

Does Gender Diversity on board lead to Risk-Taking?

Empirical Evidence from Tunisia

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Abstract

It is well documented in economic, psychological and social literatures and the few recent studies in finance that women are more risk averse than men. The current study investigates the influence of board gender-diversity in firm risk taking in a developing market.

Using a sample of Tunisian firms during 1997-2010, findings show that more women sitting on the board more is the cash held by the firm. However, we detect no significant relationship between gender-diversity and risk-taking variables when it comes to analyze financing and investing policies' firms, except cash-holding. When we take into account women directors' affiliation, we show that the presence of politically connected women and State officers' women on board increases the cash holding and investment opportunities.

Keywords: gender-diversity, board, risk-taking, leverage, R&D expenses.

JEL codes: G12, G30, G34.

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1. Introduction

The literature on board diversity has attracted an increasing interest in the last years. Many studies identify potential benefits of board diversity: (1) understanding the marketplace, (2) increasing creativity and innovation by offering greater range of perspectives, (3) effectively solving problems as directors have different backgrounds and experiences, (4) increasing the effectiveness of corporate leadership by selecting directors with different characteristics, the firm get access to different new resources because of the directors' network (directors with financial industry connections). This also may create career incentives to promote minority top executives by mentoring and (5) creating more close and global relationships by challenging ethno-cultural diversity and being more sensitive to cultural diversity (Adams and Ferreira, 2010; and Robinson and Dechant, 1997).

The board diversity has also some potential costs that come from the conflicts when the board becomes divided into subgroups based on one or more attributes which may limit communication and cohesiveness and consequently effectiveness. Sometimes, in order to promote minority top executives based on their demographic characteristics leads to the appointment of directors with little experience and non-appropriate qualifications. This leads to much more greater risk when the appointed directors have personal and professional agendas/interests and are not loyal to the firm.

In the last year gender diversity has attracted an increasing interest. Many studies have explored the effects of women on boards and leadership positions (see among others Adams and Ferreira, 2009 and 2004; Sealy et al. 2007; Carter et al., 2003; Burgess and Tharenou 2002; Adler, 2001; Farrell and Hersch 2005; Daily et al. 1999; Bilimoria and Piderit 1994; Kesner 1988). As board is the most important decision-making body in the firm, many studies analyze how women on boards may affect corporate governance and corporate performance (Adams and Ferreira, 2009 and 2004).

Similarly, policymakers have been recently involved in diversity programs and became more concerned with the gender diversity issue: specifically, several economic programs and reforms have been set up to increase the proportion of women on boards. In addition, many platforms have been created to promote women's contribution to the *global economy and society*, e.g. *Women's Forum for the Economy & Society* created in 2005. In 2007, consulting

firms (McKinsey) and nonprofit organizations (Catalyst) report that women's representation in boardrooms matters and must be higher to boost both financial and even nonfinancial performance.

Although all this recent work has yielded several positive insights on gender-diverse boards, there are still some puzzling statistics: all over the world, women hold few corporate board seats. For example, the percentage of female directors is 14,8% in USA, 10,6% in Canada, 8,7% in Australia, 8% in Europe, 0,4% in Japan, 1,9 % in Jordan and 1.2% in Tunisia (Catalyst, 2009; Sing, 2008; Equal Opportunity for Women in the Workplace Agency, 2008; and European Professional Women's Network, 2004). No more than 7% of the highest positions of power in the 500 biggest companies in France are held by women. In both developed and emerging economies, women have fewer seats on board of directors than men.

One explanation of this underrepresentation in boards is the women's attitude in risky situations. In fact, an increasing amount of economic research on the gender differences in risk perception can be found in the academic pipelines (see among others, Anderson et al. 2013, Martini et al. 2012; Bertrand 2011; Zona et al. 2013; and Croson and Gneezy, 2009).

A large body of work concludes that women invest in less risky assets in their investment portfolios. Accordingly women are more risk-averse than men (see Agnew et al., 2003; Bernasek and Shwiff, 2001; Jianakoplos and Bernasek, 1998 and Sunden and Surette, 1998) and similar behavior is shown in simulated gambles (Levin and Gaeth, 1988) and is reported in surveys on risk preferences (Barsky et al., 1997, and Prince, 1993).

Even practitioners promoting women's role in economic growth particularly after the financial subprime crisis, are tempted to believe that women are risk adverse agents/managers than men. For example, De Vita (2008) reports in *Management Today*, that "*women...have a greater desire to build firm foundations that will endure*". In *Woman Capital*, O'Conner, (2008) argues that, after Iceland bankruptcy, a government official announces that two women will rebuild financial system and says: "*Now, the women are taking over... to clean it up*". However, Maxfield et al. (2010) state that labeling women as risk-averse may have opposite effects and limits the positive benefits that both women and organizations can gain from their risk taking.

In Europe, Faccio et al. (2012) provide evidence that female CEOs of privately-held and publicly-traded companies avoid riskier investments (Lower leverage, less volatile earnings, and lower probability of failure than those run by men) and financing opportunities. This behavior leads to distortions in corporate investment policies. However, some socioeconomics

characteristics of executive teams, like for example higher proportion of female executives, increase risk-taking in German banking industry (Berger et al., 2012).

In Middle-East (Bahrain, Jordan, and Oman), where social structure is different from western society, Metcalfe (2006) advances that the proportion of women with managerial experience has increased but women are still facing significant barriers in their careers, specifically those related to gender role in Islamic culture. For example, only 1,9 % of members' boards are women in Jordanian top 50 firms (Sing et al., 2008). Social networks and commonality of backgrounds appear to affect women's appointments in boards and the dynamics of the board in general. Only women that have strong family connections and networks can be appointed to leadership positions.

In Tunisia, like in some Arab and emerging countries, social culture is slight different, in the sense, policymakers have been promoting the principle of equal opportunities for women in the workplace before the Tunisian independence 1956. Even under the French occupation, there were many Tunisian political leaders and reformists (Shayk Muhammad Snoussi, Abdelaziz Thaalbi, Cesar Ben Attar, Haydi Sabai, Tahar Haddad, etc...) who were concerned with the emancipation of women and their role in rebuilding the country.

After independence, there was the promulgation of the Personal Status Code. As Habib Bourguiba's education was in France, the code was quite inspired by women's rights in France. However, when it comes to practice, women are still facing challenging issues regarding their careers. In fact, Tunisian women have 1,2% of seats in boardroom of the biggest 30 Tunisian firms. Moreover, half of Tunisian women directors work in the financial sector (Sing, 2008).

Few studies scrutinize the link between gender diversity in the boardroom and risk-taking and how the presence of women in the firm's board could influence risk preferences. The main question raised in the current paper is: *does gender diversity lead to risk-taking?*

The current paper belongs to the research stream examining the link between female representation in boardrooms and risk-taking. We consider two sets of proxy to capture financial and strategic risk-taking. This is the first paper, to the best of our knowledge that addresses the issue of gender diversity in boardroom and risk-taking in emerging markets. We explore this issue based on Tunisian data sample. Our empirical study was conducted on Tunisian listed firms between 1997 and 2010.

The paper provides the following findings:

First, there are several interesting stylized facts. Despite Tunisian policymakers' and reformists' efforts to promote gender-diversity in boardrooms, only few women are directors.

In fact, most of the diverse boards in our sample have only one female director. This is in line with Aliani et al. (2012) results explaining that increasing gender-diversity may have a negative effect on taxation optimization when the board's members have conflict of interest. This decreases the board effectiveness (Kastlunger et al., 2010).

Second, our sample show that only women who are connected to the political world and/or are members of the founding family can seat in boards. In addition, the sample shows that no independent women are sitting in the boards of our sample.

Third, surprisingly small firms have more gender-diverse boards and are not likely to be engaged in challenging and risky projects, like R&D investment. These results are consistent to some extent with Cosentino et al. (2012) in Italy, France, Germany, Spain and Norway

Fourth, foreign controlled firms have no women appointed in their boardrooms despite the fact that very often foreign owners come from developed countries that are more concerned with the gender-diversity issue. In addition, we show that these firms display high long term leverage ratio, they have insignificant R&D investments. In fact, they prefer relying on long term debt to fund more certain activities.

Finally, when the number of women sitting in the board increases (more than one), internal growth increases and leverage ratio decreases. These firms assign a small amount of money to R&D investments and prefer more safe projects.

The paper is organized in the following. Section 2 presents a survey of the literature on women's representation in boardroom and risk-taking and the hypotheses. The methodology, variables and data are in Section 3. Results and interpretation are provided in Section 4. Section 5 concludes the paper.

2. Survey of the literature and hypotheses

Our paper is related to three brands of the literature

First, many theories deal with gender diversity in boardroom and the quality of corporate governance. For instance, agency theory and resource dependence theory explain why increasing women's proportion in the board may lead, under specific conditions to a better decision-making within the boardroom. This could enhance the quality of corporate governance and firm's performance.

