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Board gender diversity and firm's equity risk

Mohammad Jizi & Rabih Nehme

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Abstract

Purpose – There is a growing attention toward the importance of women's participation on corporate boards in enhancing board governance and decision-making quality. The literature lacks sufficient empirical evidence on the relationship between women's involvement on boards and firms' risk. This paper aims to investigate the influence of board gender diversity on firms' risk.

Design/methodology/approach - This paper explores the influence of women's participation on corporate boards on firms' stock return volatility. The examined firms are all non-financial firms listed on the FTSE 350 index between 2008 and 2013. The Bloomberg database is used to collect the needed variables. Panel data is employed through a regression model to estimate relationships. One-step *Arellano and Bond* and the generalized method of moments are used to control for reverse causality and the existence of endogenous variables.

Findings - The results suggest that women's participation on corporate boards favorably impacts firms' risk by reducing firms' stock return volatility. We also find that the influence of women on reducing stock return volatility is higher in four particular industries recognized by their close proximity to consumers (consumer goods, consumer services, health care, and utilities).

Originality/value - The study contributes to the growing literature on women on boards and offers solid empirical evidence of the correlation between board gender diversity and firms' risk. The empirical results provide economical and statistical validity to the "voluntary business-led" approach of Davies reports and to the recommendation by the UK corporate

governance code 2014 on the favourable influence of board gender diversity for effective functioning.

Keywords Board gender diversity, Stock return volatility, FTSE 350 firms.

Paper type Research paper

Introduction

With the changing business environment and the increasing complexity of corporations, there is growing attention to the importance of appointing female directors on corporate boards to facilitate effective board functioning (Adams and Ferreira, 2009; Chapple and Humphrey, 2014). Previous research on board gender diversity and firm performance highlights the positive influence of the representation of female directors on firms' financial returns (Shrader et al., 1997; Smith et al., 2006; Campbell and Minguez, 2008; Adams and Ferreira, 2009; Luckerath-Rovers, 2013). It is argued that women on boards are more inclined toward transparency and are more effectual in monitoring management activities, which result in better decision quality (Gul et al., 2011, Srinidhi et al., 2011; Vathunyoo et al., 2016). Female directors are found to be more conservative and risk averse than male directors. Their participation on boards is linked to better earning quality, higher levels of liquid assets, and higher equity capital (Gul et al., 2011; Srinidhi et al., 2011; Loukil and Yousfi, 2015; Palvia et al., 2015). Additionally, Faccio et al. (2016) and Palvia et al. (2015) find that firms led by female CEOs are less volatile and less subject to failures, particularly during periods of financial stress. Indeed, the selection of directors from a wider pool of talents brings diverse life experiences, beliefs, backgrounds, and stakeholder connections and provide a better platform for sound governance and quality decision-making (Brammer et al., 2007; Trejesen et al., 2009; Dezso and Ross, 2012; Liao et al., 2015; Gupta, 2017). In other words, a gender-diverse board is more capable of representing and understanding its environment, managing business challenges, and responding to the concerns and needs of multiple groups of stakeholders.

The importance of women on boards has led **some European** governments to set gender quotas forcing large public companies to have gender diverse' boards. **In the UK, efforts to encourage women's participation in leadership positions have started decades ago. However,**

the Lord Davies report in 2011 was the first to encourage FTSE-listed firms to achieve a set target of 25% female board representation. The UK Corporate Governance Code (2014) has supported the Davies report initiative by emphasizing the importance of board diversity to facilitate effectual functioning and stakeholder relationships. A growing body of literature on the relationship between women board participation and firm financial performance has focused on accounting performance or firm value (Shrader et al., 1997; Smith et al., 2006; Campbell and Minguez, 2008; Erhardt et al., 2008; Adams and Ferreira, 2009; Dezso and Ross, 2012; Luckerath-Rovers, 2013). However, there is a dearth of empirical studies and inconclusive evidence on the nexus of women on board and firm risk (Loukil and Yousfi, 2015; Post and Byron, 2015;).

If women's participation on corporate boards enhances boards' governance and decision quality, one would expect that boards with more women representation will be more efficient in managing firms' risk. Our research contributes new empirical evidence on the association between board gender diversity and stock price volatility of the FTSE 350 firms and identifies in which industry female directors have greater influence on firms' stock volatility. The paper provides evidence from the UK, reflecting the response to a voluntary board gender target. In addition, the examined sample is selected from year 2008 to 2013 inclusive, which is likely to help in recognizing the change in women board representation as a response to the Davis report target. Our results provide policymakers and listed firms with empirical evidence illustrating the influence of female participation in corporate decision-making.

However, we cannot claim that no other research has examined the impact of board gender diversity on firm risk; to our knowledge, most empirical studies examine the influence of women's board participation on firm performance using accounting measures or firm value such as Tobin's Q and are conducted mainly on firms in the US and some European countries (other than the UK). Therefore, we believe that our findings are new and represent powerful

support for appointing more female directors on FTSE corporate boards and removing barriers to help firms achieve better performance.

