riskier activities. They present a higher systematic risk and create a financial crises for all financial system “Too big to fail”. On the other hand, small banks are fragile and can not bear the entire risk when the banking crisis triggers. Several studies have examined the relation between the bank risk taking and the size of the firm. Godlowski (2005) and Bouaiss (2008) find a significant negative relationship between the risk and the size of the bank unlike to the result found by Pathan (2009) for the systematic risk.

Using an econometric regression, we test the following hypothesis:

**Hypothesis 6:** The size of the bank influences negatively the risk.

2.2 French Commercial banks versus French Cooperative banks

In the French Financial system, there are two major banking organizations: French Commercial banks and French Cooperative banks. They play a crucial role in financing of the economy. Their organizational form and structure of the corporate governance are completely different.

FCBs have the legal status of a stock company. Their owners are called shareholders, who monitor the activity of the bank depending on the percentage of their capital. Their objective is to maximize their profit and guarantee the continuity of their firms.

Contrary to FCBs, the organizational form of FCOPBs is decentralized in the shape of an inverted pyramid consisting on three levels (local credit unions, regional and national). As defined by the international cooperative alliance (1996), the cooperative is “an autonomous association of person united voluntarily to meet their aspirations and economic needs, social and
cultural interests thought a company whose ownership is collective and where power is exercised democratically”. The first aim of these financial entities is to protect the common interest of the members as equals. There is not a difference between the members, who democratically elect the board of directors. Also, the activity of cooperative bank is simple and specializes in standard and specific operations (Akella and Greenbaum (1988)).

For the corporate governance, the two entities have different models. In the case of FCBs, the corporate governance model is a “shareholders model” based on the principle of “one share-one vote”. The shareholder control depends on the degree of their ownership concentration. A higher shareholder concentration will decrease the owner-manager agency conflict (Marco and Fernandez (2008)).

In the case of FCOPBs, the corporate governance model is a “stakeholders model” based on the principle of “one person-one vote”. The stakeholders can participate to decision making. This contributes to the reduction of the asymmetry of information and the moral hazard. There is no conflict of interest between the shareholders and depositors because the members are at the same time the owners and the customers of the bank (Lacoue-Labarthe (2003)). However, the owner-manager conflict is very important because the manager has broad freedom of action and is not controlled by the shareholder (Rasmusen 1988).

3. THE METHODOLOGICAL FRAMEWORK

3.1 Data source

We collect data from Fitch-IBCA Bankscope for financial statements of banks and governance variables (Concentration and Board Composition) from DaFsalien data base. The sample comprises 27 commercial and 19 cooperative French banks covering the period from 2004 through 2009. We build a strongly balanced panel of data with 114 observations for cooperative banks and 162 observations for commercials banks.

3.2 The model

This paper seeks to examine the factors that affect the bank risk-taking. The relationship between these factors and the risk is represented by the following regression model using panel data techniques:

\[ \text{Risk}_{it} = \alpha_0 + \beta_1 \text{Ownership}_{it} + \beta_2 \text{BS}_{it} + \beta_3 \text{ROAA}_{it} + \beta_4 \text{ROAE}_{it} + \beta_5 \text{CAR}_{it} + \beta_6 \text{LNTA}_{it} + \epsilon_{it} \]

Where the index i denotes the bank (i=1……27 for commercial banks and i=1……19 for cooperative banks) and the index (t) denotes the year (t=2004….2009).

3.2.1 Dependent variables: Bank risk

We use two dependents variables to measure the credit risk. First, we proxy the credit risk that characterizes the loan portfolio by the ratio of loan loss provisions to loans (LLP). It measures the flow of new bad loans (Nier and Baumann (2003)). Second, we use “Z-score” to assess the insolvency risk proposed by García-Marco and Robles-Fernández (2008). The formula of “Z-score” is as follow:

\[ Z_{it} = \left( \frac{\sigma_t(\text{ROA}_{it})}{E_t(\text{ROA}_{it})+\text{CAR}_{it}} \right)^2 \]

Where,

- \( \text{ROA}_{it} \): The return on assets of bank i in period t.
Ei: The Expected value.
\sigma_{(ROA_i)}: The standard deviation.
CAR_{it}: Capital Assets Ratio. The average ratio of equity capital to total assets for the bank i in period t.

3.2.2 Explanatory variables

We use five explanatory variables in our model that are believed to be important in explaining the bank risk-taking: The Ownership Structure, the Board Size (BS), the profitability (ROAA and ROAE) and the capital (CAP). Our primary variable, the Ownership Structure, is measured by Capital Concentration for Commercial Banks and Local Control for Cooperative Banks. The Capital Concentration is defined as the percentage of the large shareholders used by Shleifer and Vishny (1986). The Local Control is the percentage of capital held by local banks Credit Agricole. To measure the profitability, we use the Return On Average Assets (ROAA) and the Return On Average Equity (ROAE). The stockholders take a higher level of risk to maximize their profits. There for, we expect a positive relationship between the profitability and risk. Finally, the capital is calculated as the ratio of book value of equity to total assets. It is an important source to resist to the shocks of financial system. Banks that hold a higher level of capital can support the risk.

3.2.3 Control variable

For the control variable, we use the Bank size (LNTA) calculated by the natural logarithm of the book value of total assets at the end of each year.

4. EMPIRICAL RESULTS

4.1 Descriptive statistics

Table 2 presents descriptive statistics of the model (1) over the period 2004-2009. By comparing CBs and COOPBs, we document that CBs have a higher credit risk than COOPBs (Z-score and LLP of CBs are on average higher than those of COOPBs). This seems to be explained by the heterogeneity of customers and the complexity of the activity of CBs. The average ownership concentration for commercial banks is 79.406%. For COOPBs, the average of the local control is 60, 15%. The board size of CBs and COOPBs varies from 2 to 31 (1 to 29) people with a mean at 13,339 (18,745) respectively. Board size of COOPBs is higher than CBs. At in concerns the performance measures, the average ROAE stands at 7.824% in CBs and at 7.841% in COOPBs. The average ROAA is 0.861% in CBs inferior to 0.869% in COOPBs. This indicates that COOPBs are more profitably than CBs. Moreover, the average capital ratio of COOPBs is higher than in CBs (11.659% > 9.132%).

Finally, CBs have the largest size (9,528 > 9,230). This is due to the importance of the numbers of their customers.

Table 3 presents the correlation matrix for all variables for commercial banks. There are a very few correlation between the independent variables. Only the ratio of capital (CAP) has a significant correlation with the size of the firm (LNTA). A problem of multicollinearity appears when these two independent variables act in the same model.
Table 4 presents the correlation matrix for all variables for cooperative banks. There is a significant correlation between the ratio of capital (CAP) and the performance measure ROAA. The elimination of one variable can improve the quality of the model.

### 4.2 Regression Results

#### 4.2.1 The Commercial banks model

Table 5 presents the regression results for the determinants of bank risk-taking in the case of commercial banks.

The first step in the regression panel data is to identify the panel structure of our model. The p-value is equal to (0, 0000) for the two measures of risk. Our model has a structure of panel. The second step is to specify the nature of individual effects: Fixed effect or random effect. The Haussmann test (1978) allows us to discriminate between these two effects. The p-value of the Haussmann test of the model with Zscore is equal to 14,25% neatly superior to 10%. This result allows us to conclude that our regression has a random effect. For the second measure of risk (loan loss provisions), we estimate the equation with cross sectional Generalized least square (GLS).

Table 5 reports a significant positive relationship between the ownership concentration and the insolvency risk at 10% but not significant with ratio of loan loss provisions. A higher ownership concentration increases the insolvency risk of the bank due to the opportunistic behavior of managers to maximize their profit. Our result do not support the one found by Marco and Fernandez (2008).

We observe a non significant positive relationship between the board composition and the two measures of the risk. The positive effect suggests that the higher number of board directors increases the risk because of the difficulty of coordination between the members.

For the performance measures, table 5 shows that ROAA has a positive and significant impact in Zscore but negative in RLLP at the level 1%. On the other hand, the ROAE has a negative and significant impact in Zscore but positive in loan loss provisions at 1%.

A significant negative relationship appears between the capital ratio and the risk measured by Zscore. In the case of the RLLP, the effect of the level of capital is significantly positive. The same result found by Altunbas et al (2007).

Finally, the size of the bank effect negatively and significantly the banking risk measured by RLLP at 10% but not significant on Z-score. The same result found by Altunbas et al (2007). The negative effect suggests that the large size allows the commercial banks to absorb the risk and to resist to the chocks.

#### 4.2.2 The Cooperative banks model

Table 6 presents the regression results for the determinants of bank risk-taking in the case of cooperative banks.

As we did for the commercial banks model, our regression has a random effect for loan loss provisions and a cross sectional GLS for the insolvency risk.

Table 6 reports a significant positive relationship between Local Control and insolvency risk. Local control doesn’t reduce the credit risk. For the board composition, board size has a negative and a significant impact on the two measures of risk. The high number of the board improves the quality of the control and reduces the bank risk taking.
At in concerns the performance measures, there is no consensus in the sign. Indeed, ROAA influence negatively and significantly on the insolvency risk but positive and not significant on RLLP. In contrast, ROAE influence negatively and significantly on RLLP but positive and not significant on insolvency risk.

We observe a negative and significant impact between the level of the capital and the ratio of loan loss provisions but positive and not significant on insolvency risk. Altunbas et al (2007) find the same result when they measure the risk with the ratio of Loan Loss Reserves.

Finally, the size of the bank has a negative and not significant impact on insolvency risk but positive on RLLP. Altunbas et al (2007) find a positive and significant impact between the size of the bank and RLLR.

4.2.3 Comparison between French Commercial banks and French Cooperative banks

By comparing the two legal forms of banks, we conclude that the influence of various factors on bank risk taking is not the same.

For the governance factors, the ownership structure influence positively and significantly on the insolvency risk for the two types of banks. This effect is more important in FCBs than FCOPBs. The board size has a significant negative greater effect on the credit risk in FCOPBs than FCBs.

For performance measures, the Return On Average Assets has a significant greater effect on the insolvency risk in cooperative banks than commercial banks. However, when the risk is measured by RLLP, the influence of ROAA is more important in CBs than COPBs. The Return On Average Equities reduces more the insolvency risk in CBs than COPBs. This relationship is reversed when the risk is measured by RLLP.

The influence of the level of capital on the insolvency risk is greater in commercial banks than cooperative banks. In fact, capital reduces the insolvency risk in CBs but it increases in COPBs. When the risk is measured by RLLP, this relationship is reversed for the two types of banks.

Finally, the bank size has a more significant impact on the risk in commercial banks than cooperative banks.

5. CONCLUSION

This paper examines and compares the determinants of risk-taking in French commercial banks and French cooperative banks which have differences in their legal form and their corporate governance.

In the case of FCBs, the factors that can reduce the bank risk taking are the Return On Average Assets and the size of the firm when we measure the credit risk by the ratio of loan loss provisions. The other factors are the Return on Average Equity and the level of the capital when the risk is measured by the insolvency risk.

In the case of FCOPBs, the factors that can reduce the bank risk taking are the Return On Average Assets and the size of the firm when we measure the credit risk by the insolvency risk. Also, the Return on Average Equity and the level of the capital reduce the risk measured by the ratio of loan loss provisions. For factors of corporate governance, only the board size has a significant impact on the credit risk.