Second, agency theorists argue that corporate governance mechanisms, particularly many attributes of the boardroom (demographic characteristics, culture, past experience,...), can play an important role in influencing and promoting managerial risk-taking

Finally, we review the emerging literature on the gender differences in terms of risk preferences.

2.1. Corporate governance and gender-diversity in boardroom

There are many economic and managements theories on board diversity. However, economic analyses of corporate boards very often abstract from the interaction and the whole process that leads to the achievement of an agreement in the board. Indeed, the board is considered as a homogenous entity. Few studies did otherwise: they focus on the distinction between independent and nondependent directors (Adam et al. 2010).

In management theories, the board is considered from different views

Resource dependency theory

According to resource dependence theory, a corporate board is an essential link between the firms' environment and their external resources. The presence of women directors brings these benefits by linking firms with stakeholders and providing legitimacy with regard to

several groups of stakeholders such as employees, customers and investors (Lückerath-Rovers, 2010; Brammer et al. 2007).

Indeed, for potential and current employees, Hillman et al. (2007) and Singh and Vinnicombe (2004) advance that the presence of woman in boardroom provides a valuable form of legitimacy and indicates a better development of careers' opportunities.

For customer-oriented businesses, the more the proportion of women on board is high, the more it gives legitimacy in eyes of their customers and the more it tightens relations with customer stakeholders (Brammer et al. 2007).

Singh (2007) argues that women "*are responding to calls for increased diversity for better governance and better use of available talent*" (p. 2131). This might improve corporate reputation and consequently corporate performance. Hillman et al. (2007) add that legitimacy and conformity to societal expectations that are key components of organizational survival.

In addition, diversity may have a political dimension as Adams and Ferreira (2004) suggest. In fact, "*companies may care more about diversity when they are concerned about their public image, either because they are large firms which are visible to outsiders or because they are required to deal with government agencies which have preferences for diversity*".

Empirical findings are mixed. For Italian firms, Martini et al. (2012) show that board diversity does not influence investments in innovation. In large UK firms, women's presence in the boardroom has a reputational effect that varies across sectors and is more significant in sectors that are the closest to final consumers (Brammer et al., 2009).

Bear et al. (2010) explores how the board diversity affects firms' corporate social responsibility (CSR) ratings for a sample of US firms. They find that the presence of female directors is positively related to CSR policy of the firm. Board diversity in US firms has a significant effect on corporate social performance.

Agency theory

Literature on board' effectiveness focuses on the effect on corporate performance and on corporate decisions. Most empirical studies mainly analyze two board characteristics: board composition (independents and insiders directors) and board size.

Recently, studies have started focusing on other board characteristics: board diversity and in particular gender diversity. Indeed, board diversity is one measure of board's independence, i.e. independent boards are more effective than insiders in terms of managerial monitoring (Jensen and Meckling, 1976). Accordingly, diverse boards in terms of gender, ethnicity or cultural

background may be more creative, in the sense that they may ask questions or provide solutions that are not seen or doable by inside directors with similar backgrounds or experiences (Arfken et al. 2004).

Accordingly, women's presence in the board may have a significant influence on board effectiveness, specifically on monitoring policy. In a sample of US firms, Adams and Ferreira (2009) observe three important characteristics in diverse board: 1) women directors have better attendance records than men directors; 2) when the board is more gender-diverse, the attendance problems of men directors is much more less severe, and 3) women are more likely to join monitoring committees.

Despite diverse boards are seen as effective mean to overcome agency problems between managers and shareholders, empirical studies bring ambiguous and non-conclusive predictions on diversity (Milliken and Martins, 1996) and on other firm outputs (tax optimization, earning quality...). In US firms, Carter et al. (2003) find a positive relationship between gender diversity in the boardroom and Tobin's Q while Adams and Ferreira (2009) find a negative one. In Spanish firms, Campbell and Minguez-Vera (2008) find that gender diversity in boardroom has a positive effect on firm value. In Danish firms, Smith et al. (2006) show a negative effect on gross profits to sales and no significant effect on several other accounting measures of financial performance whereas Rose (2007) does not find a significant effect on Tobin's Q.

For emerging markets, few studies address this issue. Jhunjhunwala and Mishra (2012) provide no link between gender board diversity and corporate performance in Indian firms, while Mhamid et al. (2011) confirm that the female presence in boardroom positively influences Tunisian firm performance.

Regarding other firms' outputs, Srinidhi et al. (2011) indicate that firms with greater female participation on their boards exhibit higher earnings quality. Aliani et al. (2012) highlight the effectiveness of women's monitoring in Tunisian boardroom. Their presence decreases tax optimization.

2.2. Corporate governance, ownership structure and risk-taking

The second brand of the literature is about the link between corporate governance attributes and risk-taking.

First, studies analyze risk attitudes between agents and principals (Barney and Hesterly, 1996). As principals can diversify portfolios across many firms they are considered risk-neutral while very often agents are considered risk-averse which creates opportunity risk costs (see among others Wiseman and Gomez-Mejia, 1998, Gray and Cannella, 1997, Shleifer and Vishny, 1997, Jensen and Meckling, 1976...). This leads very often to a moral hazard problem that can be solved by looking for appropriate incentive mechanisms. These mechanisms are provided by corporate governance, particularly the boardroom.

Studies on boardroom and corporate governance show that the board is quite useful to protect shareholders' interests and to control the management. In line with Wu (2008), Naldi et al. (2007), Zahra (2005) and Wiseman and Gomez-Mejia (1998), Belanes and Hachana (2010) provide evidence that governance mechanisms can play an important role in influencing and promoting managerial risk-taking.

However, in addition to the corporate board, Jensen and Meckling (1976) and Fama and Jensen (1983) conclude that risk-taking can be influenced by the firm's ownership structure. Two competing arguments about ownership and firm risk taking may be discussed. As high ownership allow large shareholders to monitor and control managerial decisions. Hence, shareholders are incited to increase a firm's profit by taking risky projects. However, they may take more conservative projects to secure their private benefits (John et al.,2008). The shareholder identity influences incentive for corporate risk taking. Indeed, each owner behaves according to their interests and preferences (Pedersen and Thomsen, 2003 and Thomsen and Pedersen, 2000). Recently, many studies confirm that in emerging markets the owner identity is more important than the ownership structure⁴. However, empirical studies⁵ have paid a limited attention to the risk taking behaviour of owners. Consistent with Yeh and Woidtke (2005) and Dahya et al. (2008, 2009), large shareholders may appoint their representatives in the board to expropriate minority ones, which leads to increasing or decreasing of firm risk taking.

The economic consequences of State ownership depend on institutional setting. Wu and al. (2009) and Ang and Ding (2006) argue that State plays the role of an external controller in emerging economies. In State shareholding, the government exercises a significant and close control to protect the interest of minority shareholders Indeed, State owner seek to maximize

⁴ see among others Dyck, 2000; Firth et al. 2007; Omran et al. 2008; Wu et al. 2009 and Chi and Wang, 2009 and Loukil and Yousfi, 2013.

⁵ Boubakri et al. (2012)

social stability and employment unlike others shareholders seeking profitability on their investment. Hence, state controlled firms pursue conservative investments (i.e., less risky projects) (Fogel et al. 2008; Boubakri et al., 2013). As State ownership may discourage managerial risk-taking, we are tempted to think that women that were pro-politicians or public officers will likely discourage risky investments.

Accordingly we state the following:

Hypothesis H1: Politically and State appointed women in the boardroom will discourage risk-taking.

Many studies⁶ argue that in family controlled firms, managers and directors are members of family. Families invest all their funds on one firm which leads them to support high undiversified risk. To reduce this risk, families may implement various strategies that serve only their interests. Hence, family firms may undertake unprofitable projects and less risky ones.

In addition, family controlled firms are very often presented as conservative and resistant to new forms of entrepreneurial orientations and of change (Bartholomeusz and Tanewski, 2006; Hall et al., 2001; and Zahra, 1996). This implies that women directors that are daughters of the founding family will discourage managerial risk-taking. So we hypothesize the following:

Hypothesis H2: Women directors that belong to the founding family will discourage risk-taking.

2.3. Gender diversity and risk preferences

The last brand of the literature is relate to debate in both economics and finance about gender differences in terms of risk preferences and its effect on economic outcomes.

The existent body of work focuses on the women/men comparison in terms of risk preferences. For instance, Byrnes et al. (1999) conducted a meta-analysis based on 150 papers on gender differences in risk perception. The consensus in these studies is that men are more likely to take risks than women (Agnew et al. 2003; Sundén and Surette, 1998; Jianakoplos and Bernasek, 1998 and Barsky et al., 1997). Anderson et al. (2013), and Croson and Gneezy (2009) provide quite complete surveys of the literature on gender-related differences in risk-aversion. They conclude that women are less competitively inclined than man. In fact women are less

⁶ Andres (2008); Anderson and Reeb (2003); Gomez-Mejia et al. (2001); Ali et al. (2007), Claessens et al. (2002) and Yeh and Woidtke (2005).

overconfident than their male counterparts (Niederle and Vesterlund, 2007; and Barber and Odean, 2001). Consequently, women avoid risky and challenging situations. These differences in risk perception are explained to a large extent by the environment and the partners, women are facing. However, they notice that these differences disappear in managers and professional populations.