In this study, we explore whether women participation on corporate boards has any significant effect on firm risk measured by stock return volatility. The relationship is examined using six years of data on FTSE 350 non-financial firms. We run several panel data regressions of stock return volatility and control for variables that are commonly found to impact firm risk. We find that the participation of women on boards reduces stock return volatility. The results suggest not only that the existence of women has favorable consequences on firm risk, but also that a higher percentage of women's participation on boards leads to greater reduction in stock return volatility. In addition, we find that, in industries attributed by close proximity to customers and/or those that serve a high percentage of females, women on the board are more influential on stock return volatility. Therefore, our results empirically support the Davies report and the UK corporate governance code guidelines toward more gender-diverse boards. The reported findings encourage FTSE firms to attract and appoint more female directors on their boards to improve their financial performance.

The following section provides a review of the literature and background information. The research design and hypotheses testing are discussed in Sections 3 and 4. Robustness tests and results are interpreted in Section 5. The conclusion is provided in the last section.

Literature review and hypotheses development

The latest decade witnessed growing attention to the role of gender in executive positions and the board of directors. Board gender diversity has formed widespread interest and developed a new dimension in the debate of corporate governance. The lead belonged to Norway, as it took the initiative of setting a 40% quota for women on board participation starting in 2005; non-complying companies faced dissolution (Seierstad and Opsahl, 2011). Spain followed Norway by adopting a quota law in 2007 to achieve 40% representation of female directors on corporate

boards by 2015 (Adams and Ferreira, 2009). France, in January 2011, passed a law requiring large firms (those with more than 500 employees) to have at least 20% women on boards and to gradually increase women's representation to 40% by 2017 (European Commission, 2011). The France quota law **considers the appointment of a board member invalid if it does not satisfy the gender diversity quota requirement** (European Commission, 2011). Other European countries, such as Belgium and Italy, call for one third of each gender to be presented on boards and hold firms liable for not complying with the quota law, subject to fines and sanctions. While Norway, France, Belgium, and Italy penalize firms for not complying with the board gender diversity quota laws, Germany requested its large public companies to appoint females to at least 30% of the board director positions by 2016 and to keep the unfilled women's seats vacant until they find enough female directors (European Commission, 2011; Berger et al., 2014; Seierstad et al., 2017).

Unlike other European countries, the UK has not imposed a board gender quota to enhance women's board representation, but adopted a different strategy. **Initially, FTSE 100 firms were encouraged through the Davies reports to achieve a target of 25% women on their boards (Davies Review Annual Report, 2015). By approaching the 25% set target by year 2015, a new target of 33% women on boards was set for FTSE 350 firms to achieve by 2020 (Hampton-Alexander Review, 2016).** The first report on women on boards by Lord Davies of Abersoch was issued on February 2011. The report encourages all FTSE firms to set the targeted percentage of female directors for the coming four years and urges FTSE 100 firms to have at least 25% women on their boards. In addition, firms were called to disclose the percentage of female directors on their boards and to report in their 2012 "Corporate Governance Statement" on the progress of this matter. The business case for improving board gender balance in the report focuses on boards' enhanced performance if women contribute in the boardroom. As women comprise around half of the workforce and are as successful as their

counterparts educationally and in their careers, firms will benefit by drawing from a larger pool of talents to enhance boards' performance. That is, diversity on boards facilitates a wider range of perspectives, different life experiences, higher attention to detail, and the ability to understand the needs of various stakeholders.

In a five-year summary, the “Women on Boards Davies Review” report shows that FTSE firms have responded to the call for higher women representation on corporate boards. In general, **all-male** boards were reduced dramatically to zero by 2015 in FTSE 100 firms, and female representation on FTSE 350 firms has doubled since the issuance of the first report in 2011. Building on the success of the Davies Review, the Hampton-Alexander Review (2016) points out two important dimensions to encourage firms to voluntarily increase their female representation. The review highlighted the importance of women’s skills and perspectives in decision making and the economic loss faced if they are not well represented in leadership positions. It sought to “address the significance of under-employment of women and costly loss of their skills to British business and the economy.” Additionally, the review sets a new target of 33% women’s representation on boards for all FTSE firms to achieve by 2020 and recommends enhancing female representation in executive committees, maintaining the “voluntary business-led approach.”

Traditional literature on women on **b**oards is largely descriptive (Terjesen et al., 2009; Sealy et al., 2017). In 2009, scholars started theorizing and examining the interrelationships between women on board and firms’ financial performance to justify women board participation (Sealy et al., 2017). However, a business case to support women’s participation on boards should not only be linked to firm financial performance (Ferreira, 2015). According to Senbet and John (1998), board composition is a major factor affecting its monitoring capacity. Boards’ heterogeneous composition represents and reproduces its society, environment, and stakeholders and can contribute positively to firm performance and

shareholders' value (Erhardt et al., 2003; Smith et al., 2006; Brammer et al., 2007). Firms' performance is the consequence of quality decision making, innovation, and creativity (Siciliano, 1996). Having a gender-diverse board facilitates diversity in voice and life experience, which enrich creativity and result in better governance and performance overall (Singh and Vinnicombe, 2004). Female directors are likely to bring new insights into significant strategic decisions, particularly those related to female customers, trading partners, and personnel (Daily et al., 1999). Their understanding, which might be better than male directors' understanding, of some business and/or market segments improves board decision quality (Singh and Vinnicombe, 2004). Women's participation on boards could also improve firms' image and have a positive influence on consumer behavior (Smith et al., 2006). Gender-diverse boards may, thus, reflect the absence of discrimination, offer a comprehensive knowledge base, and provide a set of business solutions for better board functioning (Carter et al., 2003; Erhardt et al., 2003; Dezsó and Ross, 2012).