By comparing the two legal form of risk, we conclude that the credit risk in commercial banks is more important than in cooperative banks.
REFERENCES


**Table (1). Definitions of variables**

<table>
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<tr>
<th>Variables</th>
<th>Measures</th>
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<tr>
<td>Z-score</td>
<td>The insolvency risk. Source: Bankscope.</td>
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<tr>
<td>Concentration</td>
<td>The percentage of capital held by large shareholders. Source: Dafsalien.</td>
</tr>
<tr>
<td>Local control</td>
<td>The percentage of capital held by Local Banks Credit Agricole. Source: Dafsalien.</td>
</tr>
<tr>
<td>BS</td>
<td>Board Size: The total number of directors on the board at the end of each financial year. Source: Dafsalien.</td>
</tr>
<tr>
<td>ROAA</td>
<td>Return On Average Assets. Source: Bankscope.</td>
</tr>
<tr>
<td>ROAE</td>
<td>Return On Average Equity. Source: Bankscope.</td>
</tr>
<tr>
<td>CAP</td>
<td>Equity/total Assets. Source: Bankscope.</td>
</tr>
<tr>
<td>LNTA</td>
<td>The natural logarithm of the book value of total assets at the end of each year. Source: Bankscope.</td>
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Table (2). Descriptive statistics (2004-2009)

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Source: Fitch-IBCA Bankscope database (for accounting variables) and Dafsalien (for governance variables)


Table (3). Correlation Matrix: Commercial banks

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### Table (4). Correlation Matrix: Cooperative banks

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See legend of Table 1.

### Table (5). Determinants of Risk taking: Commercial banks

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<td>Coefficient T-ratio p-Value</td>
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Number of observations: 160
R-sq: 0.8810

See legend of Table 1. ***, ** and * indicate parameter significance at the 1, 5 and 10% significance levels, respectively.

### Table (6). Determinants of Risk taking: Cooperative banks

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<th>Z-score (Cross-sectional FGLS)</th>
<th>RLLP (random effect)</th>
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<tr>
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<td>Coefficient T-ratio p-Value</td>
</tr>
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<td>Constant</td>
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Number of observations: 114
Wald chi2(5): 197.23
R-sq: -0.1656

See legend of Table 1. ***, ** and * indicate parameter significance at the 1, 5 and 10% significance levels, respectively.
Appendix

Table A: Name of banks in samples

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<th>Commercial banks</th>
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<td>1- Banque de la Réunion</td>
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<tr>
<td>2- Crédit Agricole de l'Anjou et du Maine</td>
<td>2- BNP Paribas</td>
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<td>3- Crédit Agricole Charente-Périgord</td>
<td>3- Boursorama</td>
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<tr>
<td>4- Caisse régionale de crédit agricole mutuel de Franche-Comté</td>
<td>4- Banque crédit foncier et communal d'alsace</td>
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<td>5- Crédit Agricole de l'Ille-et-Vilaine</td>
<td>5- Banque crédit industriel commercial</td>
</tr>
<tr>
<td>6- Caisse régionale de crédit agricole mutuel de la Champagne-Bourgogne</td>
<td>6- Natixis</td>
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<tr>
<td>7- Crédit Agricole de la Corse-Caisse régionale de crédit agricole mutuel de la</td>
<td>7- Société Générale</td>
</tr>
<tr>
<td>Corse</td>
<td>8- Tarnaud</td>
</tr>
<tr>
<td>8- Caisse Régionale de Crédit Agricole Mutuel de la Réunion</td>
<td>9- Banque Fédérative du Crédit Mutuel</td>
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<tr>
<td>9- Crédit Agricole de la Touraine et du Poitou</td>
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<td>10- Crédit Agricole de Lorraine</td>
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<td>11- Caisse régionale de crédit agricole mutuel de Normandie-Seine</td>
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<td>19- Crédit Agricole S.A.</td>
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<td>23- Credit Agricole CIB-Credit Agricole Corporate and Investment Bank.</td>
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<td>26- Banque SBA.</td>
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<td></td>
<td>27- Axa Banque.</td>
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Bank data were obtained from the Bankscope database that includes balance sheet and income statement information on banks.
DAY OF THE WEEK EFFECT ON ASSETS RETURN: CASE OF THE STOCK EXCHANGE OF CASABLANCA

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Abstract
There is an extensive amount of financial literature which focuses on the relationship between the day of the week effect and the returns assets. This relation is developed well by several researchers. Whereas, the obtained results to differentiate from a study to the other one. Thus, day-of-the-week effect on financial assets returns has been extensively discussed and abundant researches can be found in academic literatures. In our work we try to examine the impact of the days of the week on returns on the share prices of the Moroccan firms listed in the stock exchange of Casablanca during a period of 3 years (01/01/2008 - 31/12/2010). The results showed that Friday was a statistically significant positive return on assets. While that on Wednesday, has a statistically significant negative return on assets. Finally, return on assets at time t depends on that at time (t-1).

Key words: Days of the week, return assets, Stock Exchange of Casablanca, daily yield, dummy variables.

JEL Classification: D53, G10, G12, G14, G15.

1 INTRODUCTION

The distribution of assets returns in firm is one of the most widely studied in the financial market and the presence of calendar anomalies has been documented extensively for the last two decades. The majority common ones are the day-of-the-week effect and the asset returns in firm. Then, the day-of-the-week effect on financial assets returns has been extensively discussed and abundant researches can be found in academic literatures. Since these anomalous empirical evidences are hardly explained by the existing finances theory.
Then, some researches (Gibson and Hess, 1981; Keim and Stambaugh, 1984; Jaffrey and Westerfield, 1985; Condozanni et al., 1987; Ajayi and al., 2004) once affirmed that they are the most puzzling phenomena in finance.

Many studies (Cross 1973; French 1980; Lakonishok and Levi, 1982; Keim and Stambaugh, 1984; Rogalski, 1984; Smirlock and Starks, 1986; Aggarwal and Rivoli 1989; Aggarwal and Tandon, 1994; Berument and Kigmaz, 2001; Caro and al., 2006; Lee and Hung, 2008; Knif and Hogholm, 2009; Charles, 2010; Singh and Sahu, 2011; Nik Muhammed and AbdRahman, 2010) has documented that the distribution of stock return varied according to the day of the week.

Study by Wong et al. (1992) noted that the day-of-the week effect for Malaysian markets showed negative average returns on Monday and high positive returns on Thursday and Friday. Analyses by Anuar and Shamser (1993) and Mansor (1997) substantiated the presence of the day-of-the-week effect found by Wong et al. (1992). However, it contradicting with other studies of Marashdeh (1994) as he concluded that there was no week effect in the Malaysian stock market in his sample of study.

Since the first empirical evidence on calendar effects in stock returns, presented by Fields (1931), Osborne (1962), Fama (1965), Cross (1973), and French (1980), numerous papers report on new empirical evidence for and against the day-of-the-week effect.

In line with the earliest studies Gibbons and Hess (1981) asserted lower returns on Mondays and higher returns on Fridays for the US equity market. Lakonishok and Smidt (1988) documented this anomaly in the Dow Jones Industrial Average back to 1897. In contrast, Junkus (1986), in a study on equity index futures, found no evidence of the negative Monday effect in neither the cash indexes underlying the contracts or in the index futures contracts.

Thus, Jaffe and Westerfield (1985) contributed with international empirical evidence. They found day-of the-week effects in each country in their data set and report low returns on Tuesdays for the Japanese and Australian markets. Similarly, Condozanni and al. (1987), Kim (1988), Ho (1990), Wong et al. (1992), Athanassakos and Robinson (1994) and Dubois and Louvet (1996) discovered negative returns on Mondays for the American, European and Hong Kong markets but negative Tuesday returns for Korea, Japan and Australia. Kato (1990) also found low Tuesday and high Wednesday averages for Japanese stock market returns.

The main idea for this study is to answer the question follows: the extent to which day of the week can affect the return firm in the Stock Exchange of Casablanca?

Then, the organization of this paper is as follows. In section 2, we present a literature review concerning the study of the day-of-the-week effect. We provide the empirical evidences in section 3, and final section is our conclusion.

## 2 LITERATURE REVIEW

Osborne (1962) and Cross (1973) discovered empirical evidence demonstrating that Monday yields were lower than Friday ones for the S&P 500 Index. Similar results are presented in French (1980), upon comparing Monday, Friday and weekly average returns for the same index. He observed that Friday returns were greater than the average while Monday returns were lesser than the average. Gibbons and Hess (1981) also came to the conclusion that Mondays resulted in negative returns. Their study was based on a sample of 30 stocks from the Dow Jones Industrial Index. Keim and Stambaugh (1984) tried to explain the weekend effect in the American market as being related to the measurement errors in stock prices.

Gibbons and Hess (1981) examined asset returns for day of the week effects. Their objective is to confirm the results of previous studies, they also funded that the negative return
for Monday is remarkably uniform across individual stocks and that treasury bills earn a below-average return on Monday. Their results supporting day of the week effects in equilibrium returns, suggest the need for further investigation of the determinants of equilibrium over time. In the closing sections of the paper, the impact of the day of the week effects on tests of market efficiency is examined.

To test the day of the week effect and assets returns Gibbons and Hess used a list the sample composed by 30 Americans firms during the period July 2 (1962) – December 28 (1978). Those results expected by these two authors allow concluding that the impact of our results on tests of market efficiency has been considered. Even after adjusting for the market stock returns still exhibit day of the week effects, although the qualitative nature of the effect differs from that in raw returns. Future tests of market efficiency, especially event-type studies, should allow for day of the week effects in both raw returns and market-adjusted returns.

There are also evidences of day of the week effect in stock market returns. The Monday effect was identified as early as the 1920s. Kelly (1930) based on three years data of the US market found Monday to be the worse day to buy stocks. Hirsch (1968) reported negative returns in his study. Cross (1973) found the mean returns of the S&P 500 for the period 1953 and 1970 on Friday was higher than mean return on Monday. Gibbons and Hess (1981) also studied the day of the week effect in US stock returns of S&P 500 and CRSP indices using a sample from 1962 to 1978. Gibbons and Hess reported negative returns on Monday and higher returns on Friday. Smirlock and Starks (1986) reported similar results. Jaffe and Westerfield (1989) studied day of the week effect on four international stock markets: U.K, Japan, Canada and Australia. They found that lowest returns occurred on Monday in the UK and Canada. However, in Japanese and Australian market, they found lowest return occurred on Tuesday. Brooks and Persand (2001) studied the five Southeast Asian stock markets namely Taiwan, South Korea, The Philippines, Malaysia and Thailand. The sample period was from 1989 to 1996. They found that neither South Korea nor the Philippines has significant calendar effects. However, Malaysia and Thailand showed significant positive return on Monday and significant negative return on Tuesday.

Study by Lakonishock and Levi (1982) proposed a partial explanation for the apparently puzzling discovery of different daily returns. They argue that the expected stock returns as measured, for example, from closing to closing prices, should depend on the day of the week. In general, we fund that the expected returns on Mondays should be lower than would be implied simply by a trading time or calendar time model, and the returns on Fridays should be higher. In addition, we anticipate that holidays will have complex effects on stock returns on other days of the week. Our argument is based on the delay between trading and settlements in stocks and in clearing checks. The explanation that we offer for different measured daily returns does not contradict the efficient market hypothesis, as correctly adjusted expected returns should not differ according to the day of the week.