Bruce and Johnson (1994) and Johnson and Powell (1994) study how betting behavior varies with gender. Based on experimental and lottery games, these studies are tempted to conclude that women are more risk averse than man, particularly in probability lotteries. They are also more averse to competition than men and in their allocation of wealth to pensions (Bernasek and Shwiff, 2001; and Sundén and Surette, 1998). These results are explained by three factors:

(1) Emotions: psychology literature argues that women experience more strongly emotions than men (Slovic et al., 2002; Loewenstein et al. 2001; Harshman and Paivio, 1987 ;...).

(2) Overconfidence: men were substantially more confident than women in their investment decisions (see Soll et Klayman, 2004; Lundeberg et al., 1994...) and on their own skills and capacities (Niederle and Vesterlund, 2007).

(3) Interpretation of risky situations: Women are more nervous and have more fear than men in anticipation of negative outcomes (Brody 1993; Fujita et al., 1991). Unlike men who find risk situations challenging, women are skeptical and overcome and avoid as much as possible risky situation: risky decisions are considered as threats for them.

Johnson and Powell (1994) compare decision-making characteristics of men and women in two populations: “non-managerial” and “managerial”. They show that women are more risk averse than men only in the non-managerial sub population. In managerial population, Adams and Funk (2012) provide evidence that women directors are tempted to take riskier decisions than male counterparts and lead to lower profitability and firm value that can be worsen when women face bigger obstacles than men. One explanation is that they exercise excessive monitoring that reduces shareholder value (see also Ahren and Dittmar, 2012; Adams and Ferreira, 2009; and Almazan and Suarez, 2003). Dwyer et al. (2002) find that women take less risk than men in their mutual fund investments. However, the significant difference in risk taking is weakened when financial investment knowledge of the investor is included as control variable in the regression model.

Atkinson et al. (2003) compare the investor behavior of men and women mutual fund managers. They find no significant difference in taking risk. This finding indicates that

differences risk preferences are not related to gender diversity but to investment knowledge and wealth constraints.

According to all these studies, we state the following:

Hypothesis H3: Higher female participation in the boardroom reduces risk-taking.

Hypothesis H4: Higher female participation in boards increases risk-taking.

3. Data and Methodology

3.1. Sample

Our initial sample consisted of 32 non-financial Tunisian firms listed on Tunis Stock Exchange (TSE) during the period 1997-2010. The data set is hand-collected from corporate annual reports and “stock Guide” provided by TSE. The reports contain information about shareholders and board of directors. We filter out firms with missing data. The final sample contains 30 listed firms and 256 yearly observations.

Table 1. Sample composition

Industries	Number of Firms	Percentage
Energy	5	16,66%
Health care	2	6,67%
Consumer goods and services	15	50,00%
Industrials	7	23,33%
Telecommunication	1	3,33%
Total	30	100%

Table (1) shows that almost 50 % of firms in our sample belong to the consumer goods and services sector; 23.33 % to the industrial sector and 16.66% of firms belong to the energy sector. Few firms (less than 4%) are in telecommunications sector.

3.2. Variables

To analyze risk-taking and women’s diversity in boardrooms, we consider the following variables:

Risk-Taking

Capturing risk-taking with only financial measures can lead to controversial findings. Indeed, risk-taking is a multidimensional concept that cannot be summarized into the financial dimension (Gilley et al., 2002). For instance, the managerial risk-taking depends closely on human behavior that cannot be measurable by financial models (March and Shapira, 1987). In addition, risk-taking depends closely on the context (Wu, 2008; and Zahra, 2005).

To assess the level of risk-taking by firms, we choose strategic and financial proxies:

Managerial risk-taking proxies are:

- **RDEX** is R&D expenditure and assets ratio. In fact, R&D is a very risky investment compared to capital expenditure on tangible assets (Bhagat and Welch, 1995). Under a managerial approach, risk-taking is the level of willingness of management to engage in commitments/attitudes/investments that lead to uncertain but significant benefit (Gilley et al., 2002). This is assessed by the ability to bring new ventures, innovate or to invest in R&D activity (see among others Wu, 2008; Dewett, 2007; Naldi et al., 2007; Coles et al., 2006; Zahra, 2005).
- **GROW** is the annual growth rate of assets. It estimates new investments in the firm that can be risky or lowly risky. According to Lipson et al. (2009), higher asset growth is associated with relatively lower risk. Berk et al. (1999) state that growth options are more risky than assets in place. One explanation is that when a firm makes capital investments (risky growth options) are replaced with less risky assets in place the average firm risk will be lower.
- **MBVA** is the ratio of the market to book value of total assets that measures the level of investment opportunities of the firm.

As financial proxies, we include two leverage ratios to capture the level of leverage in the firm so that it becomes easier to evaluate the financial policy. In addition, we use a measure of total risk.

- **LEVR** is the ratio of the book value of long term debt and assets.
- **LDME** is the ratio of the book value of long term debt and market value of equity.
- **SDRT** measures the total level of risk undertaken in the firm. It is measured by the standard deviation of daily stock returns of the fiscal year. In the regression of total risk, we use **LEVR** and **RDEX** as control variables

- **CASH** is a proxy for the amount of cash assigned to new investments. It is measured by the ratio of current assets (net of stocks) and current liabilities. Low values for this ratio (lower than 1) shows some difficulty meeting current obligations. We add this variable as control variable to analyze R&D expenses.

Gender-Diversity GD in Boards

To assess the level of gender diversity in the board, we rely on the following proxies:

- **DWOM** is a dummy variable that captures the presence of female directors. It is measured by:

$$\mathbf{DWOM} = \begin{cases} 1 & \text{if } n \geq 1 \\ 0 & \text{otherwise} \end{cases},$$

where n is the number of women in the boardroom.

- **PWOM** is the percentage of women on the board, calculated by the number of women directors divided by the total number of directors in the boardroom.
- **NWOM** is the exact number of female directors in the board to analyze their effect as a type of board diversity, on innovation (Torchia et al., 2011).

Control Variables

The control variables in the current model are related to financial decisions in the firm.

- **BSIZ** is the measure of the board size given by the total number of directors sitting in the board. Agency theory argues that small boards tend to encourage managerial risk-taking (Hermalin and Weisbach 2003). In addition, Yermack (1996) advances that larger boards reduce risk-taking. Wang (2013) finds that companies with smaller boards take lower leverage but select riskier investments.
- **UFOR** to analyze the control type in the firm, i.e. State, family and foreign control. The identity of the ultimate owner is an important feature in corporate governance of Tunisians firms. Doidge et al. (2009) and Leuz et al. (2010) find that foreign investors avoid investing in poorly governed firms and prefer investing in well governed firms. Since, poor governed firms face serious information problems that may increase managerial risk-taking. Accordingly, foreign owners are associated with more managerial risk-taking than government owners. Several studies provide evidence that foreign owners may influence corporate investment policy (Ferreira and Matos, 2008;

John et al., 2008; Dyck, 2001; and Boycko et al., 1996) and under specific conditions, improve corporate governance which in turn increases managerial risk taking.

Table 2. Variables and measures in the model

	Variables	Symbol	Definitions
Risk-taking variables	• R&D expenditure	RDEX	The ratio of R&D expenditure scaled by assets.
	• Firm Growth	GROW	The annual rate of growth rate of assets
	• Investment opportunities	MBVA	The market value of assets scaled by book value of assets
	• Leverage	LDBA	The ratio of the book value of financial long term debt scaled by assets.
		LDME	The ratio of the book value of financial long term debt scaled by market value of equity.
	• Cash holding	CASH	The ratio of current asset (net of stocks) and current liabilities.
	• Total risk	SDRT	The standard deviation of daily stock returns during fiscal year.
Gender diversity GD variables	• The presence of women in board	DWOM	A dummy variable that takes a value of one when at least one woman seats on the board, and zero otherwise
	• The proportion of women directors	PWOM	The percentage of women on the board, calculated by the number of women directors divided by the total number of directors in the boardroom.
	• The number of women	NWOM	The number of women on the board of directors
Control variables	• Firm performance	ROA	Return on asset ratio
	• Foreign ultimate owner	UFOR	A dummy variable that takes one when the ultimate owner is foreign investor and zero otherwise
	• Board size	BSIZ	The total number of directors
	• Firm size	SIZE	The book value of assets

In Tunisia, there are three categories of ultimate owners: State, family and foreign investors. Few studies are conducted on the issue. Foreign owner reduces CEO power (Ben Cheikh and Loukil, 2013) and decreases stock liquidity (Loukil and Yousfi, 2013).

$$\mathbf{UFOR} = \begin{cases} 1 & \text{if the ultimate owner is foreign investor} \\ 0 & \text{otherwise} \end{cases}$$

- **SIZE** is the measure of the firm size assessed by the book value of assets.
- **ROA** is the return on asset ratio to measure the firm performance. Since debt policy and risk depend on the firm performance, ROA is used as control variable in Total risk and leverage regressions of risk-taking.