Both agency theory and stakeholder theory are helpful in explaining the board gender diversity–firm risk nexus (Chapple and Humphrey, 2014). From an agency theory standpoint, having more female directors on boards limits financial consequences (Tanaka, 2014; Sabatier, 2015). The mix of diverse life experiences and capabilities is important to boards in executing their fiduciary duties and assessing management strategies (Hillman and Dalziel, 2003). According to Adams and Ferreira (2009), women on boards are more likely to be independent compared to their male counterparts and are more inclined to fire poor-performing CEOs. The fact that female directors “do not belong to the old boys' club” make them more likely to emphasize the independence concept more (Adams and Ferreira, 2009). Women on boards are inclined toward more transparency and disclosing voluntarily public information to enable investors to better assess the firm, which improves stock value (Krishnan and Parsons, 2008; Gul et al., 2011). Other studies highlight women's risk-aversion behavior and their role in

facilitating board decision-making communication (Bilimoria, 2000; Schubert, 2006). Approaching compromised decisions reduces firms' risk through reducing variability in performance (Lenard et al., 2014). Tanaka (2014) shows that firms with gender-diverse boards experience lower cost of public debt. Tanaka (2014) argues that the monitoring and advising capacity of outside female directors reduce agency conflict and the risk of default; consequently, bondholders perceive women on boards as a form of protection of their interests. Carter et al. (2003), Campbell and Minguez-Vera (2008), and Dezsö and Ross (2012) conclude that women on the boards of Fortune 1000 companies and Spanish firms lead to better shareholders' value. The optimistic investors' reaction of board gender diversity encourages firms to have gender-balanced boards, as this is likely to maintain and/or improve board independence (Kang et al., 2009). Therefore, gender-diverse boards have better corporate governance outcomes, which influence firms' reputation and financial performance (Terjesen et al., 2009).

Ryan and Haslam (2005) observe the correlation between women on boards and firm market performance by examining stock behavior in the month prior to and after the appointment of a matched sample of male and female directors. They find that firms that had experienced a decline in the stock market had appointed female directors. However, after the three-month period of appointment, the decline in stock returns had reduced, and the return matched with the return of firms that had appointed male directors. In a later study, Haslam et al. (2010) show that the relationship between board gender composition and firm performance varies according to the employed performance measure. They argue that, while no correlation exists between women on boards and accounting-based performance measures, a negative correlation exists with market-based measures. While Sabatier (2015) argues that gender-diverse boards assist firms in reducing inefficiencies and get them closer to their optimal performance, Joecks et al. (2013) address the debate on board gender diversity from a critical

mass perspective. Joecks et al. (2013) show that women's participation on boards can influence positively the performance only if their representation exceeds 30%, otherwise their presence will have an adverse effect. A look at investors' reactions to women's board participation shows that the representation of female directors on boards enhances monitoring, evidenced by higher earnings quality and accounting returns (Srinidhi et al., 2011; Post and Byron, 2015). Lenard et al. (2014) examine a sample of US firms, showing that higher female participation on boards contributes to a reduction in stock market variability. Similarly, Liu et al. (2014) and Sabatier (2015) show that women's participation on boards of directors enhances performance indicators such as return on assets, return on equity, return on sales, and Tobin' Q.

From a stakeholder theoretic perspective, firms' success is linked to developing good relationships with stakeholders, acknowledging and addressing societal needs and concerns, and respecting the mix and values of its community (Jizi, 2017; Foote et al., 2010). Diversified boards assist in managing stakeholders' expectations in a complex societal setting (Chapple and Humphrey, 2014). Appointing female directors might advance firms' social welfare by maintaining and improving firms' relationships with their society and reflect the demographic attributes of core stakeholder groups (Luckerath-Rovers, 2013). Female directors consider the interest of multiple stakeholders, demonstrate sensitivity to others' needs, and enhance board service roles (Mallin and Michelon, 2011). Women on boards appear to occupy a role of network member and a symbol of change for other women, thus reflecting a firm's gender equality and fair representation of society (Walls et al., 2012). The presence of demographic differences on boards and reflecting the diversity in the socio-economic environment facilitate understanding of the complex business environment and respond to the needs of multiple stakeholders (Hillman and Dalziel, 2003; Campbell and Mingues-Vera, 2008; Bowrin, 2013). This enhanced decision quality is likely to be reflected on firms' risk (Colaco et al., 2011). Board effective functioning relates to a board's collective expertise and backgrounds; however,

the director's impact also affects the public interest (Forbes and Milliken, 1999). Prior research shows that social and environmental issues are more of a concern to women than men, which explains women's encouragement to manage environmental risk and prefer quality of life to material success (Fukukama et al., 2007; Hofstede et al., 2010; Liao et al., 2015).