The data employed by Lakonishock and Levi are those for the daily stock market returns for closing-to-closing prices from the Center for Research in Security Prices (CRSP) of the University of Chicago and cover the period from July 1962 to December 1979. These researches presented an argument that the measured daily returns should depend on the day of the week and that adjustment for interest gains on certain days over adjacent business days should be made. Our results suggest that future examinations of the stock market which use data before 1974, even if adjusted data are used, will have residual daily effects.

Solnik and Bousquet (1990) presented evidence on the day-of-the-week effect on a stock market with a particular settlement procedure: the Paris Bourse. A strong and persistent negative return is found on Tuesdays. These tests are conducted using the daily CAC index
from January 1978 to December 1987. The Paris Bourse is open from Monday to Friday and we can calculate 2069 daily returns. The CAC index is calculated by the Paris Bourse and is the most widely used index. It is a market-capitalization weighted index of all the major French companies listed on the forward market.

In this study, Solnik and Bousquet presented evidence of a day-of-the-week effect in daily stock returns on the Paris Bourse. Contrary to the evidence on the American market, its manifestation is a strong and persistent negative mean return on Tuesday. The specific monthly settlement procedure of the Paris market shows up in the data as expected. While it can explain the larger positive return observed on Fridays, this forward settlement procedure cannot explain the negative mean returns observed on Tuesdays.

Aly et al. (2004) investigated daily stock market anomalies in the Egyptian stock market using its major stock index, the Capital Market Authority Index (CMA), to shed some light on the degree of market efficiency in an emerging capital market with a four-day trading week. In Their paper, they used the data consists of daily closing values for the major Egyptian stock market index, the Capital Market Authority Index, from April 26, 1998 to June 6, 2001. The results of their study indicate that Monday returns in the Egyptian stock market are positive and significant on average, but are not significantly different from returns of the rest of the week. In addition, no evidence was uncovered to support any daily seasonal patterns in the Egyptian stock market, indicating that stock market returns are consistent with the weak form of market efficiency. Thus, these results should be interpreted with caution since the Egyptian stock market has only a limited number of stocks that are actively traded.

In the same vein, Balaban and al. (2001) use a GJR–GARCH framework to test daily stock returns for 19 countries and find a significant day-of-the week effect on volatility for 8 countries. Thus, Berument and Kiyamaz (2001) model the day-of-the-week effect in a GARCH specification by allowing the constant term to vary for each day-of-the-week. The authors show that the day-of-the-week effect is present on the SP 500 index in both the volatility and return equations. However, Berument et al. (2007) judge the day-of-the-week effect on foreign exchange rate changes and their volatility with an EGARCH specification. More recently, Alagidede (2008) investigated the day-of-the-week anomaly in Africa’s largest stock markets by looking at both the first and second moments of returns. From a GARCH in mean model, the author incorporates the market risk to test for the presence of daily effects. There is significant daily seasonality for some of African stock markets regarding both mean and variance.

Lee and Hung (2008) examined the day-of-week-effect on the shape of the distribution by using the GARCH (1, 1) model with the heavy-tailed distribution of Politis (2004). The empirical results showed that both returns of Dow Jones and S&P 500 significantly exhibited fat-tailed on Mon, Tues, Thurs and Fri, and this provided important implication on risk management, in particular the calculation of daily VaR. In this study, Dow Jones Industry index and S&P 500 stock index are used as our empirical investigation. The sample period of both stock indices began on January 1997 and ended on December 2005, totally containing 2265 observations. The empirical evidences revealed that the return of Dow Jones and S&P 500 significantly exhibited fat-tailed on Monday, Tuesday, Thursday and Friday, and the result contains important implication on risk management, in particular downside risk measurement of Value-at-Risk.

Singh and Dhananjay (2011) analyzed the effect of different day on the return of Indian Stock Market under the influence of futures contract. Thus, in order to capture the exclusive effect of futures contracts introduction, the data on daily price of CNX-Nifty Index has been taken from June 1999 to June 2001. These two authors concluded that abnormal
behavior is present in the returns of the Indian Stock Market. However, mean return is found maximum on Wednesday in comparison to other trading days. Thus, the difference in mean return within the trading days is statistically significant and the introduction of index futures trading does not influence the behavior of day specific positive return. Finally, they concluded that the finding is fruitful particularly to small investors in relation to their decision regarding the timing of entry and exit from the financial market.

Before the existence of several studies presented by several authors such as: Osborne (1962), Cross (1973), French (1980), Gibbons and Hess (1981), Lakonishok and Levi (1982), Keim and Stambaugh (1984) and Rogalski (1984), Jaffe and Westerfield (1985a), (1985b), Aggarwal and Rivoli (1989), Solnik and Bousquet (1990), Chang et al. (1993), Athanassakos and Robinson (1994), Dubois and Louvet (1996) and Kyimaz and Berument (2001), Balaban et al. (2001), Alagidede (2008) and Singh and Dhananjay (2011). In the next section, we will test empirically the day of the week effect and asset return in the Stock Exchange of Casablanca.

3 EMPIRICAL RESULTS

3.1 Sample selection

In this section, Morocco Exchange Market (MEM) is used as our empirical investigation. In our study, we will test the day of the week effect and asset return for 74 companies listed in the MEM. Thus, the sample period of the MEM began on January 2, 2008 and ended on December 31, 2010, totally containing 23550 observations.

3.2 Presentation of the model

In this study we used the model developed by many researches (Smirlock and Starks, 1986; Aggarwal and Rivoli, 1989; Aggarwal and Tandon, 1994; Berument and Kigmaz, 2001; Caro and al., 2006; Lee and Hung, 2008; Knif and Hogholm, 2009; Charles, 2010; Nik Muhammed and AbdRahman, 2010; Singh and Sahu, 2011) who measured the returns for firms. They are calculated as first differences in natural logarithms according to the following expression:

\[ R_{it} = \text{Ln} \left( \frac{P_{it}}{P_{it-1}} \right) \times 100 \]

Where \( R_{it} \) the return in period \( t \), \( P_{it} \) and \( P_{it-1} \) are the daily closing prices of the Morocco firms \( i \) for periods \( t \) and \( t-1 \) respectively. However, if there is a holiday (\( t \)) during the five days of market opening. In this case, the price of the asset (\( i \)) in this day is a problem of breakdown in the moments. So, we took the price of the asset at the moment (\( t – 1 \)). Well, we took the assumption that no break in the daily observation of return on assets.

Thus, these returns are assumed to be independent and the analysis of the day of the week effect. The analysis on our study is based on the hypothesis that the return produced by each security is not independent of the different days of the week. An initial approximation that could contrast the different days of the week effect can be carried out with a regression model, similar to Miralles and Miralles (2000). Then, they included five dummy variables, one for each day of the week.

\[ R_{it} = \beta_0 + \beta_1 D_{1t} + \beta_2 D_{2t} + \beta_3 D_{3t} + \beta_4 D_{4t} + \beta_5 D_{5t} + \epsilon_t \]

Where

\( R_{it} \) is the daily yield of the assets returns of the Morocco firms.

\( D_{jt} \) are dummy variables which take on the value 1 if the corresponding return for day \( t \) is a Monday, Tuesday, Wednesday, Thursday or Friday, respectively (for Monday \( j=1 \), Tuesday \( j=2 \), Wednesday \( j=3 \), Thursday \( j=4 \) and Friday \( j=5 \)) and 0 otherwise.
\( \beta_j \): are coefficients which represent the average return for each day of the week.

\( \varepsilon_t \): is the error term.

The estimation of this model emphasizes two problems with the approach developed by Miralles and Miralles (2000). First, the residuals from the regression model may be auto-correlated, thus creating errors in inference. The second problem is that the variance of the residuals are not constant, and possibly a function of time. Finally, referring to the approach taken by Ramsey (1969) concerning the test of model specification. A solution of these two problems was to introduce the back with a one-week period in the regression model, as used in Easton and works Fäff (1994), Corredor and Santamaría (1996) and Kyimaz and Beru (2001).

The model to estimate is the one shown below:

\[
R_{it} = \beta_1 D_{1t} + \beta_2 D_{2t} + \beta_3 D_{3t} + \beta_4 D_{4t} + \beta_5 D_{5t} + \sum_{j=1}^{4} \beta_{j+5} R_{i(t-j)} + \varepsilon_t
\]

Where

\( R_{i(t-j)} \): is the daily yield of the assets returns of the Morocco firms successively in (t-1), (t-2), (t-3) and (t-4).

\( \beta_{j+5} \): are coefficients which represent the average return for the daily yield of the Morocco firms successively in (t-1), (t-2), (t-3) and (t-4) which \( j = 1 \ldots 4 \).

The estimate will be made by the method of ordinary least squares. Thus, the estimation results are presented in what follows.

### 3.3 Empirical results

In Table 1, we present a descriptive analysis of variables associated with different Morocco firms obtained using STATA. In fact, in this study, we have considered the closing price of the shares as a dependent variable expressed in terms of dummy variables and according to historical prices observed respectively in the periods (t-1), (t-2), (t-3) and (t-4).

Analysis of Table 1 shows that the minimum value of daily return on assets is (233.136), while its maximum value is (224.1362). Thus, by observing a graph we can see that average yields characterized by some negative peaks. This can be justified by the existence of the international financial crisis during the study period. Notably, this decrease was in 2009 that corresponds to the period of aggravation of the crisis.

We also noted in Graph 2 that the performance of share prices on Moroccan firms is almost constant except at a few companies (7) which exhibit strong fluctuations in returns of stock prices. These fluctuations can be justified through the financial crisis that has a remarkable impact on financial markets.

In addition, the results presented in Table 2 show no correlation coefficient exceeds the tolerance limit (0.7), which does not cause problems during the regression of \( R_{it} \). This table shows that only variables \( D_{4t} \) and \( D_{5t} \) are positively correlated with the dependent variable \( R_{it} \). While the variables \( D_{1t} \), \( D_{2t} \) and \( D_{3t} \) are negatively correlated with \( R_{it} \). However, all dummies are negatively correlated with each other.

After interpreting the results from the table of descriptive statistics and correlation table, we will present the results of the estimation of our model that measures the daily yield firms listed on the stock exchange of Casablanca during the study period.
First, we are dealing with a linear regression to be estimated by the method of ordinary least squares. Thus, following the approach adopted by Fäff (1994), Corredor and Santamaría (1996) and Kyimaz and Beru (2001). The model estimation is presented in table 3. In fact, the probability of Fisher is equal to (0.0001) is less than 5%. So the estimated model is globally significant.

First, it should be noted that the residuals are normally distributed. Then, the coefficient of the variable $R_{it-1}$ is positive (0.0776). Thus, this variable has a significant and positive impact on the value of Student $t$ which is equal to (11.51) at 5%. In this context, the return on assets at time $t$ depends on it at time $(t-1)$. When the $R_{it-1}$ increases by one unit there the variable $R_{it}$ Increment of (0.0776). The return $R_{it-j}$ $(j = 2 \ldots 4)$ did not affect the volatility of stock returns of firms in Morocco.