All variables are summarized in table 2.

4. Empirical Results

4.1. Descriptive statistics

Table 3 provides the following stylized facts:

Most firms in our sample have no women on the board. Only 26% of total observations show the presence of women directors in their boardroom: the most gender-diversified boards contain 3 women (1.15% of total observations). The most frequent gender-diverse boards contain only one woman (21.37%). Then, few boards contain two women directors (3.8%). It is straightforward to see that the proportion of women directors varies significantly between 1997 and 2010: from 9% (= 1/11) in 1999 to 33% (=8/24) in 2007 (Panel B). On average, the proportion of women on boards is low 3.4% with high standard deviation (6%). 27% is the highest women's proportion on board (panel A).

In 1999, there was only one woman in MONOPRIX boardroom among 11 firms. In 2007, this number increased significantly but simultaneously the average number of directors doubled. In fact, women representation does not change considerably, in the sense, only one woman seats on each of the seven corporate boards (SOMOCER, SOTUMAG, ASSAD, STIP SOTRAPIL, SIPHAT and SIAME), and three women directors are present on STEQ board (panel B).

In Panel C, the average cash ratio is 1.71 which implies that there are no liquidity problems. Despite the effective measures and programs set up in place to promote innovation, Tunisian firms assign small investment in research and development (around 0.1% of firm's assets).

Table 3. Descriptive statistics

Panel A. The proportion of gender diversity in boards

Legend: PWOM is the percentage of women on the board, calculated by the number of women directors divided by the total number of directors in the boardroom; NWOM is the number of women on the board of directors; DWOM is a dummy variable that takes a value of one when at least one woman sitting in the board, and zero otherwise.

	PWOM	NWOM	DWOM
Frequency			16,40%
Mean	0,0348735	0,3244275	
Median	0	0	
Sdeviation	0,0627374	0,6046552	
Max	0,2727273	3	
Min	0	0	
Skewness	1,618589	2,00005	
Kurtosis	4,648299	7,088763	

Panel B. The yearly frequency evolution of gender diversity in boards

Year\ñ	No woman	One woman	Two women	Three women	At least one women
1997	77,78%	22,22%	0,00%	0,00%	22,22%
1998	88,89%	11,11%	0,00%	0,00%	11,11%
1999	90,91%	9,09%	0,00%	0,00%	9,09%
2000	75,00%	25,00%	0,00%	0,00%	25,00%
2001	68,75%	25,00%	6,25%	0,00%	31,25%
2002	76,47%	11,76%	11,76%	0,00%	23,53%
2003	76,19%	14,29%	9,52%	0,00%	23,81%
2004	70,00%	25,00%	5,00%	0,00%	30,00%
2005	70,00%	20,00%	10,00%	0,00%	30,00%
2006	71,43%	19,05%	4,76%	4,76%	28,57%
2007	66,67%	29,17%	0,00%	4,17%	33,33%
2008	68,00%	32,00%	0,00%	0,00%	32,00%
2009	74,07%	22,22%	3,70%	0,00%	25,93%
2010	76,92%	19,23%	0,00%	3,85%	23,08%
Total	73,66%	21,37%	3,82%	1,15%	26,34%

Panel C. Descriptive Statistics on risk taking

Legend: **RDEX** is the ratio of R&D expenditure scaled by assets; **GROW** is the annual rate of growth rate of assets; **MBVA** is the market value of assets scaled by book value of assets; **LEVR** is the ratio of the book value of financial long term debt scaled by assets; **LDME** is the ratio of the book value of financial long term debt scaled by market value of equity; **CASH** is the ratio of current assets (excluding stocks) to current liabilities; **SDRT** is the standard deviation of daily stock returns during fiscal year;

	RDEX	GROW	MBVA	LEVR	LDME	SDRT	CASH
Mean	0,0011652	0,073357	1,51193	0,131793	1,483109	0,0203597	1,713545
Median	0	0,0445297	1,195827	0,1135803	0,573759	0,0162967	1,099802
Sdeviation	0,0031343	0,1839416	0,9003251	0,1209396	2,712806	0,0207958	2,230811
Max	0,0182491	1,390763	6,641281	0,4904555	20,2702	0,2163384	14,17656
Min	0	-0,2949606	0,136624	0	0,0015511	0	0,1554263
Skewness	3,354296	3,336698	2,300198	0,6357741	4,161036	6,005131	3,341411
Kurtosis	14,11175	22,61226	9,862192	2,562535	24,02566	46,04509	15,34929

Panel D. Descriptive Statistics on firm characteristics

Legend **ROA** is Return on assets ratio; **SIZE** is the book value of assets; **UFOR** is a dummy variable that takes one when the ultimate owner is foreign investor and zero otherwise; **BSIZ** is the number of directors on board.

	SIZE	BSIZ	ROA	UFOR
Frequency				12.30%
Mean	1,29E+08	9,20229	0.051597	
Median	5,16E+07	10	0.046578	
Sdeviation	2,80E+08	1,945895	0.077802	
Max	1,49E+09	12	0.240886	
Min	1,03E+07	4	-0.265173	
Skewness	3,887389	-0,4297802	-0.651556	
Kurtosis	16,93913	2,628708	4.54652	

On average, the asset growth rate of Tunisian firms is low (7.3%) and varies significantly 18%. The market to book value of assets ratio is also low (1.511) with low deviation.

Leverage ratio shows that financial long term debt represents 13% of assets with high deviation 12%. The highest leverage is 49% of total assets. On average, the total risk measured by stock return standard deviation is 2% with high deviation (2%).

According to the debt to equity market value, long term debts, on average, debt is 1.48 times the market capitalization of the firm and this ratio varies highly from one firm to another (271%).

Panel D reports that the average firm size is 129 million Tunisian dinars and the average board size is 9 directors. The average firm performance ROA is around 5%.

Finally, we observe high Skewness coefficients of the following variables: RDEX, SDRT, NWOM, SIZE, GROW, LDME, MBVA and CASH. In order to overcome this problem, we consider in the remaining, the logarithm of these variables.

4.2. Gender diversity and risk taking: comparison means

In this sub-section, we analyze how the number of women appointed in the board may influence differently risk-taking. Comparison results are presented in table 4.

Table 4. Comparison means : Risk taking measures and gender diversity

Legend: RDEX is the ratio of R&D expenditure scaled by assets; GROW is the annual rate of growth rate of assets; MBVA is the market value of assets scaled by book value of assets; LEVR is the ratio of the book value of financial long term debt scaled by assets; LDME is the ratio of the book value of financial long term debt scaled by market value of equity; CASH is the ratio of current assets (excluding stocks) to current liabilities; SDRT is the standard deviation of daily stock returns during fiscal year;

Variables	Mean		Difference	Mean		Difference
	No Women	Women		No Women	one Woman	
RDEX	0,0011	0,0013	-0,0001	0,0011	0,0015	-0,0004
MBVA	1,5140	1,5061	0,0079	1,5140	1,6079	-0,0939
GROW	0,0795	0,0562	0,0233	0,0795	0,0587	0,0208
LEVR	0,1412	0,1056	0,0355**	0,1412	0,1106	0,0306*
LMDE	1,3421	1,8776	-0,5355	1,3421	2,0275	-0,6854
CASH	1,4479	2,4676	(-1,019)**	1,4479	2,7385	(-1,2905)***
SDRT	0,0207	0,0193	0,0014	0,0207	0,0198	0,0009
N	193	69		193	56	

*, **, *** are respectively significance level of 10%, 5%, 1%

Variables	Mean		Difference	Mean		Difference
	One Woman	Two Women		Two Women	Three Women	
RDEX	0,0015	0,0004	0,0011**	0,0004	0,0004	0,0000
MBVA	1,6079	1,0340	0,5738***	1,0340	1,1793	-0,1453
GROW	0,0587	0,0139	0,0449	0,0139	0,1421	(-0,1282)**
LEVR	0,1106	0,0890	0,0216	0,0890	0,0685	0,0205
LMDE	2,0275	1,4344	0,5931	1,4344	0,5563	0,8780**
CASH	2,7385	1,2215	1,5169***	1,2215	1,1485	0,0730
SDRT	0,0198	0,0184	0,0014	0,0184	0,0146	0,0037
N	56	10		10	3	

*, **, *** are respectively significance level of 10%, 5%, 1%

First, we consider two groups of firms: firms with no women directors and firms with women directors. Statistics reveal significant differences in only funding policy. According to table 4,

first, leverage ratio (book value ratio) in firms with women directors, is lower (10%) than other firms (14%). In addition, we find also that firms with women directors hold more liquidity (246%) than other firms (144%). These findings indicate that in presence of women on the board, firms rely more on internal fund to finance investments than debts. For other measures of risk taking (total risk and managerial proxies), we find no differences between two groups of firms.