Arguably, women's behavior on corporate boards differs from that of male directors (Adams and Ferreira, 2009). The quality of board governance is influenced by the variety of characteristics of its directors (Tanaka, 2014). Gender behavioral difference in management explains the changing dynamics when women participate on boards (Dezso and Ross, 2012), forming a new governance dimension (Liao et al., 2015). Female directors are less self-interest oriented, more inclined toward sustainable investments, possess better communication skills, and are more committed than their male counterparts (Coffey and Wang, 1998; Huse and Solberg, 2006; Charness and Gneezy, 2012). Additionally, women apply an interactive leadership approach, seek others' input, share information, and communicate effectively with subordinates (Tanaka, 2014; Rishani et al., 2015; Kelan, 2016). They are more collaborative, civilized, and supportive than their male counterparts (Terjesen, et al., 2009) and more inclined toward participatory and democratic management (Eagly and Johnson, 1990). In general, female board directors are better prepared for meetings and tend to ask more questions, which provide new viewpoints and add value to the board discussions (Farrell and Hersch 2005; Konrad et al. 2008). Adams and Ferreira (2009) find that female directors not only have better board meeting attendance than male directors, but also demonstrate greater participation, thus enhancing males' attendance behavior. These behaviors exhibit the mechanism underlying the favorable consequences of a gender-diverse board (Van Knippenberg et al., 2004) and the influence of gender diversity on board effectiveness (Adams and Ferreira, 2009).

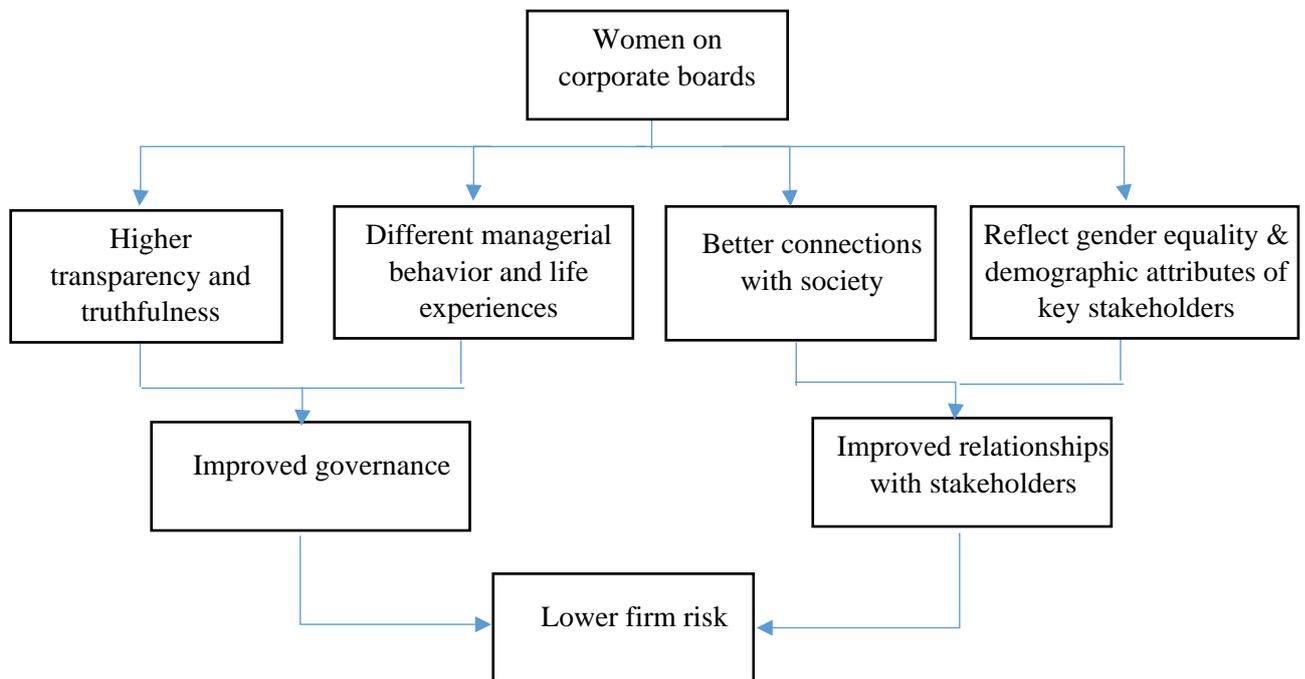
Building on the above points, we argue that, if more women's participation on boards enhances board effectiveness and improve firm's governance, whether because they bring new

life experiences and have better understanding than male directors in some business segments, or because they form a new concept of independent director by not belonging to the classical male group of directors, firms with more women on boards are expected to have less risk.

H1: The greater the representation of female directors on the board, the lower the firm risk.

H2: The influence of women’s board participation on firm risk varies across industries.

Our conceptual model is illustrated below:



Research design

Sample

The paper seeks to explore whether women’s participation on the corporate boards of FTSE 350 non-financial firms is related to firms' stock return volatility. We, therefore, examine the period from 2008 to 2013 as a balanced sample before and after the issuance of the Davies report in February 2011. We exclude financial firms to avoid having firms subject to different types of business risk and operation complexity. This leaves us with an initial sample of 1,423 observations across a six-year period. We use the Bloomberg database to collect data on the percentage of women on boards, firm stock price volatility, and other variables to control for

board- and firm-related characteristics. After adjusting for missing data, the final examined sample size is 1,138 observations.

To avoid model misspecification, we control for a set of board- and firm-related characteristics. Board composition and diligence are known to be key determinants of board effectiveness. We, therefore, control for board composition and diligence using board size, board independent directors, board meeting, and chairman dual role. Board size influences the quality of communication, which in turn reflects board effectiveness and decision-making. Cheng (2008) finds that larger boards have less variable stock returns, as their final decisions are less extreme and reflect more discussion before reaching an agreement. Previous research suggests that board independence is related to positive firm outcomes and limits the occurrence of earnings management and the opportunity for fraud (see e.g. Dechow et al., 1996; Christy et al., 2013). However, executive directors might have more inside information for effective decision making (Ramdani and Witteloostuijn, 2010). A chairman's dual role is expected to reduce performance (Carty and Weiss, 2012), as it might indicate power abuse by CEOs and loss of monitoring. The higher frequency of board meetings improves communication among board members and has a favorable impact on firm value (Brick and Chidambaran, 2010).