We noticed that impact dummies variables for the five days of opening of the Casablanca stock exchange. Indeed, only on Wednesday and Friday are statistically significant. The variable $D_{5t}$ has a negative coefficient (-0.2140). It is negatively significant (-2.9) at 5%. While the variable has a coefficient positif $D_{5t}$ (0.1370). This variable is statistically significant and positive (1.86) at the 10%.

These results suggest that returns on share prices of Moroccan firms are significantly positive caused by Friday’s returns. Table 3 shows the abnormal presence of volatility to know market behavior in terms of return on Wednesday and Friday in the Moroccan stock exchange during the study period. This finding is not agreement with Kyimaz and Beru (2001).

In this regard, emphasis is placed on the importance of Friday in the volatility of returns. The average returns from Friday important more than other days of the week. Thus, this result is conform to other results and studies developed by several researchers.

Osborne (1962) and Cross (1973) discovered empirical evidence demonstrating that Monday yields were lower than Friday ones for the S&P 500 Index. Similar results are presented in French (1980), upon comparing Monday, Friday and weekly average returns for the same index. He observed that Friday returns were greater than the average while Monday returns were lesser than the average.

4 CONCLUSION

Several studies of the volatility of share prices were based on the faith that the returns are not influenced by the days of the week. However, we presented in our study the argument that the moderate daily returns should depend in the daytime on the week.

The study of the Moroccan stock market allowed us to conclude that the day return on the assets is positively influenced by Friday; because that this is statistically significant and positive. Whereas, Wednesday has a negative impact on the return on assets of firms listed in the stock exchange of Casablanca. This result confirms this one advanced by some authors (Osborne, 1962; Cross, 1973) but it is contradicted by the others (Kyimaz and Beru, 2001). So, we demonstrated that the daily return on assets depends positively on the one who preceded.

Then, we demonstrated that the financial crisis started in 2007 has an impact on the return on the assets of the Moroccan firms listed in the stock exchange of Casablanca. In other words the volatility at the level of the returns can be justified by means of the financial crisis and by the opening of the Moroccan stock market towards the foreigner.
REFERENCES

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**Appendix**

**Table 1: Descriptive statistics**

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<th>Stats</th>
<th>Rit</th>
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<th>D2</th>
<th>D3</th>
<th>D4</th>
<th>D5</th>
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**Table 2: Matrices of correlation**

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<th>Rit</th>
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**Table 3: Estimation of Rit**

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Value significant in a threshold of: (*) 1%; (**) 5% and (***) 10%.

\[ F(9, 23421) = 16.57 \]
\[ \text{Prob } F = 0.0001 \]
Graph 1: The average of the return on the share of the Moroccan firms

Graph 2: The distribution of the share prices of the Moroccan firms
ARE CONFIDENT CUSTOMERS RELATIONSHIP LOYAL TO RETAILER?

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Abstract
The passage from transactional marketing to relationship marketing drew the attention of researchers and practitioners on the importance to build and to maintain a long term relation with customers, based on trust, to develop a retailer’s relationship loyalty. This urged us to ask an inevitable question: is the relation between trust and retailer’s relationship loyalty systematic? On the basis of a questionnaire administered to 295 customers of a retailer specialized in the sale of cosmetics, this paper proposes a typology of the confident customers according to their retailer’s relationship loyalty. By using the cluster analysis method, two groups of customers presenting different levels of relationship loyalty or disloyalty have been identified.

Keywords: relationship loyalty, trust, commitment, responses to dissatisfaction and counter persuasion, retailer, typology

I- INTRODUCTION

Previously, to face competition, retailers resorted to a defensive strategy which was translated by the institution of switching costs and by the implementation of a successful complaint management service (Fornell and Wernelfelt, 1987, 1988). Nowadays, retailers opt for the development of customers’ relationship loyalty, which consists in convincing durably the consumers (Richard, 1998).

Customer relationship loyalty represents a means of differentiation between retailers. Furthermore, the trust turned out to be an antecedent of retailer relationship loyalty (N’Goala, 2000, Zhioua, 2010). However, a previous qualitative study allowed us to notice that the confident customers are not all relationship loyal to the retailer (Zhioua, 2009).

In our knowledge, this research is a first attempt to classify the confident customers by their retailers’ relationship loyalty and to state the main reasons of relationship disloyalty of some confident customers.

First, it has for interest to bring elements of answer to the questionings of the managers, worried about maintaining a sustainable relation with their customers and increasing their retailer long term loyalty. Then, it has for interest to identify the profile of the confident relationship
disloyal customers to retailer; which would allow the managers to direct their actions to these customers.

So, the objective of this paper is to propose a typology of the confident customers according to their relationship loyalty to retailer and to characterize the groups by relational, socio-demographic and commercial variables. This paper is divided into three parts. First, the theoretical framework of loyalty and trust will be presented as well as a research proposition. Then, we will set out an empirical study and the results of its analysis. Finally, the results will be discussed, contributions will be presented as well as limits of research.

II- THEORETICAL FRAMEWORK

II-1- The concept of loyalty

Literature on the concept of loyalty goes back to more than fifty years (Brown, 1952; Cunningham, 1961). Presented by Brown (1956) as a sequence of purchases, the loyalty underwent an evolution before it could be defined as the strength of the relationship between commitment and repetitive buying behavior (Davis-Stramek and al, 2007). For a long time, loyalty was considered as a repetitive buying behavior. Within the framework of this behavioral approach, loyalty is based on the observation of real or declared behavior (Brown, 1952; Cunningham, 1961; Guadagni and Little, 1971; Ehrenberg and Goodhart, 2000) or on the analysis of the previous behavior to plan the future behavior (Aaker and Jones, 1971; Uncles and Ehrenberg, 1988, 1990). Several critics are addressed to this approach. Indeed, this last rests on the description of real behavior of the customers without explaining it (Odin and al, 2000). Furthermore, brand loyalty cannot be reduced to a simple measure of repetitive buying (Day, 1969; Jacoby, 1971; Jacoby and Keyner, 1973). So, the favorable attitude was considered as one of the conditions for the existence of the « real loyalty » (Day, 1969). The attitude was integrated into the study of loyalty as being a set of predispositions built from previous purchases engendering a loyalty behavior (Jacoby, 1971; Fishbein and Azjen, 1975). Later, a mixed approach of loyalty, putting in relation the repetitive buying and the attitude was formulated (Day, 1969; Jacoby and Keyner, 1973; Dick and Basu, 1994; Simon, 2000; East and al, 2005; Bandyopadhyay and Martell, 2007; Russel-Bennett and al, 2007). Critics of this approach were shown. Indeed, the concept of loyalty cannot be reduced to a combination between the attitude and the behavior. It misses in the brand attitude solidity, robustness and stability that allow to regularity of the behavior in the long term.

II-2- Customer relationship loyalty to retailer

By joining a relational approach, Plank and Newel (2007) defined the customer relationship loyalty as a «customer perception of his intention to remain committed to the supplier». From this perspective, Davis-Stramek and al (2007) consider loyalty as the strength of the relationship between commitment and repetitive buying behavior. Indeed, commitment represents the affective dimension of loyalty (Mahoney and al, 2000) whereas repetitive buying behavior reflects its conative dimension. Beyond these definitions, N’Goala (2000, 2003) proposed a conceptualization of the retailer’s relationship loyalty, which takes into account both customer commitment (the long term relation with retailer) and responses to dissatisfaction and counter persuasion (the punctual transaction). Thus, we hold the definition of N’Goala (2003), according to which customer loyalty to retailer is «the expression of continuous and long term
affective relationship established between a consumer and a brand, advocated generally by the relational literature through the notion of commitment, but it shows itself concretely during situations of purchase and consumption».

II- 2-1- Affective commitment

Affective commitment finds its origins in the social psychology (Festinger, 1957; Kiesler, 1971). This concept was also studied in the organizational context (Buchanan, 1974; O'Reilly and Chatman, 1986; Allen and Meyer, 1990). It was defined by Buchanan (1974) as «an emotional attachment in the purposes and in the values of the organization, in the role which arises from it and to the organization for itself except the purely instrumental considerations». Besides, it was applied to the domain of marketing and more particularly to the domain of relationship marketing (Morgan and Hunt, 1994; Kumar and al, 1995; Gundlach and al, 1995; Amine, 1998, 1999). In this context, Amine (1998) considers affective commitment as the will of an individual to maintain its relation with an object, on the basis of its emotional attachment to and identification with this one. On one side, affective commitment is considered as a brand emotional or psychological attachment (Beatty and al, 1988; Lacoeuille, 1997 and 1999), a feeling of affection for the brand (Aaker, on 1998) or the strength of the emotional attachment and favorable feelings of the customer (Lasser and al, 1995; Davis-Stramek and al, 2007). On the other hand, affective commitment is translated by the brand identification. So, customers develop an affective commitment to the organization which they feel that they belong to (Achrol, 1997). The brand identification is grounded on the congruence and the association between brand personality and an individual’s personality. Some researches support a positive relation between the process of identification and the concept of brand attachment. Indeed, according to the theory of congruence, the consumer becomes attached to the brand among which we might mention the personality, the values and the image that are in adequacy with the concept of the self.

II- 2-2- consumer responses to dissatisfaction and counter persuasion

The consumer responses to dissatisfaction and to counter persuasion represent the indicators of the intensity of his loyalty. So, loyalty is stronger if the consumer maintains with constancy a favorable behavior to the retailer in spite of the appearance of reasons for switching (N'Goala, 2003). The researches of consumer responses to dissatisfaction find their origin in the study of Hirschman (1970), which proposes three responses: exit, voice and loyalty. In the same sense, other typologies according to the type of response were proposed (Day, 1980; Ross and Hulin, 1985; Ping, 1993; Shouted and Ladwein, 1998; N' Goala, 2000, 2003). A second approach of classification of responses to dissatisfaction relates to individual attributes. In this direction, classifications are based on a typology of individuals (Masson and Himes, 1973; Plaff and Blivice, 1977; Shuptrine and Wenglorz, 1980; Bearden and Teel, 1983; Singh, 1990). Against the consumer responses to dissatisfaction, the consumer responses to a competitor offer are not subject in depth studies (N'Goala, 2003). Hirschman (1970) considers that there are two types of responses to counter persuasion: exit and loyalty. However, N'Goala (2003) introduced the notions of opportunism and integrative negotiation. By referring to the typology of N'Goala (2000, 2003), the consumer responses to the situations of dissatisfaction and counter persuasion are examined in terms of six elements: tolerance to dissatisfaction, negative word of mouth,
complaint, opportunist behavior, switching and integrative negotiation. However, the concept of integrative negotiation was substituted by that of the participation in the definition of products and services of Bettencourt (1997).

II-3-The concept of trust

Trust has already been studied by a number of researchers including social psychologists (Deutsh, 1958; Lewicki and Bunker, 1995), sociologists (Lewis and Weigert, 1985; Granovetter, 1985; Zacker, 1986) and economists (Dasgupta, 1988; Kreps, 1990; Williamson, 1993). Then, it was applied in the theory of organizations and in the field of marketing.