Second, we compare risk-taking policy between two groups: firms with one woman versus firms with no woman on the board. Comparison results join previous ones and provide evidence that women's presence influences only the corporate funding policy (cash holding policy and debt). All proxies of managerial risk-taking are positive and non-significant.

Third, we analyze the risk taking differences between firms with one woman versus those with two women on board. We find that the presence of two women directors reduces managerial risk taking, in particular, R&D expenses and investments opportunities MBVA, and also cash holding. Estimation results⁷ in the table provide non-significant differences between firms with one woman when it comes to growth ration, leverage and LMDE. Consequently, the total effect on risk is positive but non-significant.

Finally, comparing boards with two and three women on boards brings several interesting findings in terms of risk-taking. The annual growth and the ratio of the book value of financial long term debt are positive and significant while all the other risk-taking variables are positive with no significant effect. It seems that increasing the number of women on boards (more than 2) boosts investment policy of the firm, in the sense it enhances internal growth, and discourages the use of long term debt.

4.3. Correlation analysis

Correlation coefficients between board diversity variables (lnNWOM, PWOM and DWOM) and leverage ratio are negative and significant (Table 5). We detect also a negative and significant correlation between investment opportunities (MBVA) and the proportion of women directors.

The cash ratio is correlated positively and significantly to two measure of board diversity (lnNWOM and DWOM).

⁷ These results not reported

However, there is no significant association between board diversity variables and other taking risk measures (total risk, long term debt to market value of equity ratio, growth rate and R&D expenditures). This supports the idea that leverage ratio and investment opportunities decrease and cash holding rises when there are more women in the board while the other risk measures do not depend on the presence of women directors.

Board size and risk-taking measured by leverage ratio, debt to equity market value and R&D expense are positively and significantly correlated. In contrast, board size and other risk measures are not correlated.

Another interesting result is that leverage ratio and R&D investment are positively and significantly associated to total risks, but the leverage ratio and R&D are negatively and significantly related. We find also that cash holding is negatively related to total risk and leverage and positively related to investment opportunities and R&D expenditures. This leads to the following preliminary result.

Firms in our sample do not use long term debt to finance R&D investment and other investment opportunities. One explanation is that Tunisian firms avoid increasing long term leverage to reduce the level of total risk. They prefer raising equity or using the self-financing (cash holding). Furthermore, firm performance decreases with the level of total risk and leverage: negative correlation between ROA, and total risk and leverage ratio.

Regarding the identity of the ultimate owner, statistics and correlations matrix indicate the presence of foreign ultimate owner. At the same time, UFOR is negatively and significantly related to R&D investment and positively and significantly related to leverage ratio. These results are consistent with the literature on financial corporate strategy of firms controlled by foreign investors. In fact, foreign ultimate owners reduce R&D investment and increase the leverage coming from long term debt in firms they are investing in.

LnSIZE displays a negative correlation coefficient with gender diversity variables. One interpretation is only small size firms have an increasing number of women directors appointed in their boardroom. This may imply that only these firms are concerned with the gender-diversity issue in their boardrooms because of reputational effects or to take advantage of their connections.

Table 5. Correlation analysis

Legend: LnRDEX is the logarithm of the ratio of R&D expenditure scaled by assets; LnGROW is the logarithm of the annual rate of growth rate of assets; LnMBVA is the logarithm of the market value of assets scaled by book value of assets; LEVR is the ratio of the book value of financial long term debt scaled by assets; LnLDME is the logarithm of the ratio of the book value of financial long term debt scaled by market value of equity; LnCASH is the logarithm of the ratio of current assets (excluding stocks) to current liabilities; LnSDRT is the logarithm of the standard deviation of daily stock returns during fiscal year; DWOM is a dummy variable that takes a value of one

when at least one woman seats on the board, and zero otherwise; **PWOM** is the percentage of women on the board, calculated by the number of women directors divided by the total number of directors in the boardroom; **LnNWOM** is the logarithm of the number of women on the board of directors; **ROA** is Return on assets ratio; **LnSIZE** is the logarithm of the book value of assets; **UFOR** is a dummy variable that takes one when the ultimate owner is foreign investor and zero otherwise; **BSIZ** is the number of directors on board.

	lnSRDT	LEVR	lnRDEX	LnGROW	LnMBVA	LnLDME	lnNWOM
LEVR	0.1191*	1.0000					
lnRDEX	0.1113*	-0.1238**	1.0000				
GROW	-0.0201	-0.0584	-0.0769	1.0000			
LnMBVA	-0.0472	-0.160***	-0.0863	0.0654	1.0000		
LnLDME	0.1722***	0.4793***	-0.0509	-0.0520	-0.544***	1.0000	
lnNWOM	0.0017	-0.1309**	0.0566	-0.0053	-0.0366	-0.0675	1.0000
PWOM	-0.0104	-0.345***	0.0350	0.0515	-0.2377**	0.0112	0.8358***
DWOM	0.0023	-0.1297**	0.0533	-0.0056	-0.0342	-0.0696	0.9997***
lnSIZE	0.1038*	0.3289***	-0.0970	0.0349	0.0289	0.3005***	-0.1811***
BSIZ	0.0008	0.2252***	0.1415****	-0.0247	0.0193	0.1573**	0.0405
ROA	-0.209***	-0.288***	-0.0364	0.2482***	0.5225***	-0.676***	-0.0484
lnCASH	-0.1254**	-0.238***	0.1565**	-0.1086	0.1602***	-0.576***	0.1812***
UFOR	-0.0539	0.3087***	-0.2726***	0.0517	0.4545***	-0.246***	-0.0415
	PWOM	DWOM	lnSIZE	BSIZ	ROA	lnCASH	UFOR
lnSIZE	-0.394***	-0.179***	1.0000				
BSIZ	-0.1406	0.0359	0.3853***	1.0000			
ROA	0.0220	-0.0484	-0.0776	0.0543	1.0000		
lnCASH	0.1215	0.1834***	-0.1978***	-0.0237	0.3927***	1.0000	
UFOR	-0.312***	-0.0396	0.1148*	0.1769***	0.3511***	0.1483**	1.0000

*, **, *** are respectively significance level of 10%, 5%, 1%

4.4. Multivariate Analysis

We analyze the relationship between firm risk taking and board gender diversity through a multiple regression with panel data. Thus, we estimate the following seven models:

Model I

$$\text{LnRDEX} = b_0 + b_1 \text{GD}_{it} + b_2 \text{LnSIZE}_{it} + b_3 \text{BSIZ}_{it} + b_4 \text{LnCASH}_{it} + b_5 \text{LnSDRT}_{it} + b_6 \text{UFOR}_{it} + \varepsilon_{it}$$

Model II

$$\text{GROW} = b_0 + b_1 \text{GD}_{it} + b_2 \text{LnSIZE}_{it} + b_3 \text{BSIZ}_{it} + b_4 \text{ROA}_{it} + b_5 \text{LnCASH}_{it} + b_6 \text{UFOR}_{it} + \varepsilon_{it}$$

Model III

$$\text{MBVA} = b_0 + b_1 \text{GD}_{it} + b_2 \text{LnSIZE}_{it} + b_3 \text{BSIZ}_{it} + b_4 \text{ROA}_{it} + b_5 \text{LnCASH}_{it} + b_6 \text{UFOR}_{it} + \varepsilon_{it}$$

Model IV

$$\text{LEVR} = c_0 + c_1 \text{GD}_{it} + c_2 \text{LnSIZE}_{it} + c_3 \text{BSIZ}_{it} + c_4 \text{ROA}_{it} + c_5 \text{LnSDRT}_{it} + c_6 \text{UFOR}_{it} + \varepsilon_{it}$$

Model V

$$\text{LDME} = c_0 + c_1 \text{GD}_{it} + c_2 \text{LnSIZE}_{it} + c_3 \text{BSIZ}_{it} + c_4 \text{ROA}_{it} + c_5 \text{LnCASH} + c_6 \text{LnSDRT}_{it} + c_7 \text{UFOR}_{it} + \varepsilon_{it}$$

Model VI

$$\text{LnCASH} = c_0 + c_1 \text{GD}_{it} + c_2 \text{LnSIZE}_{it} + c_3 \text{BSIZ}_{it} + c_4 \text{LnMBVA}_{it} + c_5 \text{LnLDME} + c_6 \text{LnGROW}_{it} + c_7 \text{UFOR}_{it} + \varepsilon_{it}$$

Model VII

$$\text{LnSDRT} = d_0 + d_1 \text{GD}_{it} + d_2 \text{LnSIZE}_{it} + d_3 \text{BSIZ}_{it} + d_4 \text{ROA}_{it} + d_5 \text{LnRDEX}_{it} + d_6 \text{LEVR}_{it} + \varepsilon_{it}$$

where GD_{it} variable is one the gender diversity variables (PWOM, LnNWOM, DWOM) and ε_{it} is the error term of firm i at year t . The idea is the estimate each model three times using different gender-diversity variable (see table 6).