Another set of variables is used to control for firm characteristics, including return on assets (ROA), logarithm of total assets, leverage, market-to-book value, and average traded volume. Firms with high ROA are more resistant to financial problems and external shocks (Baek et al., 2004), as profitability reduces spread and compensates investors for further risk-taking (Flannery and Sorescu, 1996). Large firms might face less stock price volatility, as they have a greater ability to diversify their investments and access capital markets (Baek et al., 2004). We control for firm leverage, as it is seen as a tool to manage agency problems and enhance stock performance (Kochhar, 1996). Jizi and Dixon (2017) suggest that firms' growth indicators and traded volume influence return volatility. Higher market-to-book value reflects

firms' potential to undertake new investment opportunities and the sufficient use of available cash flows, which increase the probability of future returns.

The Model

The below model is used to test the hypothesis:

$$VOL_{it} = \alpha_0 + \alpha_1 WB_{it} + \alpha_2 BS_{it} + \alpha_3 BI_{it} + \alpha_4 CEOD + \alpha_5 BM_{it} + \alpha_6 LOGA_{it} + \alpha_7 ROA_{it} + \alpha_8 MB_{it} + \alpha_9 LEV_{it} + \alpha_{10} ATV_{it} + \varepsilon_{it}$$

[Table 1 is about here]

Table 2 shows that the mean of the percentage of women's participation on boards during the examined period is 8.83% with a standard deviation of 9.2% and a maximum women's board representation of 50%. Table 3 shows the progression of women's participation on boards across the years as the mean increased from 7.7% in 2008 to 10.7% in 2013. While firms across industries increased women's representation on their boards post-Davies report, the variation in women's presence is more pronounced. The highest percentage of women on boards is in the utilities industry, followed by consumer goods and consumer services, and almost half the representation occurs in the energy and basic materials industries. The reported results suggest that women are more represented on boards in industries characterized by their close connections to the final consumers, while other sectors such as energy and basic materials are less connected to final consumers and consequently are more dominated by male directors (Brammer et al., 2007).

[Table 2 is about here]

[Table 3 is about here]

Table 4 shows that the stocks of firms with women on their boards witnessed higher traded volume and less return volatility. The lower volatility supports the notion that women's

representation on boards enhance firms' market performance; however, no significant difference is reported regarding firms' profitability proxied by ROA. Luckerath-Rovers (2013) argues that women's representation on boards might be impacted by the limited number of board seats. Our results show that firms with women on the board have larger board sizes, which is likely to facilitate the appointment of female directors. In addition, boards with women's participation have more independent directors. While ROA and market-to-book value report no significant differences in their means between the two sub-groups, firms with women on their boards have higher leverage and larger asset size relative to firms without women on the boards.

[Table 4 is about here]

Hypotheses testing

In this section, we examine the association of women's participation on corporate boards and firms' stock return volatility. Three measures to proxy for board gender diversity are used to explore the influence of the existence of women on boards, percentage of women on boards, and groups of women on boards. The second set of regressions aims to identify whether women's influence on firm volatility differs across industries. Table 5 illustrates the Spearman correlation matrix and the VIF test, suggesting no serious multi-collinearity in our regressions. As we exclude the financial sector, we are left with nine industry groups relating to FTSE 350 firms. *White robust standard error* is applied to adjust for any heteroskedasticity.

[Table 5 is about here]

In our first hypothesis, we presume that women's participation on corporate boards has positive consequences on firm risk. We test this hypothesis using three different measures of women's participation on boards, as illustrated in Table 6. Our results show that both the participation of women and the percentage of women on boards are negatively associated with stock

volatility and are statistically significant. This suggests that gender difference brings a new voice and monitoring behavior that reflects a board's effective functioning. The business environment is in continuous change (Adams and Ferreira, 2009) and addressing the changing business needs using the traditional set of solutions is likely to limit quality decision making. Boards' fiduciary duties seem to be more successfully addressed when women participate in the decision-making process. The participation of women on boards presumably brings a new way of thinking, management style, life experiences, networks, and information (Eagly and Johnson, 1990; Terjesen et al., 2009; Mallin and Michelon, 2011; Dezsó and Ross, 2012; Shi et al., 2017).

According to group dynamics, two or more female directors are more likely to cooperate and have better power to promote their perspectives. To test whether having group of female directors, rather than merely appointing one female director to appease public pressure, is more effectual in reducing firm stock return volatility, we construct a dummy variable, giving a value of one if two or more female directors are on the board, and zero otherwise. Column 3 Table 6 shows that the coefficient of groups of women on boards variable is larger than the coefficient of women on board dummy. This indicates that having groups of female directors exhibits higher capacity to communicate and promote their views. This is in line with the finding reported in Column 1 Table 6 showing that the greater the percentage of women representation, the more the reduction in stock return volatility was seen.