Trust was studied by several researchers in marketing. Some authors distinguish between trust as an accumulated capital, as risk and as belief (Mendez, 2000; Gatfaoui, 2003). However, for other researchers, trust is likened to a psychological concept (Morgan and Hunt, 1994; Ganesan, 1994; Kumar and al, 1995; Geyskens and al, 1996; Gurviez and Korchia, 2002; Johnson and Grayson, 2005), a behavioral concept (Moorman and al 1992; Andaleeb, 1995; Mayer and al 1995; Curral and Judge, 1995; Smith and Barclay, 1997; Chaudhuri and Holbrook, 2001) or both psychological and behavioral concept (Smith and Barclay, 1998; Usunier, 1998; Dumond, 1998).

Within the framework of this study, trust is apprehended as a psychological concept that refers to the belief of the partner. It includes cognitive and affective processes (Rempel and al, 1985; Moorman and al, 1992; Johnson and Grayson, 2005). Trust represents the customer’s willingness to count on the competence and the reliability of a partner (Moorman and al, 1992). Besides, it reflects feelings of security and the strength gained from the relation (Johnson and Grayson, 2005). However, the issue of decomposition of trust was not settled. We refer to the bi-dimensional conceptualization of Ganesan (1994), who decomposed the concept into two elements: credibility and benevolence. The originality of its works is in the fact that he studied the relationship and the antecedents of trust through the eyes of the buyer rather than those of the salesman. Credibility includes the attribution of competence and honesty and represents the capacity and the willingness to keep promises. On the contrary, benevolence corresponds to the good intentions of the partner, to its received determination to pay attention to the needs of others (Ganesan, 1994; Kumar and al, 1995).

Literature in the matter did not inform us about a categorization «trust- relationship loyalty». The theories did not cater from the problem of the classification of the confident customers according to their relationship loyalty to retailer. Thus we were brought to undertake an exploratory qualitative study with a group of customers, which allowed us to suppose that confident customers are affectively committed to retailers. However, they do not still present favorable responses to a punctual dissatisfaction or to counter persuasion, particularly when it is about a promotion made by a competitor (Zhioua, 2009), therefore we put the following proposition:

P: The confident customers are not all relationship loyal to retailer.

III- METHODOLOGY

III- 1- Methodological choices

Our survey is conducted with customers of a retailer specialized in the sale of cosmetics in self service in Tunisia. This investigation has taken place in April, May and June 2007. The chosen sector considers the intensification of competition. Furthermore, it is a convenient sector
for critical incidents (the defective products, the service problems, the shortage of stock, the incompetence in counseling and the promotions of the competitors). The questionnaire was administered to a sample of 330 individuals. We tried to respect the rule of Hair and al (1998) according to which « the number of items was multiplied by 10 ». Only 295 questionnaires were exploited. The method sampling is that of convenience. This method consists in interviewing the customers at the exit of the store. We asked them a question to assure that they are effectively retailer’s customers.

The objective of this study is, at first, to verify the reliability and the validity of the scales measure of various constructs. In this regard, the structural equations method is thus adopted. Then, it is a question of verifying the research proposition. Two segmentations of the sample were realized. The first one is conceived to separate the confident customers from the non confident. The second, which takes place at the level of the segment of confident customers, allows us to verify if they are systematically retailer’s relationship disloyal. To realize our typology, a hierarchical cluster analysis was used given that the non hierarchical methods handle important population in term of staff. Furthermore, the discriminant analysis was adopted to bring out the variables which discriminate most between groups.

III- 2- The measurement scales

Given that the measurements of the variables used in this research work are developed in other contexts, a qualitative study allowed us to adapt these scales and to bring out new items (Zhioua, 2009).

The reserved trust scale of measurement is based on the scales of the social psychology of Larzelere and Houston (1980) and Rempel and al (1985), on the scale of Gurviez and Korchia (2002) within the framework of the relationship between consumer and brand. The scale established to measure the affective commitment was inspired by the organizational literature and particularly the scales of O'Reilly and Chatman (1986) and Allen and Meyer (1990). Two dimensions were reserved: identification and loyalty. The scale of Allen and Meyer (1990) was adopted to measure the continuance and normative commitment. As for the measure of the complaint, we referred to the scales of Ping (1993) and Zeithaml (1996). The scale established to measure negative word of mouth is based on the scale of N'Goala (2000), which is inspired by the scale of positive word of mouth of Zeithaml and al (1996). The scale of measurement of the participation in the definition of products and services represents a compressed version of that of Bettencourt (1997). For the operationalisation of the sacrifice and the opportunism, we opted for the scales of Ping (1993) and N'Goala (2003). The scale of Ping (1993) was retained to measure the switching behavior.

IV- RESULTS AND DISCUSSION

IV- 1- Purification and validation of scales of measurement

A principal component analysis with varimax rotation was realized for each of the scales. Items with low factorial contributions (values lower than 0.6) and those whose factorial contributions were shared between several factorial axes are eliminated. The results indicate that trust is a bi-dimensional concept: it includes credibility and benevolence. Commitment is tri-dimensional: it integrates affective, continuance and normative commitment whereas the
consumer responses to situations of purchase and consumption are six: sacrifice, complaint, negative word of mouth, opportunism, switching and participation in the definition of products and services. For each of the dimensions, internal consistency was calculated using Cronbach’s alpha, which allows us to eliminate the items which damage the reliability of the measurement scales. Ten items were thus eliminated. The values of the Cronbach’s alpha range between 0.85 and 0.94, which is acceptable to Nunnally (1978). Then, a confirmatory factor analysis was realized, under Amos 4.0, to test the reliability and the convergent and discriminant validity of the constructs (Appendix, table1). The approach of Fornell and Larker (1981) was adopted. The test of reliability by the ρ of Jöreskog confirms the Cronbach’s alpha results. Indeed, the coefficient ρ of Jöreskog is superior to 0.8 for all the scales. Furthermore, the values of this coefficient exceed for the majority of the cases the threshold of 0.9. Convergent validity is considered excellent given that the values of convergent validity are superior to 0.5 (Fornell and Larker, 1981) (0.592 < 0.826). The discriminant validity is also verified. Indeed, the values of ρ of convergent validity are greater than the square of the correlations shared with the other concepts except for the scale of the affective commitment. So, the squares of the correlations of the affective commitment with the other latent variables are less than the index of affective commitment with the exception of that of the affective commitment with the normative commitment, which remains higher than $\rho_{vc}$ ($\rho_{vc} = 0.652 < r^2 = 0.74$). This result confirms that of Bansal and al (2004), according to which the normative commitment is strongly correlated to the affective commitment.

IV- 2- Verification of the research proposition

IV- 2-1- typology of customers according to their retailer’s trust

To build this typology, we opted for the hierarchical cluster analysis. The retained criteria of segmentation send back only to the facets of trust: credibility and benevolence. The dendogram using ward method visualizes two groups of customers. To assure us that there is a significant difference between both groups, the discriminant analysis was applied. Two indicators were used: the Lambda of Wilks and the test of Fisher (Appendix, table 2). Then, we tried to present the individuals’ characteristics of each of the classes from the averages of variables (see table 1).

-Group 1: the confident:

This group presents the strongest average levels of credibility and benevolence (respectively 4.13 and 4.09). The customers of this group think that the retailer possesses the necessary skills to meet the customers’ expectations. Furthermore, they believe that it keeps its promises and takes into account customers’ interests in the same way as its interests. The individuals of this group are qualified as «confident customers». They present 87 % of the interviewed individuals.

-Group 2: the non confident:

Group 2 has the lowest averages for credibility (2.15) and benevolence (2.36). These averages are widely lower than the average inter-groups. The customers of this group do not rely
on the retailer. They do not believe in the retailer’s competence. Besides, they do not think that the retailer is opportunist and that it does not possess the qualities of honesty and equity. We thus call them « non confident». They represent only 13% of the interviewed individuals.

Table 1: Comparison of the averages of trust according to the class of affectation

<table>
<thead>
<tr>
<th>Class of affectation</th>
<th>Credibility</th>
<th>Benevolence</th>
</tr>
</thead>
<tbody>
<tr>
<td>The confidents (87%)</td>
<td>1</td>
<td>4.13</td>
</tr>
<tr>
<td>The non confidents (13%)</td>
<td>2</td>
<td>2.15</td>
</tr>
<tr>
<td>Total</td>
<td>3.88</td>
<td>3.9</td>
</tr>
</tbody>
</table>

IV- 2- 2- Segmentation of confident customers according to their retailer’s relationship loyalty

The check of the proposition P, according to which the confident customers are not all relationship loyal to retailer, passes by the segmentation of the group of the confident customers to retailer. This group being identified, the segmentation is made according to the criteria of retailer’s relationship loyalty. The classification of confident customers is thus made according to the following variables: affective commitment, sacrifice, complaint, negative word of mouth, switching, opportunism and participation in the definition of products and services.

The hierarchical cluster analysis results show two well-balanced groups. The values of Wilks’s lambda as well as the test of Fisher (F) demonstrate that participation in the definition of products and services and switching intervene strongly in the construction of the classes whereas complaint and opportunism participate averagely in the construction of the groups. Finally, sacrifice and affective commitment intervene only weakly in the formation of the classes. The observed variables having participated in a significant way to form both groups are presented in appendix, table 3. The calculation of the averages of variables for every group allows us to bring out the individuals’ specificities which constitute every class (see table 2).

- Group 1: the relationship loyal customers

The first group is characterized by the highest averages for variables of affective commitment, complaint, sacrifice and participation in the definition of products and services. In a situation of punctual dissatisfaction, the customers privilege the complaint with the staff. In case of counter persuasion, the confident customers to the retailer do not resort to the opportunism. Furthermore, they do not change a retailer but they make suggestions to improve its offer.

- Group 2: the relationship disloyal customers:

The second group includes individuals affectively committed to the retailer. However, they show unfavorable inclinations to behave further to dissatisfaction and counter persuasion.
Indeed, further to dissatisfaction, they complaint with the staff and emit negative word of mouth. Furthermore, further to a competition attractive offer, they behave in an opportunist way. However, they do not change definitively the retailer. This class differs from the other one by high levels of opportunism, switching and negative word of mouth.

Table 2: Comparison of the averages of commitment and consumer’s responses further to critical situations according to the class affectation

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affective commitment</td>
<td>4.08</td>
<td>3.91</td>
<td>4</td>
</tr>
<tr>
<td>Sacrifice</td>
<td>2.6</td>
<td>2.2</td>
<td>2.42</td>
</tr>
<tr>
<td>Complaint</td>
<td>4.04</td>
<td>3.29</td>
<td>3.71</td>
</tr>
<tr>
<td>Negative word of mouth</td>
<td>2.69</td>
<td>3.08</td>
<td>2.86</td>
</tr>
<tr>
<td>Opportunism</td>
<td>2.93</td>
<td>4.61</td>
<td>4.23</td>
</tr>
<tr>
<td>Switching</td>
<td>1.5</td>
<td>2.71</td>
<td>2.04</td>
</tr>
<tr>
<td>Participation in the definition of products and services</td>
<td>3.95</td>
<td>1.85</td>
<td>3.01</td>
</tr>
</tbody>
</table>

The second part of analysis consists in characterizing the classes by means of socio-demographic and commercial variables. To test the significance and the weight of these variables in the construction of the groups, we opted for the analysis of variance (ANOVA) (Appendix, table 4). The cross tabulation as well as the calculation of the averages of these variables for each of the groups were used to deepen the description of the groups. The results show that socio-demographic variables (gender, age, social status, profession) do not intervene in a significant way in the constitution of the groups. However, the retailer’s nature as well as the number of frequented retailers have a big weight in the classes’ formation. Furthermore, the percentage of purchases with a retailer and the relationship stage participate averagely in the contribution of the classes. However, the choice reasons of the retailer contribute weakly to the formation of the groups.