The estimation of all regressions reports no significant effect of gender-diversity in board on all risk variables except cash ratio.

When we use managerial measures of risk taking, the GD coefficients are positive and not significant, except for the model with investment opportunities coefficients are negative but non-significant (see table 6, Panel A).

For financial risk-taking, empirical results are mixed. For leverage ratios and total risk regressions, gender diversity coefficients are negative and non-significant except for the LnNWOM and DWOM coefficients are positive in LEVR model. However, it is straightforward to see that gender diversity variables have significant and positive effects on cash holding (see table 6, Panel B). But when we consider total risk-taking assessed by SDRT, we conclude that neither risky investment decisions nor risky financing decisions are explained by the presence of female directors in boards. However, the presence of women directors explains cash holding. Hence, it seems that women directors prefer to hold cash but

their presence in the board cannot affect firm's decisions to invest in risky projects or to choose risky financing tools.

Since gender diversity affects only cash corporate policy, Tunisian sample shows that women do not affect risk-taking preferences in firms in which they are sitting. One explanation could be that governance mechanisms in Tunisian firms cannot promote challenging activities and cannot therefore favor "positive" risk-taking. Belanes and Hachana (2012) provide evidence that majority shareholders invest in risky activities in which risk is mainly coming from managerial risk-taking. However, these projects increase shareholders' value, but not necessarily stakeholders' one.

In the light of all these results, we reject H3 and H4.

The results show that risk variables are explained by control type (UFOR) and financial constraints (BSIZE, LnCASH, LnSRDT, LnLDME, ROA). This is consistent with Atkinson et al. (2003) and Johnson and Powell (1994).

We find a significant and positive effect of board size when risk-taking is measured by R&D expenses and debt to market value of equity ratio (LDME) and negative and significant effect on investment opportunities (MBVA). The results about the relationship between risk-taking and board size are non-conclusive.

On the one hand, this is not consistent with agency theory prediction, in the sense; large boards in our sample are tempted to invest in risky investments (for instance R&D investment) and to engage in risky financing tools.

However, it joins resource dependency theory. It means that large boards strongly connected to their external environment are more able to handle the environment uncertainty as they can get access to more resources than other firms do (Pfeffer and Salanick, 1978). Accordingly, large boards have better skills knowledge and more resources to select and manage R&D investment and vice versa, firms interested in R&D are tempted to have large boards but not gender diverse ones.

On the other hand, consistent with agency theory, a large board is ineffective control tool that reduces investment opportunities.

In contrast, there is no significant relation between board size and other risk-taking variables (LEVR, GROW, CASH and SDRT). These findings may explain why SDRT is not affected by board size.

The analysis of the owner identity effect leads to the following findings:

The presence of foreign ultimate owner reduces R&D investment and increases the investment opportunities and leverage ratio. Long term debt is therefore assigned to investments with less uncertainty and more stable and certain benefits. In fact, it is commonly argued that foreign owners invest less in R&D than other firms (State and family controlled firms). Indeed, State controlled firms invest in R&D activities as a signal of good quality and to enhance their reputation in the market (see among others Molas-Galartand Tang, 2006; and Munari et al., 2002). From a heritage plan, family firm represents a legacy that must be transferred from generation to generation. Consequently, they make their investment-decisions based on long-term profit maximization objective (see among others James, 1999 and Casson, 1999).

Firms controlled by foreign owners have more investment opportunities than other firms.

In terms of debt policy, results indicate that foreign owners rely more on external fund than family and State owners do.

In addition, results show a negative and significant effect of corporate performance (ROA) on leverage ratios (LEVR and LDME) and on total risk which indicates that firms performing poorly are tempted to take more risky financing decisions. Indeed, these firms mainly rely on debt to improve their performance by investing in risky projects. However, findings report a positive and significant effect of corporate performance on investment opportunities and growth assets rate. Hence, more performing firms invest on assets growth and have more future investment opportunities.

Finally, findings indicate that risky investments (R&D) are associated positively to total firm risk (SDRT). Not surprisingly, high risky investments globally induce high level of total risk.

Table 6. Board Gender diversity and Firm risk taking**Panel A. Managerial risk-taking measures and gender diversity models**

Legend: **LnRDEX** is the logarithm of the ratio of R&D expenditure scaled by assets; **LnGROW** is the logarithm of the annual rate of growth rate of assets; **LnMBVA** is the logarithm of the market value of assets scaled by book value of assets; **DWOM** is a dummy variable that takes a value of one when at least one woman seats in the board, and zero otherwise; **PWOM** is the percentage of women on the board, calculated by the number of women directors divided by the total number of directors in the boardroom; **LnNWOM** is the logarithm of the number of women on the board of directors; **ROA** is Return on assets ratio; **LnSIZE** is the logarithm of the book value of assets; **UFOR** is a dummy variable that takes one when the ultimate owner is foreign investor and zero otherwise; **BSIZ** is the number of directors on board.

	Ln RDEX	Ln RDEX	Ln RDEX	LnGROW	LnGROW	LnGROW	LnMBVA	LnMBVA	LnMBVA
PWOM	3.648 (0.62)			0.574 (1.21)			-0.068 (0.14)		
Ln NWOM		0.031 (0.57)			0.005 (1.12)			-0.002 (0.28)	
DWOM			0.406 (0.55)			0.074 (1.13)			-0.021 (0.28)
lnSIZE	-0.589 (1.47)	-0.603 (1.50)	-0.605 (1.51)	0.037 (0.95)	0.035 (0.91)	0.035 (0.91)	0.026 (0.55)	0.025 (0.53)	0.025 (0.53)
BSIZ	0.459 (2.01)**	0.460 (2.02)**	0.461 (2.03)**	-0.020 (1.09)	-0.019 (1.08)	-0.019 (1.07)	-0.042 (2.35)**	-0.042 (2.33)**	-0.042 (2.33)**
LnCASH	0.545 (1.34)	0.551 (1.36)	0.552 (1.36)	-0.124 (3.90)***	-0.124 (3.91)***	-0.124 (3.91)***	0.006 (0.14)	0.007 (0.15)	0.007 (0.15)
LnSRDT	1.298 (3.40)***	1.298 (3.40)***	1.298 (3.40)***						
UFOR	-4.709 (6.81)***	-4.748 (6.90)***	-4.750 (6.91)***	-0.063 (0.55)	-0.069 (0.60)	-0.069 (0.60)	0.467 (3.23)***	0.467 (3.21)***	0.467 (3.20)***
ROA				2.184 (5.08)***	2.190 (5.07)***	2.191 (5.07)***	1.457 (3.63)***	1.441 (3.61)***	1.441 (3.61)***
Constant	-2.556 (0.37)	-1.865 (0.27)	-2.253 (0.33)	-1.698 (2.66)***	-1.595 (2.58)**	-1.665 (2.63)***	0.084 (0.10)	0.083 (0.10)	0.103 (0.13)
R-squared	0.3960	0.3953	0.3952	0.1190	0.1180	0.1180	0.1256	0.1236	0.1236

*, **, *** are respectively significance level of 10%, 5%, 1%
Z statistics are in ()

Panel B. Financial risk-taking measures and gender diversity

Legend: **LEVR**: The ratio of the book value of financial long term debt scaled by assets; **LnLDME**: The logarithm of the ratio of the book value of financial long term debt scaled by market value of equity; **LnCASH**: The logarithm of the ratio of current assets (excluding stocks) to current liabilities; **LnSDRT**: The logarithm of the standard deviation of daily stock returns during fiscal year; **DWOM**: A dummy variable that takes a value of one when at least one woman seats in the board, and zero otherwise; **PWOM**: The percentage of women on the board, calculated by the number of women directors divided by the total number of directors in the boardroom; **LnNWOM**: The logarithm of the number of women on the board of directors; **ROA**: Return on assets ratio; **LnSIZE**: The logarithm of the book value of assets; **UFOR**: A dummy variable that takes one when the ultimate owner is foreign investor and zero otherwise; **BSIZ**: the number of directors on board.