If female directors bring to board discussion new insights and life experiences on one hand (Carter et al., 2003; Erhardt et al., 2003) and have better understanding of some market segments and connections with key stakeholder groups on the other hand (Singh and Vinnicombe, 2004; Daily et al., 1999; Mallin and Michelon, 2011), one might argue that women's participation on boards might not have a similar influence on stock volatility across all industries. To test this theory, we introduce the interaction variables between the dummy

variable representing the presence of women on boards and the industries' dummy variables. Column 4 in Table 6 shows that women on the boards of four out of nine industries are negatively associated with stock return volatility. We find that female representation on the corporate boards of consumer goods, consumer services, health care, and utility firms is favorable. Our results suggest that firms with a relatively high percentage of female workforce in close proximity to customers and/or serve high percentage of females (Brammer et al., 2007) benefit more from women participation on their corporate boards. This finding supports the argument that female directors are more knowledgeable than male directors in some business segments and/or markets and their voices bring to the board the needs of a demographic group of stakeholders (Luckerath-Rovers, 2013; Bowrin, 2013; Singh and Vinnicombe, 2004; Smith et al., 2006). Therefore, gender-diverse boards in firms with close proximity to consumers benefit from women's collective experiences and backgrounds as well as their ability to respond to the needs of multiple stakeholders to enhance their functioning and the quality of decision-making process, which in turn reduces stock return volatility.

[Table 6 is about here]

Robustness testing

To validate our results, we conduct additional testing for robustness. We employ firm-year fixed-effect regression to eliminate any unobservable heterogeneity among observations in the examined sample and to control for the possibility of omitted unobservable firm characteristics (Campbell and Minguez-Vera, 2008; Adams and Ferreira, 2009). Reverse causality might also be of concern. Firm performance might affect firms' interest in appointing a female director, and on the other hand, a female director might decline a board seat in a poor-performing firm. We control for this issue by running a regression with one-year lead volatility, as the performance of a given year might affect and/or be affected by women on board, but the volatility of a lead year might not affect women's participation in the previous year.

Consequently, we omit the possibility of reverse causality. In addition, reverse causality is controlled by running the regression with one-year lagged volatility. The introduction of one-year lagged volatility assists in controlling for endogeneity that might result from having prior-year volatility affecting board diversity; however, adding one-year lagged volatility as an explanatory variable increases the problems with autocorrelation (Dezso and Ross, 2012). Therefore, to account for autocorrelation and the existence of endogenous variable, we use the one-step *Arellano and Bond* estimates of the specification and *Generalized Method of Moments* (GMM) (Arellano and Bond, 1991; Adams and Ferreira, 2009; Dozso and Ross, 2012; Gippel, Smith and Zhu, 2015).

It is well known that coming up with a valid instrumental variable is challenging, particularly in the governance-performance context (Adams and Ferreira, 2009). The variables that are supposed to correlate with the endogenous variable are in general other governance variables, which are either included in the model or should be added into the regression. Therefore, we aimed at selecting a variable which is not identified yet in the previous literature as a determinant of volatility. Hence, two instrumental variables are constructed. We consider the issuance of the Davies report in February 2011 as an exogenous shock to FTSE firms in general. Hence, we constructed the first instrument as a dummy variable that gives a value of one for observations post-Davies report and zero otherwise. The second instrument is a dummy variable that gives a value of one if the firm is listed in FTSE4Good (an index grouping firms that meet socially responsible standards) and zero otherwise. Socially responsible firms are considered less risky, as they are perceived to be better managed (McGuire et al., 1988), more connected with stakeholders, and less subject to adverse reaction when facing negative events (Godfrey, 2005). Hence, FTSE4Good may control for firms' unobservable omitted factors. The Hansen test of over-identification restrictions reported results confirming the validity of the used instruments.

Table 7 shows that women's participation on boards is statistically significant and negatively impacts stock return volatility. These results are in line with the results reported in Table 6. The results of regression (2) with a one-year lead volatility as a dependent variable show that our results are not affected by reverse causality. Women's participation on boards remains statistically significant and negatively influences the stock return volatility of the following year. Similar quantitative results are obtained when employing *Arellano and Bond* and when instrumental variables are used. The one-year lagged volatility is not significant, and women's percentage of board representation negatively impacts firms' volatility and is statistically significant.

In unreported results, we replace the percentage of women on boards with the board diversity dummy variable and the group women dummy variable and re-run the equations in Table 7 to estimate relationships. The results are largely consistent with those reported.

[Table 7 is about here]

Conclusion

The business environment is in continuous change, and addressing changing business needs using a traditional set of solutions is likely to limit quality decision making. With the changing business environment and the increasing complexity of corporations and market needs, there is growing attention to the importance of appointing female directors on corporate boards to facilitate effective board functioning (Adams and Ferreira, 2009). **Some** European countries have introduced board gender quotas to facilitate women's participation on corporate boards. The UK has opted to encourage women's board participation voluntarily by setting a 25% gender **target** through the Davies report on one hand, and on the other hand by emphasizing in the UK corporate governance code (2014) the importance of women's participation for effective board functioning. **Enhancing women's representation on boards is not initiated for purposes of women's rights, but rather driven by the favourable consequences female directors**

can have on firms' performance and decision quality. Moving from the traditional all-male boards to gender-diverse boards aims at utilizing a larger pool of skills and improving business and the economy at large. This influence is attributed to several behavioral and managerial aspects as well as having different life experiences and social networks (Brammer et al., 2007; Trejesen et al., 2009; Dezso and Ross, 2012; Liao et al., 2015).