The relationship loyal customers do 100 % of their purchases with a single retailer (87.4 % against 9 % in the other group). These customers have good relations with their principal retailer. Indeed, 79 % chose the retailer "Fatales", given that they maintain good relations with the staff in contact. Contrary to the previous group, the majority of the relationship disloyal customers to retailer purchase cosmetics with two retailers (70.4 % against only 11.9 % in the group of the relationship loyal customers). Furthermore, 74.8 % of these customers do 80 % of their purchases with their principal retailer and the remaining 20 % with their secondary retailer while 23.5 % share their purchases in an equalitarian way between their principal and secondary retailer. In this group, less than half of the customers chose the retailer, given its geographical nearness of the dwelling or the place of work. Indeed, the relation built with the staff constitutes a little important factor in the retailer’s choice (14.8%).

According to the results of the hierarchical cluster analysis, the retailer’s confident customers are not all relationship loyal to retailer. Our research proposition is thus validated.
V- CONCLUSION

This research allowed us to show that the confident customers are not all retailer’s relationship loyal. Indeed, the relationship disloyalty of the confident customers is not due to their degree of commitment but to their level of responses to dissatisfaction and counter persuasion. This study turns out interesting for the marketing persons in charge of a retailer, given that it allows showing them the importance of the situation and its role in the explanation of the consumer’s behavior. Besides, it allows drawing their attention on the opportunity to build and maintain a long term relationship with their customers, based on trust and commitment to develop their relationship loyalty.

This work allowed identifying the profile of the relationship loyal and disloyal confident customers to retailer. This would allow the managers to undertake the necessary actions toward these two types of customers. On one side, the relationship loyal customers rarely tolerate the dissatisfaction silently but resort most often to the complaint. Besides, they resist to a counter persuasion while trying to participate to define retailer’s products and services. The relationship loyalty of these customers is thus based on the communication between the customer and the retailer, which is based on information exchange between the partners. Within the framework of this relationship, the critical situations met by these customers, if they were amiably resolved, could be an opportunity to improve the customer-retailer relationship. On the other hand, the relationship disloyal customers are committed to the retailer. However, their opportunism prevents them from remaining loyal to a single retailer and incites them to diversify their purchases with several retailers when the occasion appears.

The results reveal a number of theoretical and methodological limitations. Concerning the theoretical limits, it seems that the typology of responses to dissatisfaction and counter persuasion deserves to be deepened. Indeed, the concept of participation in the definition of retailer’s products and services should find a more precise definition. Furthermore, the relations between the consumer’s responses further to dissatisfaction and counter persuasion were not envisaged. As for the methodological limits, it is worth mentioning that the empirical study took place in a single sector and with customers' sample of only one retailer. It would be interesting to transfer this study to other retailers and to different products. Then, the measurement scales built for the various concepts were not elaborated for this study. They were adapted to see, even transposed into other business sectors. This choice can upset the internal consistency of the scales for a new ground.

REFERENCES


Appendix
Table 1: Results of confirmatory factor analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>ρ of Jöreskog (ρ)</th>
<th>ρ of the convergent validity (ρcv)</th>
<th>discriminant validity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credibility</td>
<td>0.919</td>
<td>0.738</td>
<td>0.72</td>
</tr>
<tr>
<td>benevolence</td>
<td>0.836</td>
<td>0.631</td>
<td>0.56</td>
</tr>
<tr>
<td>affective commitment</td>
<td>0.903</td>
<td>0.652</td>
<td>0.74</td>
</tr>
<tr>
<td>continuance commitment</td>
<td>0.912</td>
<td>0.775</td>
<td>0.6</td>
</tr>
<tr>
<td>normative commitment</td>
<td>0.896</td>
<td>0.741</td>
<td>0.07</td>
</tr>
<tr>
<td>Complaint</td>
<td>0.813</td>
<td>0.592</td>
<td>0.23</td>
</tr>
<tr>
<td>sacrifice</td>
<td>0.918</td>
<td>0.789</td>
<td>0.05</td>
</tr>
<tr>
<td>negative word of mouth</td>
<td>0.901</td>
<td>0.819</td>
<td>0.11</td>
</tr>
<tr>
<td>Switching</td>
<td>0.924</td>
<td>0.802</td>
<td>0.23</td>
</tr>
<tr>
<td>participation in the definition of products and services</td>
<td>0.929</td>
<td>0.812</td>
<td>0.23</td>
</tr>
<tr>
<td>opportunism</td>
<td>0.905</td>
<td>0.826</td>
<td>0.07</td>
</tr>
</tbody>
</table>

Table 2: Wilks’s λ and Value of F test

<table>
<thead>
<tr>
<th>Observed variables</th>
<th>Wilks’s λ</th>
<th>F</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credibility 1</td>
<td>0.501</td>
<td>291.424</td>
<td>0.000</td>
</tr>
<tr>
<td>Credibility 2</td>
<td>0.475</td>
<td>323.554</td>
<td>0.000</td>
</tr>
<tr>
<td>Credibility 4</td>
<td>0.449</td>
<td>359.251</td>
<td>0.000</td>
</tr>
<tr>
<td>Credibility 5</td>
<td>0.471</td>
<td>329.325</td>
<td>0.000</td>
</tr>
<tr>
<td>Benevolence 1</td>
<td>0.616</td>
<td>182.893</td>
<td>0.000</td>
</tr>
<tr>
<td>Benevolence 2</td>
<td>0.582</td>
<td>210.457</td>
<td>0.000</td>
</tr>
<tr>
<td>Benevolence 3</td>
<td>0.537</td>
<td>252.342</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Table 3: Wilks’s $\lambda$ and Value of F test

<table>
<thead>
<tr>
<th>Observed variables</th>
<th>Wilks’s $\lambda$</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>participation 2</td>
<td>0.408</td>
<td>371.473</td>
<td>0.000</td>
</tr>
<tr>
<td>participation 4</td>
<td>0.438</td>
<td>329.111</td>
<td>0.000</td>
</tr>
<tr>
<td>participation 1</td>
<td>0.455</td>
<td>306.369</td>
<td>0.000</td>
</tr>
<tr>
<td>switching 4</td>
<td>0.675</td>
<td>123.03</td>
<td>0.000</td>
</tr>
<tr>
<td>switching 3</td>
<td>0.718</td>
<td>100.543</td>
<td>0.000</td>
</tr>
<tr>
<td>switching 2</td>
<td>0.729</td>
<td>95.007</td>
<td>0.000</td>
</tr>
<tr>
<td>complaint 4</td>
<td>0.795</td>
<td>66.143</td>
<td>0.000</td>
</tr>
<tr>
<td>complaint 3</td>
<td>0.824</td>
<td>54.645</td>
<td>0.000</td>
</tr>
<tr>
<td>complaint 2</td>
<td>0.864</td>
<td>40.212</td>
<td>0.000</td>
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<tr>
<td>opportunism 3</td>
<td>0.903</td>
<td>27.555</td>
<td>0.000</td>
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<tr>
<td>negative word of mouth 1</td>
<td>0.951</td>
<td>13,321</td>
<td>0.000</td>
</tr>
<tr>
<td>sacrifice 2</td>
<td>0.976</td>
<td>6.248</td>
<td>0.013</td>
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<td>sacrifice 4</td>
<td>0.981</td>
<td>5.038</td>
<td>0.026</td>
</tr>
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<td>sacrifice 1</td>
<td>0.985</td>
<td>3.954</td>
<td>0.048</td>
</tr>
<tr>
<td>loyalty 2</td>
<td>0.975</td>
<td>6.508</td>
<td>0.011</td>
</tr>
<tr>
<td>identification 2</td>
<td>0.976</td>
<td>6.178</td>
<td>0.014</td>
</tr>
<tr>
<td>identification 1</td>
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<td>4.033</td>
<td>0.0460</td>
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</table>

Table 4: ANOVA

<table>
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<th>Variables</th>
<th>Gender</th>
<th>Age</th>
<th>Social status</th>
<th>Retailer’s nature</th>
<th>Profession</th>
<th>Number of frequented retailers</th>
<th>Pourcentage of purchases</th>
<th>Choice reasons</th>
<th>Relationship stage</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>0.168</td>
<td>0.754</td>
<td>0.287</td>
<td>491.32</td>
<td>0.055</td>
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<td>393.855</td>
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<td>277.393</td>
</tr>
<tr>
<td>Sig</td>
<td>0.682</td>
<td>0.386</td>
<td>0.593</td>
<td>0.000</td>
<td>0.815</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
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</tbody>
</table>
MANAGERIAL OWNERSHIP AND PERFORMANCE: A SIMULTANEOUS-EQUATION MODEL

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Abstract:  
The literature dealing with the corporate governance gives too much importance to the managerial property. Since the agency costs are due to the conflicts between the agents and the stockholders, these costs are lowest when the managerial property is high. The empirical studies showed important facts inasmuch as it turned important to us to study this relationship for the small-sized French firms. Further, the stake the managers hold is influenced by the profitability of the firm they manage. Using a two-equation model and a sample made up of 36 small-sized French firms, we study the relationship between the managerial property and the performance.

Keywords: corporate governance, performance, endogeneity
1 INTRODUCTION

The current paper is in line with the papers dealing with the corporate governance of firms with medium and small size, which are quoted in EuroliSt B of the Parisian market since the end of the 1990s. Our primary goal is the study of the relationship between performance and the managerial ownership. The literature focusing on this question is very rich (Huimin and Mak, 2002, Charreaux, 1997). The findings seem to be very heterogeneous. We do believe that the analysis of these relations using a sample of newly quoted firms, basically before the Dot Com Bubble. The sample seems to be very useful for several reasons. First, the equity of these firms is very concentrated and in most of cases the CEO and the General Manager are the same person. Second, once the firms are listed, the stakes of the majority shareholder fall. As Fama and Jensen (1983) argue, there is a shift from a closed to an open firm. In order to limit a quick fall of their stake, there are rules that guarantee some commitments that allow them to reserve their stakes. In order to a quick reduction in their stakes, the legislation requires commitments such that these stakes remain unchanged 12 months after being newly quoted. Third, it was documented that there is a decrease in the performance during the period after the IPO (Ducharme et al., 2001).

There is an interesting dynamic link between ownership and performance that we analyzed using several statistical tools such as the OLS and the instrumental variables methods. The idea is that the managerial ownership does not impact the performance, which raises the question of its endogeneity with respect to performance. The next section will focus on the main approaches studying the link between the managerial ownership and the performance. It also will expound the model that will be fitted. The empirical methodology will be explained in Section 3. Section 4 will present the sample and the estimation results. Finally, we conclude by including some future research questions.