	LEVR	LEVR	LEVR	LnLDME	LnLDME	LnLDME	LnCASH	LnCASH	LnCASH	lnSRDT	lnSRDT	lnSRDT
PWOM	-0.043			-0.061			1.330			0.109		
	(0.57)			(0.05)			(2.07)**			(0.21)		
Ln NWOM		0.000		-0.001				0.014			0.001	
		(0.16)		(0.05)				(2.10)**			(0.15)	
DWOM			0.002			-0.010			0.189			0.012
			(0.20)			(0.05)			(2.11)**			(0.16)
lnSIZE	0.028	0.028	0.028	0.162	0.162	0.161	0.017	0.010	0.009	0.050	0.049	0.049
	(2.16)**	(2.17)**	(2.18)**	(1.21)	(1.20)	(1.20)	(0.17)	(0.10)	(0.09)	(1.16)	(1.14)	(1.15)
BSIZ	0.003	0.002	0.002	0.108	0.107	0.108	0.011	0.008	0.008	-0.019	-0.019	-0.019
	(0.63)	(0.56)	(0.56)	(2.89)***	(2.86)***	(2.87)***	(0.38)	(0.29)	(0.29)	(0.99)	(0.99)	(0.99)
LnCASH				-0.599	-0.599	-0.599						
				(4.44)***	(4.41)***	(4.41)***						
LnSRDT	0.006	0.006	0.006	0.007	0.007	0.007						
	(0.99)	(1.00)	(1.00)	(0.10)	(0.10)	(0.10)						
UFOR	0.112	0.112	0.112	-0.350	-0.351	-0.351	0.325	0.312	0.312			
	(2.08)**	(2.06)**	(2.06)**	(1.54)	(1.54)	(1.54)	(1.38)	(1.31)	(1.31)			
ROA	-0.209	-0.207	-0.207	-6.568	-6.541	-6.540				-0.871	-0.871	-0.870
	(2.57)**	(2.55)**	(2.56)**	(5.75)***	(5.76)***	(5.76)***				(2.02)**	(2.02)**	(2.01)**
LEVR										0.354	0.352	0.352
										(1.15)	(1.14)	(1.15)
Ln RDEX										0.015	0.015	0.015
										(2.46)**	(2.46)**	(2.46)**
LnMBVA							-0.727	-0.715	-0.715			
							(5.90)***	(5.82)***	(5.82)***			
LnLDME							-0.457	-0.452	-0.452			
							(6.52)***	(6.48)***	(6.48)***			
LnGROW							-0.142	-0.142	-0.142			
							(3.28)***	(3.32)***	(3.32)***			
Constant	-0.380	-0.382		-4.044	-4.054	-4.044	-0.650	-0.319	-0.498	-4.561	-4.538	-4.551
	(1.67)*	(1.67)*		(1.82)*	(1.85)*	(1.82)*	(0.39)	(0.19)	(0.30)	(6.07)***	(6.03)***	(6.05)***
R-squared	0.1267	0.1268		0.4499	0.4482	0.4482	0.3701	0.3652	0.3652	0.2645	0.2676	0.2676

*, **, *** are respectively significance level of 10%, 5%, 1%
Z statistics are in ()

4.5. Robustness analysis

4.5.1. Ultimate owner identity effect on the gender diversity and Risk taking relationship

In emerging economies like Tunisia, firms face severe agency problems between controlling and minority shareholders (La Porta et al. 1999). Hence, minority shareholders have a limited and insignificant effect on making decision process: it is difficult for them to decide on the board composition and to appoint independent administrators. However, they have more effective role when the market becomes better regulated (Kim and al., 2007).

From an agency perspective, women are considered as independent directors, their appointments may only be decided by the dominant shareholders. Regarding Tunisian corporate board, in particular non-financial corporate, there is only one woman (Mrs Alya Abdallah) who is politically connected. In fact, she is married to Abdelwhab Abdallah (the advisor of the ex-president Ben Ali).

Among 16 family controlled firms, 6 firms have appointed women on their boards. However, these women are very often wives or daughters of founding-family members.

The 12 State-controlled firms in our sample do not display different features: 6 firms of them appoint female directors in their boardrooms who are State bureaucrats: they were pro-politicians or public officers.

Surprisingly, there are no women appointed on the board of directors when the ultimate owner is a foreign investor. In our sample, there are only three firms controlled by foreign owners. It should be noticed here that, among them, the owners of two firms come from countries promoting gender-diversified boards (French owners). Another explanation is that they are not forced to accept the appointment of local women directors on their boards.

Since shareholder identity affects shareholders objectives and ways to exercise their rights (Pedersen and Thomson, 2003, 2000), we argue that risk preferences are not influenced neither by decisions taken by women on boards nor by the changes they introduce but most probably by their network and professional background. This is in line with Goldman et al. (2009, 2008) who show that connected directors may affect shareholder value and sometimes firm value by affecting the probability of winning government procurement contracts. This why, we will focus on the following, on the affiliation of women directors in our sample. We introduce the following gender-diversity variables:

- **WPCO:** women directors are politically connected.
- **WFAM:** Women directors are founding family directors.
- **WSTA:** Women directors who are state bureaucrats.

Table 7. Robustness regressions: Gender diversity, women affiliation and risk taking measures

Legend: **LnCASH** is the logarithm of the ratio of current assets (excluding stocks) to current liabilities; **LnMBVA** is the logarithm of the market value of assets scaled by book value of assets; **WPCO** is Female directors who are connected politically; **WSTA** is women directors who are state bureaucrats; **WFAM** is women directors who are members of family when the ultimate owner is the family; **LnSIZE** is the logarithm of the book value of assets; **UFOR** is a dummy variable that takes one when the ultimate owner is foreign investor and zero otherwise; **BSIZ** is the number of directors on board.

	LnCASH	LnMBVA
WPCO	0.400 (1.71)*	0.271 (2.21)**
WSTA	0.013 (2.15)**	-0.003 (0.61)
WFAM	0.008 (0.83)	-0.002 (0.25)
BSIZ	0.004 (0.13)	-0.046 (2.48)*
LnMBVA	-0.756 (6.02)***	
Lnsize	0.030 (0.31)	0.028 (0.58)
LnLDME	-0.462 (6.58)***	
LnGROW	-0.195 (3.63)***	
UFOR	0.325 (1.34)	0.413 (2.72)***
ROA		1.415 (3.38)***
LnCASH		0.003 (0.06)
Constant	-0.535 (0.33)	-0.002 (0.00)
R-squared	0.3924	0.1260
Number of code	28	29

*, **, *** are respectively significance level of 10%, 5%, 1%
Z statistics are in ()

Regression results confirm the robustness of our previous findings for total risk, leverage ratio, growth rate and R&D expenditures. Hence, the gender-diversity variables on the affiliation of women on board do not affect these risk-taking variables.

We show, however, a significant effect of gender diversity variables on risk-taking when it is assessed by CASH (financial dimension) or MBVA (managerial dimension).

For instance, the presence of politically connected women on the board affects positively and significantly investment opportunities. While women directors who are state bureaucrats influence positively cash holding.

These findings are consistent with resource dependency theory arguing that politically connected women and State officers' women rely on their network and use their connections so that they become able to handle the environment uncertainty. In fact, they bring much more resources than other firms without women on board (Pfeffer and Salanick, 1978). Hence, these women help firms hold more cash and have more investment opportunities. Accordingly, we cannot reject hypothesis H1

This is also consistent with the hypothesis that the appointment of women on some boards is explained by a reputational effect: some firms want to enhance their image in the market by presenting themselves as gender-diversified firms while other firms have not really chosen to appoint these women on their boards (they are sometimes forced to accept them, particularly when they are politically connected). Despite the fact that they have diverse women affiliations, these women very often have no effective effects from financial and managerial risk-taking perspectives, on the boardrooms where they are sitting.

In family firm, we noticed a non-significant effect of all risk-taking variables that points out the ineffectiveness of board of directors in presence of dominant shareholder like family owner. In fact, it seems that women directors have little or no ability to influence the businesses of the firm or the composition of board. Another explanation is that they are sitting on the boards for the only aim: implementing the strategy of the controlling shareholder. Accordingly we cannot accept H2.

4.5.2. The effect of board gender diversity on the relationship between corporate board characteristics and firm risk taking

In the previous regressions (main and robustness), we tested the direct effect of the presence of women directors on risk-taking. In this subsection, we test the indirect influence of the gender-diversified board on firm risk-taking. For thus, we divide our sample into two subsamples: firms with no women directors and firms with women directors and we regress board characteristics on risk-taking proxies in each group.

We include in this analysis two additional variables that reflect board independence: CEO split functions and the proportion of independent directors.

INDP: Directors are independent if they do not hold any executive position in the firm and are not affiliated in any way to the firm. From agency perspective, independent directors represent and defend minority shareholders' interests. They can potentially prevent expropriation of minority shareholders by large ones, supervise CEO, participate to the executive investment decisions and protect shareholders' wealth (Shleifer and Vishny, 1990). Hence, the independent directors have a commitment to undertake low risk investment/decisions.

SPLI: The separation between the functions of CEO and chairman is used as the second indicator of the board independence.

The composition of each group is given in Table 8 while the estimation results are presented in Table 9.

Table 8. Subsamples composition

Without women	Number	With women	Number
Energy	5	Energy	2
Industrials	7	Industrials	2
Health care	1	Health care	1
Consumer goods and services	12	Consumer goods and services	8
Telecommunication	1	Telecommunication	1
Total	26	Total	14

We would like to highlight that some companies belong to two subsamples but for different time periods.

Results indicate that board size and board independence affect differently risk-taking proxies in both subsamples. According to these findings, we confirm that the presence of women on the corporate board affects some strategic and financial decisions.

In firms with women directors, we find that the coefficient of the board size is positive and significant when risk-taking is measured by R&D expenses. In these firms, we find also that board size affect negatively and significantly cash-holding.