In recent years, board gender diversity has received increasing interest. Several studies have been conducted to address different aspects of women's board representation. Our study seeks to provide empirical evidence on the relationship between board gender diversity and firm risk, which might be of value to policy makers and businesses. The paper provides evidence from the UK, reflecting the response to a voluntary board gender target contrary to some other European countries where quota laws are enforced. Additionally, we explore the effect of women's board participation on stock return volatility on different industry levels, showing that firms do not similarly benefit from women's participation on boards. This can be useful to policymakers to avoid passing laws that treat likely all organizations similarly, irrespective of their unique attributes. Furthermore, the study supports the "comply and explain" approach of the 2014 UK corporate governance code in encouraging board gender diversification, rather than following a compulsory approach as in other European countries.

We find that women's participation on boards is negatively associated with stock volatility, suggesting that board fiduciary duties seem to be more successfully addressed when women participate in the decision-making process. This is in line with prior studies (e.g. Lenard et al., 2014; Sabatier, 2015), reporting a favorable consequence to gender-diverse boards on firms' performance. Unlike Joecks et al. (2014), who argue that women's participation on boards adversely affects firms' performance unless their participation exceeds 30%, we show that both the existence and the percentage of women on boards reduce risk, and the higher the participation, the higher the influence. However, we agree with the "critical mass" argument

by Joecks et al. (2013), as our results indicate higher risk reduction when a group of female directors participates on the board compared to the existence of a female director or the percentage of women on the board. Additionally, the reported results appease the fear of female directors over monitoring (e.g. Adams and Ferreira, 2009), as they are more risk averse and independent from management (Srinidhi et al., 2011).

Our results support the ideas offered by previous literature claiming that female directors bring to boardrooms new insights, management style, life experiences, networks, and information (Eagly and Johnson, 1990; Terjesen et al., 2009; Mallin and Michelon, 2011; Dezso and Ross, 2012). Accordingly, new input and ways of thinking out of the homogenous board box to address the contemporaneous business challenges and enhance board risk consideration are provided. That is, gender diversification is likely to provide boards with resources and skills that facilitate achieving optimal decisions and reduced risk. Alternatively, passing a gender quota that modifies the composition of boards across all industries might backfire (Adam and Ferreira, 2009). **The results show** that some industries attributed by the high percentage of female workforce, close proximity to customers, and/or high percentage of females (i.e. consumer goods, consumer services, health care, and utilities), women board participation is more influential on stock return volatility. This suggests that firms with close proximity to consumers are encouraged to appoint women to their boards to benefit from their collective experiences. Also, gender-diverse boards **are likely to** benefit from women's ability to address the needs of multiple stakeholders to enhance their functioning and the quality of decision-making process, which in turn reduces stock return volatility.

Our study examines women's participation on corporate boards and reports its association with stock return volatility. It would be of interest in future research to conduct an event study examining the stock reaction to the addition of a female director on a board.

References

- Adams, R. and Ferreira, D. (2009), "Women in the boardroom and their impact on governance and performance", *Journal of Financial Economics*, Vol. 94 No. 2, pp.291-309.
- Arellano M, and Bond S. (1991), "Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations", *Review of Economic Studies*, Vol. 58 No. 2, pp.277-297.
- Baek, J., Kang, J., and Suh Park, K. (2004), "Corporate governance and firm value: evidence from the Korean financial crisis", *Journal of Financial Economics*, Vol. 71 No. 2, pp. 265-313.
- Berger, A.N., Kick, T. and Schaeck, K. (2014), "Executive board composition and bank risk taking", *Journal of Corporate Finance*, Vol. 28, pp.48-65.
- Bilimoria, D. (2000), "Building the business case for women corporate directors", In R. J. Burke & M. C. Mattis (Eds.), *Women on corporate boards of directors: International challenges and opportunities* (pp. 25-40). Dordrecht: Kluwer Academic Publishers.
- Bowrin A. (2013), "Corporate social and environmental reporting in the Caribbean", *Social Responsibility Journal*, Vol. 9 No. 2, pp.259-280.
- Brammer, S., Millington, A and Pavelin, S. (2007), "Gender and Ethnic Diversity Among UK Corporate Boards", *Corporate Governance: An International Review*, Vol. 15 No. 2, pp.393-403.
- Brick, I., and Chidambaran, N. (2010), "Board meetings, committee structure, and firm value", *Journal of Corporate Finance*, Vol. 16 No. 4, pp.533-553.
- Carty, R. and Weiss, G. (2012), "Does CEO duality affect corporate performance? Evidence from the US banking crisis", *Journal of Financial Regulation and Compliance*, Vol. 20 No. 1, pp.26-40.
- Campbell, K. and Miguez-Vera, A. (2008), "Gender Diversity in the Boardroom and Firm Financial Performance", *Journal of Business Ethics*, Vol. 83 No. 3, pp.435-451.
- Carter, D., Simkins, B.J. and Simpson, W.G. (2003), "Corporate governance, board diversity, and firm value", *The Financial Review*, Vol. 38, pp.33-53.
- Chapple, L. and Humphrey, J. (2014), "Does board gender diversity have a financial impact? Evidence using stock portfolio performance", *Journal of Business Ethics*, 122, pp.709-723.
- Charness, G., and Gneezy, U. (2012). "Strong evidence for gender differences in risk taking", *Journal of Economic Behavior & Organization*, Vol. 83, pp.50-58.
- Cheng, S. (2008), "Board size and the variability of corporate performance", *Journal of Financial Economics*, Vol. 87 No. 1, pp.157-176.
- Christy, J., Matolcsy, Z., Wright, A. and Wyatt, A. (2013), "Do board characteristics influence the shareholders' assessment of risk for small and large firms?" *Abacus*, Vol. 49 No. 2, pp.161-196.
- Coffey, B., and Wang, J. (1998), "Board diversity and managerial control as predictors of corporate social performance", *Journal of Business Ethics*, Vol. 17 No. 14, pp.1595-1603.