2. PROFITABILITY AND MANAGERS’ OWNERSHIP

The ownership of managers is one of the key devices of governance (De Miguel, Pindado and De La Torre, 2005). The literature studied mainly the question of the ownership influence on performance. Four main approaches are identified and could be expressed using the following monikers: convergence, neutrality, entrenchment, and non-linearity. Recently, the impact of the profitability on the managerial ownership was largely tackled.

The dissociation of ownership and management – that is brought forth by the fact that the manager is no longer the only owner of the firm – leads to the emergence of incentive problems that must be taken into account such that the managers runs the firm’s activity in the interests of stakeholders. The ownership is at the center of incentives. The idea is as follows: as long as the manager has a higher stake in the firm’s equity he has the incentive to maximize the firm’s market value. There exists a positive relationship between the performance and the ownership. This will let the objectives of the managers and the stockholders closer. In their landmark paper, Jensen and Meckling (1976) study the case when the sole owner of the firm (and at the same time the manager) sells a fraction of the firm’s equity. They show that in this case the managing stockholder is not the only who will bear the agency costs. A high managerial ownership will lead to lower agency costs. If one takes for granted that the agency costs have a negative impact on performance, then there will be supposedly a relationship between the managerial ownership and the performance. Several studies showed the same result. For instance, using a sample of 356
small- and medium-sized German firms, Mueller and Spitz-Oener (2006) show that there is a positive impact of managerial property on performance.

The study of the relationship between the managerial ownership and the performance was studied since the seminal paper of Jensen and Meckling (1976) in terms of the statistical methods and the used samples. De Miguel et al (2005) argue that this relationship must be analyzed by taking into account the corporate governance devices. They found some drivers: the legal protection of investors, the degree of equity concentration, the financial market development, and the structure of the board of directors. For instance, in Japan and Germany a high fraction of the equity is owned by the bankers. By contrast, in Italy and France, individual investors, firms and foundations (Rose, 2005) own a high fraction of the listed firms’ equities.

In these countries, the hidden conflicts of interests may occur between minor and major stockholders rather than between managers and stockholders. The legal rules may be considered as less protecting towards the minor stockholders in Europe (La Porta et al, 2000), which “increases the expropriation risk in the countries where the legislation does not have sufficient protection” (Zaabar, 2005, p. 39). The managerial ownership is only one of the key elements of corporate governance and it can also lead to increasing the agency costs in certain situations. The central question is about the asymmetrical distribution of information existing between the managers and the stockholders.

The contributions of Demsetz (1983) and Demsetz et Lehn (1985) had an important impact on the understanding of the relation between the ownership structure and the performance. In their 1985 paper, Demsetz and Lehn study the drivers of the ownership structure. They determine some drivers such as the firm’s size, the influence of the intensity of control and the influence of the rules to which the firm is constrained to respect. A high size is symptomatic of a lower concentration. One should notice the non-pecuniary benefits the managers could gain from their management. The authors are interested in the impact of the profitability upon the ownership. Their model shows that this impact is not proved. In this manner, the finance literature hence accepts the neutrality of the ownership structure, and hence the managerial ownership, with respect to the profitability.

In the aforementioned paper of Demsetz and Lehn, the authors give three examples of firms for which the market values rapidly increased after the death of the main managing stockholder. In the three cases, the main stockholders were implementing poorly-performing strategies. The combination of the ownership and the control is not a sufficient condition of the performance if the devices to protect the stockholders are not sufficient (Shleifer and Vishny, 1997). In fact the question is: “The interesting problem is to determine when separation of decision management, decision control, and residual risk bearing is more efficient than combining these three functions in the same agents” (Demsetz et Lehn, 1985, p. 1161). The entrenchment approach argues that a high managerial ownership does not necessarily lead to a better profitability. Using a dataset from the USA, Denis and Sarin (1997) test this hypothesis. They show that a high level of managers’ participation protects them from the control devices, which is therefore in favour of their entrenchment.

But what are the arguments supporting such an approach? The main argument is that a large ownership allows the managers to have remuneration conditions that allow them to lower their incentive to value optimally the firm’s capital. From this perspective, a manager having a low ownership may be more efficient if the incentive tools are sufficiently binding.
The study of a non-linear relation between the ownership and the performance was marked by many developments. Several authors documented that the combination of the alignment and entrenchment effects may create a non-linear relation between holding the shares by the managers and the firm’s performance. The contribution of Morck, Shleifer, and Vishny (1988) is closely related to the latter perspective. In their study, the authors document that: (i) there is no linear relationship between the managerial ownership and the performance; (ii) there is a positive, non-linear relationship for the ownership between 0 and 5%; (iii) there is a negative, non-linear relationship for the ownership between 5 and 25%, and (iv) there is a positive, non-linear relationship for any ownership greater than 25%. McConnell and Servaes (1990) use Tobin’s Q and show the same non-linear relation.

Some studies concluded that the ownership structure is neutral. Demsetz and Villalonga (2002) stand for the neutrality approach by arguing that the ownership structure depends on the stockholders’ objectives. Cheung and Wei (2006) study the same problem and document that there is no relationship existing between the performance and the ownership structure. Further, they show the ownership structures are stable over time. Pintado and De la Torre (2004) use panel data and show the same result of neutrality.

Pintado and De la Torre (2005) tackle the relationship between the ownership structure and the performance by taking into account the characteristics of the corporate governance devices of the country. They document that for the USA, Japan and Germany the relationship is positive, whilst it is non-linear for the UK and Spain. They argue that a legal system that is less protecting vis-à-vis the minor stockholders may renders the relationship between the managerial ownership and the profitability non-positive.

Cho (1998) study the relations between the ownership structure, the investment and the value of the firm. They study a twofold question: - testing the influence of the ownership upon the investment, and thus upon the value of the firm; - testing the endogeneity hypothesis of the ownership structure. Using the instrumental variables method, the authors show the impact of the ownership on the performance, and not the inverse. Loderer and Martin (1997) show that there is an impact of the performance on the ownership structure and that this impact does not exist in the case of a high level of ownership.

A decrease of the profitability may induce the managers to sell a fraction of their ownership. These results led to the use of an econometric approach based on simultaneous equations.

3. METHODOLOGY

In this section we are interested in the method that will be used to study the relation between the managerial ownership and the performance. Taking for granted that there may be an impact of the profitability upon the ownership leads us to use the simultaneous equations model.

3.1 Sample

We use a sample of firms that are listed in the Nouveau Marché between 1999 and 2001. The restructuring of the French market cancelled this market from the French Stock Exchange and created Eurolist B. The firms that are included in the sample are in the computer industry. The choice of this sample is based on the following arguments: First, we are interested in studying the firms in the period after they were listed. Being listed has many goals (Pagano et al. 1998),
the most important of which is that the oldest stockholders are willing to benefit by selling their parts in order to increase their wealth. Such firms are characterized by the fact that the management and the ownership are not well distinguished before they are listed. In most of cases the CEO is also the major stockholder. The IPO allows them to gain a high value after selling their parts. Second, we are interested in studying a homogenous sector. The study of the drivers of the ownership structure showed that the sector is influencing. Demsetz and Lehn for instance take into account the following variables: the rules that are imposed to the firm and the instability of the environment. So studying only one sector turns out to be very interesting in order to neutralize the effect of the sector upon the ownership structure.

3.2 The benchmark model

We selected a proxy for the profitability, namely the book to market ratio, hereafter BTM. The ownership structure is captured by PROMAN, which is the percentage of the ownership that is held by the CEO and PROPMAJ, which is the percentage of the ownership that is held by the five main stockholders minus the percentage belonging to the CEO. We also use the following variables: CONS captures the size of the board of directors, EXT is the percentage of the directors who are independent inside the board. LNCAP is the natural logarithm of the market value, T is the natural logarithm of the turnover, LNCP is the natural logarithm of the equity, DUA is binomial variable that is equal to 1 when the CEO is also the general manager, REUN is the annual number of the board’s meetings, and ENR captures the entrenchment measured in number of years.

In the first stage, we study the ownership-performance relationship by using a basic model. We examine the drivers of the profitability. We propose the following equation:

\[
EQ1 : BTM = a_0 + a_1PROMAN + a_2PROPMAJ + a_3LEV + \varepsilon_1
\]

The exogenous variables are therefore PROMAN, PROPMAJ and LEV. We further retained the managerial ownership, the cumulated ownership of the five main stockholders and the leverage. The cumulated ownership gives information about the concentration of the voting rights. When it is important it reduces the autonomy that the manager has (Gugler and Weigand, 2003). We take into account of the Free Rider question (Rose, 2005). The point is that a high dispersion of the capital may lead to a higher diversification of the stockholders’ portfolios and hence to a lower risk that they run. This may bring forth a decrease in their control which may negatively impact the profitability of the firm. The indebtedness may also be a factor in favor of the performance.

We examine the drivers of the managerial ownership by fitting the following equation:

\[
EQ2 : PROMAN = b_0 + b_1BTM + b_2LNCAP + \varepsilon_2
\]

A priori, the size is a driver impacting negatively the managerial ownership (Demsetz and Lehn, 1985). The largest the firm’s size the largest is the cost of holding a larger ownership part.
3.3 The Two-Equation Model

We test the determinants of the profitability and ownership in equations 1 and 2. The use of the OLS method assumes that there is no endogeneity problem. The variable managerial ownership is the endogenous variable in equation 1, since there is an endogeneity problem. This characteristic is a violation of one of the major hypotheses of OLS method, namely that of the independence between the exogenous variables and the error term. Therefore, it is interesting to construct a two-equation model and to use the instrumental variables method. The system to be fitted is as follows:

\[ \begin{align*}
    \text{EQ1} & : \text{BTM} = a_0 + a_1\text{PROPMAN} + a_2\text{PROPMAJ} + a_3\text{LEV} + \varepsilon_1 \\
    \text{EQ2} & : \text{PROPMAN} = b_0 + b_1\text{BTM} + b_2\text{LNCAP} + \varepsilon_2
\end{align*} \]

4. SAMPLE AND RESULTS

4.1 The Characteristics of the Firms

In the following tables, we provide the financial and economic characteristics of the sample.

Table 1: Descriptive statistics of accounting and economic data: CA, VA, CAF, Total assets, Equity, Actif brut et Capitaux propres sont exprimés en Kuros.

<table>
<thead>
<tr>
<th>Data for 2004</th>
<th>CA</th>
<th>VA</th>
<th>CAF</th>
<th>Total assets</th>
<th>Equity</th>
<th>Leverage (%)</th>
<th>Return (%)</th>
<th>Employees</th>
<th>Age (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>21461</td>
<td>12001</td>
<td>-182</td>
<td>61004</td>
<td>22843</td>
<td>12.34</td>
<td>5.27</td>
<td>153</td>
<td>18.13</td>
</tr>
<tr>
<td>Standard Error</td>
<td>27059</td>
<td>13676</td>
<td>10041</td>
<td>58511</td>
<td>26693</td>
<td>16.97</td>
<td>91.37</td>
<td>180</td>
<td>18.88</td>
</tr>
<tr>
<td>Q1</td>
<td>6540</td>
<td>1974</td>
<td>-680</td>
<td>22500</td>
<td>5290</td>
<td>0.12</td>
<td>-14.58</td>
<td>33</td>
<td>9.79</td>
</tr>
<tr>
<td>Median</td>
<td>13268</td>
<td>8182</td>
<td>206</td>
<td>35821</td>
<td>15037</td>
<td>2.55</td>
<td>1.73</td>
<td>90</td>
<td>14.78</td>
</tr>
<tr>
<td>Q3</td>
<td>23652</td>
<td>17010</td>
<td>1131</td>
<td>87380</td>
<td>38245</td>
<td>19.38</td>
<td>8.37</td>
<td>193</td>
<td>18.44</td>
</tr>
</tbody>
</table>

From this table we could infer the following points:
- The average return (as measured by the income to equity ratio) is positive and highly volatile.
- The financial leverage is low, which is quite logical since the firms in our sample are newly listed and have a high level of liquidities.
- A high volatility of the age.