Table 9. Robustness Analysis: Board effectiveness, gender diversity and managerial risk taking

Panel A. managerial measures of risk taking, board effectiveness and gender diversity models

Legend: **LnRDEX:** The logarithm of the ratio of R&D expenditure scaled by assets; **LnGROW:** The logarithm of the annual rate of growth rate of assets; **LnMBVA:** The logarithm of the market value of assets scaled by book value of assets; **INDEP:** % of independent directors ; **SPLI:** Takes 1 if there is a separation between the functions of CEO and chairman and zero otherwise **ROA:** Return on assets ratio; **LnSIZE:** The logarithm of the book value of assets; **UFOR:** A dummy variable that takes one when the ultimate owner is foreign investor and zero otherwise; **BSIZ:** the number of directors on board.

	No Women	Women	No Women	Women	No Women	Women
	Ln RDEX	Ln RDEX	LnGROW	LnGROW	LnMBVA	LnMBVA
BSIZ	0.325 (1.26)	2.175 (4.17)***	-0.008 (-0.40)	-0.028 (-1.10)	-0.036 (-1.89)*	-0.041 (-0.53)
INDP	0.373 (0.08)	2.811 (0.63)	0.678 (2.00)**	-0.417 (-1.92)*	0.024 (0.08)	-0.183 (-0.31)
SPLI	-2.820 (-2.66)***	-0.320 (-0.18)	0.029 (0.36)	0.149 (1.45)	0.096 (1.07)	0.328 (1.44)
lnSIZE	-0.787 (-1.65)*	-0.186 (-0.10)	0.042 0.93	0.198 2.02	0.722 (1.44)	-0.230 (-0.81)
LnCASH	0.299 (0.68)	1.985 (1.84)*	-0.124 (-2.77)***	-0.012 (-0.19)	0.040 (0.81)	-0.192 (-1.07)
LnSRDT	0.513 (1.20)	3.811 (5.04)***	0.004 (0.07)	0.005 (0.08)	0.010 (0.32)	0.045 (0.67)
UFOR	-3.655 (-4.98)***	-8.963 (-4.14)***	-0.022 (-0.16)	-0.432 (-3.50)***	0.392 (2.71)***	0.529 (1.42)
ROA			1.554 (2.63)***	3.394 (5.74)***	1.288 (3.91)***	2.725 (1.45)***
Constant	-0.030 (-0.00)	-15.521 (-0.48)	-1.942 (-2.39)**	-4.447 (-2.51)**	-0.761 (0.85)	4.649 (0.90)
R-squared	0.4712	0.5776	0.1257	0.4988	0.2247	0.2342
N	189	66	167	59	189	66

*, **, *** are respectively significance level of 10%, 5%, 1%
Z statistics are in ()

Panel B. Financial risk taking measures, board effectiveness and gender diversity

Legend: **LEVR:** The ratio of the book value of financial long term debt scaled by assets; **LnLDME:** The logarithm of the ratio of the book value of financial long term debt scaled by market value of equity; **LnCASH:** The logarithm of the ratio of current assets (excluding stocks) to current liabilities; **LnSDRT:** The logarithm of the standard deviation of daily stock returns during fiscal year; **ROA:** Return on assets ratio; **LnSIZE:** The logarithm of the book value of assets; **UFOR:** A dummy variable that takes one when the ultimate owner is foreign investor and zero otherwise; **BSIZ:** the number of directors on board.

	No women	Women	No women	Women	No women	Women	No women	Women
	LEVR	LEVR	LDME	LnLDME	LnCASH	LnCASH	lnSRDT	lnSRDT
BSIZ	0.003 (0.61)	0.006 (1.23)	0.100 (2.32)**	0.073 (0.43)	0.0448 (1.31)	-0.128 (-2.96)***	-0.008 (-0.40)	-0.074 (-1.50)
INDP	-0.012 (-0.12)	0.078 (1.35)	0.211 (0.35)	-2.026 (-1.43)	-0.618 (-1.16)	-1.410 (-3.25)***	-0.177 (-0.41)	-0.996 (-3.04)***
SPLI	0.020 (0.82)	0.034 (1.49)	-0.064 (-0.27)	0.224 (0.70)	-0.231 (-1.48)	0.056 (0.35)	-0.128 (-1.39)	0.201 (1.35)
lnSIZE	0.027 (2.04)**	0.033 (1.88)*	0.156 (1.02)	-0.563 (-0.85)	-0.028 (-0.27)	-0.279 (-1.93)**	0.018 (0.36)	0.090 (0.73)
LnCASH			-0.557 (-3.51)***	-0.953 (-2.15)**				
LnSRDT	0.006 (0.84)	0.007 (0.99)	0.067 (0.87)	-0.105 (-0.74)				
UFOR	0.115 (2.40)**	0.185 (6.81)***	-0.415 (-1.55)	0.859 (1.22)	0.392 (1.40)	1.185 (6.00)***		
ROA	-0.237 (-2.46)**	-0.413 (-2.79)***	-6.331 (-6.44)***	-8.540 (-1.77)*			-0.793 (-1.49)	-0.952 (-1.21)
LEVR							0.461 (1.25)	0.024 (0.05)
Ln RDEX							0.010 (1.32)	0.014 (1.35)
LnMBVA					-0.874 (-4.08)***	-0.695 (-4.95)***		
LnLDME					-0.483 (-5.33)***	-0.504 (-7.75)***		
LnGROW					-0.117 (-2.40)**	-0.068 (-0.53)		
Constant	-0.374 (-1.60)	-0.547 (-1.84)	-3.653 (-1.41)	8.698 (0.71)	0.046 (0.03)	6.245 (2.44)**	-4.094 (-4.75)***	-4.677 (-2.04)**
R-squared	0.1048	0.6069	0.5360	0.4431	0.3593	0.8537	NS	0.2511
N	189,000	67,000	189,000	66,000	169,000	59,000		67,000

*, **, *** are respectively significance level of 10%, 5%, 1%
Z statistics are in ()

According to these results, we conclude that the presence of women on the board increase large board effectiveness (BSIZ, INDP, see table 9, panel A). In the financial literature, it is strongly argued that a large board brings more resources and more business connections, and also high coordination costs (under asymmetric information).

Our empirical findings show that women on board diminish potential conflicts between directors, strengthen directors' relationship and reduce coordination costs. Hence, women presence leads directors to engage in R&D investments and to use cash holding on investment.

In firms without women directors, we detect a negative and significant effect of board size ($p < 0.1$) on investment opportunities and a positive and significant effect ($p < 0.01$) on the level of leverage (LDME). Hence, in absence of women directors, large-sized boards are ineffective, in the sense they fund low profitable investment opportunities with high leverage. These findings indicate that these firms take risky financing decisions but not risky investment decisions.

When we use assets growth as risk taking proxy, the coefficient of the proportion of independents directors is positive and significant ($p < 0.05$) in firms without women directors and negative and significant ($p < 0.1$) in firms with women directors

In addition, for the sample of firms with women directors, we find a negative and significant effect ($p < 0.01$) of the proportion of independents directors on total firm risk.

These findings highlight that the presence of women on board leads independent directors to take more "safe" and "conservative" decision and reduces internal growth and total firm risk. Since gender diversity is considered as one of the measures of board independence, results show that the presence of women increases board independence which consequently reduces risk taking.

In contrast, we find that firm risk-taking increases with the proportion of independents directors in absence of women on board.

This finding corroborates stewardship perspective arguing that inside directors and affiliated directors are the most effective directors. Indeed, in presence of asymmetric information they are well informed and they are closer to the management team than outside directors. High percentage of inside directors allows an informative and effective communication advantages within the company (Donaldson, 1990; and Donaldson and Davis, 1994, 1991). In contrast, independent directors are not tempted to control and supervise officers as they have a marginal and limited ability to influence decisions and face severe asymmetric information problems when they want to know more about the business.

In addition, inside directors are very often reluctant when it comes to changes introduced by the independent ones. We are tempted to think that the absence of women directors worsens conflicts between insiders and independents directors. Thus, the lack of cooperation and trust

between the board and management will reduce the board's effectiveness and increase risk-taking problem.

For CEO split functions, the only significant coefficient appears when we use R&D expenses and in firms without women directors. This coefficient is negative and significant ($p < 0.1$). This finding is in line with the assumption that split function reduces managerial discretion which induces risky investment decision.

5. Conclusion

Despite the considerable work done in Tunisia, few women only are sitting on boards most of them are politically connected and/or founding-family members. Only small boards are concerned with the gender diversity issue. The analysis of the effect of the control type shows that foreign ultimate owners are not concerned with firms with gender-diversified boards. They rely on long term debt but they do not invest in risky investments, like R&D activity.

Our results provide evidence that women affect only financial risk-taking through the corporate cash policy and have very often no effect on managerial risk-taking. The robustness analysis shows that only political connected women and State affiliated women have a significant effect on cash corporate policy and investment opportunities. One explanation could be provided by corporate governance theory that is the lack of independent and outside directors. It would be interesting to analyze the reputational effects of appointing women in the board on stock liquidity.

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