Table 2: Descriptive Statistics of the main governance characteristics MAJ (part of the 5 major stockholders), ENR (entrenchement in years), DUA (frequency of combination of Board Chairman’s functions and CEO)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>57.90</td>
<td>57.40</td>
<td>56.68</td>
<td>6.36</td>
<td>6.28</td>
<td>5.71</td>
<td>0.68</td>
<td>0.73</td>
</tr>
<tr>
<td>Standard Dev</td>
<td>18.98</td>
<td>19.72</td>
<td>20.53</td>
<td>5.21</td>
<td>4.79</td>
<td>4.58</td>
<td>0.47</td>
<td>0.45</td>
</tr>
<tr>
<td>Q1</td>
<td>45.45</td>
<td>45.60</td>
<td>40.76</td>
<td>2.37</td>
<td>2.00</td>
<td>2.08</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Median</td>
<td>61.21</td>
<td>59.59</td>
<td>60.28</td>
<td>5.17</td>
<td>5.00</td>
<td>5.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Q3</td>
<td>72.64</td>
<td>72.55</td>
<td>74.22</td>
<td>9.38</td>
<td>9.00</td>
<td>8.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>
From this table we could infer the following points:
- The entrenchment is longer.
- The duality is lowered.
- The weight of the major stockholders is increased.

**Table 3**: 36 firms included listed in Nouveau Marché between 1999 and 2001. Observed values for the year 2004, with RENT = Book to Market; PROP = percentage of capital held by the main manager; LEV = debt to equity ratio.

<table>
<thead>
<tr>
<th></th>
<th>PROP (%)</th>
<th>BTM</th>
<th>T</th>
<th>EXT (%)</th>
<th>DUA 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>20,24</td>
<td>3,05</td>
<td>10,08</td>
<td>0,31</td>
<td>0,68</td>
</tr>
<tr>
<td>Standard Dev</td>
<td>17,65</td>
<td>5,67</td>
<td>1,08</td>
<td>0,25</td>
<td>0,47</td>
</tr>
<tr>
<td>Q1</td>
<td>6,00</td>
<td>1,16</td>
<td>9,57</td>
<td>0,00</td>
<td>0,00</td>
</tr>
<tr>
<td>Median</td>
<td>12,94</td>
<td>1,98</td>
<td>10,12</td>
<td>0,33</td>
<td>1,00</td>
</tr>
<tr>
<td>Q3</td>
<td>28,52</td>
<td>2,64</td>
<td>10,78</td>
<td>0,50</td>
<td>1,00</td>
</tr>
</tbody>
</table>

One could conclude the following points:
- A high level of the managerial ownership and the duality
- A low level of debt. This is the natural consequence of being listed. The raised funds are mainly higher that the financial needs. The firms that are newly listed have sufficient liquidities. Accordingly, the need to raise funds is low.

### 4.2 The Results

In order to keep the interpretation at a fairly abstract level, we only focus on the interpretation of equations 1 and 2.

**Table 4**: Relationship between the managerial ownership and the performance. 36 newly listed firms between 1999 and 2001, with BTM = Book to Market, PROPMAN = percentage of the capital held by the main manager; PROPMAJ = percentage of capital held by the five major stockholders; LEV = the rate of financial leverage.

**EQ1**: BTM = a0 + a1PROPMAN + a2PROPMAJ + a3LEV + ε1

<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>PROPMAN</th>
<th>PROPMAJ</th>
<th>LEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>0,960</td>
<td>-0,008</td>
<td>0,027</td>
<td>0,071</td>
</tr>
<tr>
<td>t</td>
<td>0,902</td>
<td>-0,375</td>
<td>1,390</td>
<td>3,58</td>
</tr>
<tr>
<td>prob</td>
<td>0,375</td>
<td>0,711</td>
<td>0,175</td>
<td>0,001***</td>
</tr>
<tr>
<td>a</td>
<td>0,637</td>
<td>-0,031</td>
<td>0,069</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>1,035</td>
<td>2,138</td>
<td>3,645</td>
<td></td>
</tr>
<tr>
<td>prob</td>
<td>0,309</td>
<td>0,041**</td>
<td>0,001***</td>
<td></td>
</tr>
</tbody>
</table>

**R² = 0,383**

**F = 7,42***

**R² = 0,401**

**F = 11,39***

**p.c. < 0,05 — *** p.c. < 0,01**

We first fitted the set of exogenous variables. Then we used the backward method. The results of this regression could be interpreted in the following manner:
- The coefficient relative to the managerial ownership is negative and statistically non-significant.
- PROPMAJ and LEV have positive and statistically significant coefficients.

The profitability seems to be linked to the major ownership and to the indebtedness. The coefficient of adjustment is very high, amounting to 0.401. Taking account of the size – no matter its proxy, market value or equity, does not modify qualitatively our results.
Table 5: Relation performance/managerial ownership. 36 of newly listed firms in the Nouveau Marché between 1999 and 2001. PROPMAN = percentage of the capital that is owned by the main manager; BTM = book to market; LNCAP: natural logarithm of market capitalization

$$\text{EQ2 : PROPMAN} = b_0 + b_1\text{BTM} + b_2\text{LNCAP} + \epsilon_2$$

<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>BTM</th>
<th>LNCAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>39.065</td>
<td>-1.731</td>
<td>-1.223</td>
</tr>
<tr>
<td>t</td>
<td>1.213</td>
<td>-1.145</td>
<td>-0.413</td>
</tr>
<tr>
<td>prob</td>
<td>0.255</td>
<td>0.262</td>
<td>0.682</td>
</tr>
</tbody>
</table>

$R^2 = 0.049 \quad F = 0.753$

<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>BTM</th>
<th>LNCAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>25.928</td>
<td>-1.747</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>5.091</td>
<td>-1.172</td>
<td></td>
</tr>
<tr>
<td>prob</td>
<td>0.00***</td>
<td>0.250</td>
<td></td>
</tr>
</tbody>
</table>

$R^2 = 0.052 \quad F = 1.373$

*** p.c. < 0.01

The coefficients that are associated to BTM and LNCAP are negative. The market capitalization has a negative impact upon the managerial ownership. We document a result that was previously demonstrated in the literature. The profitability impacts negatively the ownership. An increase of the profitability is associated with a decrease of the managers’ parts in the capital. Seeing that the managers that are contained in our sample are mostly the founders of the firms, the last result could be interpreted in the following manner: a higher return boosts the managers to lower their participation in the firm’s capital. The proxy for the profitability is the Book to Market, its increase may be positive signal to the managers. These interpretations should be taken with some care due to the low statistical significance.

We present in the following table the fitting results of the tow-equation system, and thus using the instrumental variables method.

Table 6: Relation between managerial ownership and performance. 36 newly listed firms in the Nouveau Marché between 1999 and 2001 with BTM = Book to Market, PROPMAN = percentage of capital held by the main manager; PROPMAJ = percentage of the capital held by the five main stockholders; LEV : the rate of financial leverage, LNCAP : natural logarithm of market capitalization. CONS is the size of the board; LNCP: the natural logarithm of equity, RENT : the income to equity ratio; REUN: the number of meetings of the board during the year, and T : the natural logarithm of the turnover

$$\text{EQ1 : BTM} = a_0 + a_1\text{PROPMAN} + a_2\text{PROPMAJ} + a_3\text{LEV} + \epsilon_1$$

$$\text{EQ2 : PROPMAN} = b_0 + b_1\text{BTM} + b_2\text{LNCAP} + \epsilon_2$$

<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>PROPMAN</th>
<th>PROPMAJ</th>
<th>LEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>4,760</td>
<td>-0.099</td>
<td>-0.079</td>
<td>0.217</td>
</tr>
<tr>
<td>t</td>
<td>0.823</td>
<td>-0.964</td>
<td>-0.622</td>
<td>2.743</td>
</tr>
<tr>
<td>prob</td>
<td>0.414</td>
<td>0.339</td>
<td>0.536</td>
<td>0.008</td>
</tr>
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</table>

Instruments: CONS, LNCP, RENT

<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>BTM</th>
<th>LNCAP</th>
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<tbody>
<tr>
<td>b</td>
<td>82,301</td>
<td>0.640</td>
<td>-5.815</td>
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<tr>
<td>t</td>
<td>1.712</td>
<td>0.151</td>
<td>-1.405</td>
</tr>
<tr>
<td>prob</td>
<td>0.093</td>
<td>0.881</td>
<td>0.166</td>
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Instruments: REUN, T
The fitting of the system leads to results that are different from those that we obtained when fitting the equations separately. In equation 1, PROPMAJ has a negative impact upon the performance. For equation 2, the performance – as proxyed for by BTM – a hereafter a positive impact upon the managerial ownership. However, the statistical significances are low in both cases. In compliance with the first fitting of the first equation, PROPMAN has negative impact and LEV has a positive impact on BTM. Only LEV is statistically significant. As for equation 2, LNCAP is associated negatively to the ownership and its statistical significance is slightly improved. The fitting using a two-equation system has led to the rejection of the hypothesis that the endogeneity of the ownership structure with respect to the performance. The use of Hausman test in the case of equation 1, where CONS and LNCP are the instrumental variables, shows the following figures: t = -0.819 and prob = 0.413. This test proves that the ownership structure is not endogenous.

5. CONCLUSION

We have studied a sample of small-size firms but homogenous with respect to their industry. They consist of newly listed firms. The estimation results show that the managerial ownership does not impact the performance. Further, the endogeneity is rejected. In our sample, most of the managers are the founders of the firms. Their ties with their respective firms are not limited to the maximization of their values. It is possible to propose a research route by studying the firms that were listed since 2005 in the French Stock Exchange. In fact, with the launch of Alternext that is devoted to the new listing of firms, the characteristics of IPOs changed. The firms have a larger size, are more profitable, and have a higher age. The relationship between the performance and the ownership could be studied from a different angle.

REFERENCES


## Appendix

### Firms included in the sample

<table>
<thead>
<tr>
<th>ACCESS COMMERCE</th>
<th>ESKER</th>
<th>LINEDATA SERVICES</th>
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<tr>
<td>ACTEOS</td>
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<td>MEDCOST</td>
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<td>MICROPOL-UNIVERS</td>
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<td>ALTI</td>
<td>HIGH-CO</td>
<td>NET 2S SA</td>
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<td>HUBWOO.COM</td>
<td>PHARMAGEST INTERACTIVE</td>
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<td>BUSINESS INTERACTIF</td>
<td>IGE + XAO</td>
<td>REPONSE</td>
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<td>CAST</td>
<td>IB GROUP</td>
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