- Colaco, H., Myers, P. and Nitkin, M. (2011), "Pathways to leadership: Board independence, diversity and the emerging pipeline in the United States for women directors", *International Journal of Disclosure and Governance*, Vol. 8 No. 2, pp.122-147.
- Daily C, Certo S, and Dalton, D. (1999), "A decade of corporate women: some progress in the boardroom, *none* in the executive suite", *Strategic Management Journal*, Vol. 20 No. 1, pp.93-99.
- Dechow, P., Sloan, R. and Sweeney, A. (1996), "Causes and Consequences of Earnings Manipulation: An Analysis of Firms Subject to Enforcement Actions by the SEC", *Contemporary Accounting Research*, Vol. 13, No. 1, pp.1-36.
- Dezso, C. and Ross, D. (2012), "Does female representation in top management improve firm performance? A panel data investigation", *Strategic Management Journal*, Vol. 33 No. 9, pp.1072-1089
- Eagly A, Johnson B. (1990), "Gender and leadership style: a meta-analysis", *Psychological Bulletin*, Vol. 108 No. 2, pp.233-256.
- Erhardt, N. Werbel, J. and Shrader, C. (2003), "Board of director diversity and firm financial performance", *Corporate Governance*, Vol. 11 No. 2, pp.102-111.
- European Commission's Network to Promote Women in Decision-making in Politics and the Economy (2011), *The Quota instrument: different approaches across Europe*.
- Faccio, M., Marchica, M. and Mura, R. (2016), "CEO gender, corporate risk-taking, and the efficiency of capital allocation", *Journal of Corporate Finance* Vol. 39, pp.193-209.
- Farrell, K. and Hersch, P. L. (2005), "Additions to corporate boards: The effect of gender", *Journal of Corporate Finance*, Vol. 11, pp.85-106.
- Ferreira, D. (2015) Commentary: Board diversity: Should we trust research to inform policy? *Corporate Governance: An International Review*, Vol. 23 No. 2, pp.108-111.
- Financial Reporting Council (2014), "UK Corporate Governance Code", London, UK.**
- Flannery, M. and Sorescu, S. (1996), "Evidence of bank market discipline in subordinated debenture yields: 1983- 1991", *The Journal of Finance*, Vol. 51 No. 4, pp.1347-1377.
- Foote J., Gaffney N. and Evans J. (2010), "Corporate social responsibility: Implications for performance excellence", *Total Quality Management*, Vol. 21 No. 8, pp.799-812.
- Forbes, D. and Milliken, F. (1999), "Cognition and corporate governance: understanding boards of directors as strategic decision-making groups", *Academy of Management Review*, Vol. 24 No. 3, pp.489-505.
- Fukukawa, K., Shafer, W. and Lee, G. (2007), "Values and attitudes toward social and environmental accountability: a study of MBA students", *Journal of Business Ethics*, Vol. 71 No. 4, pp.381-394.
- Gippel, J., Smith, T. and Zhu, Y. (2015), "Endogeneity in accounting and finance research: Natural experiments as a state-of-the-art solution", *ABACUS*, Vol.51, No. 2, pp. 143-165.
- Godfrey, P. (2005), "The relationship between corporate philanthropy and shareholder wealth: a risk management perspective", *Academy of Management Review*, Vol.30, pp.777-798.

- Gul F., Srinidhi B. and Ng A. (2011), "Does board gender diversity improve the informativeness of stock prices?", *Journal of Accounting and Economics*, Vol. 51 No. 3, pp.314-338.
- Gupta, N. (2017), "Gender inequality in the work environment: a study of private research organizations in India", *Equality, Diversity and Inclusion: An International Journal*, Vol. 36 Issue: 3, pp.255-276,
- Hampton-Alexander Review - FTSE Women Leaders, Improving gender balance in FTSE Leadership, November 2016.
- Haslam, S., Ryan, M., Kulich, C., Trojanowski, G. and Atkins, C. (2010), "Investing with prejudice: The relationship between women's presence on company boards and objective and subjective measures of company performance", *British Journal of Management*, Vol. 21 No. 2, 484-497.
- Helgesen S. (1990), "The Female Advantage: Women's Way of Leadership", *Doubleday*: Garden City, NY.
- Hillman A. and Dalziel T. (2003), "Boards of directors and firm performance: integrating agency and resource dependence perspectives", *Academy of Management Review*, Vol. 28 No. 3, pp.383-396
- Hofstede, G., Hofstede, G. and Minkov, M. (2010), "Cultures and organisations: Software of the mind: Intercultural operation and its importance for survival", New York, NY: McGraw-Hill.
- Huse, M., and Solberg, A. (2006), "Gender-related boardroom dynamics: how Scandinavian women make and can make contributions on corporate boards", *Women in Management Review*, Vol.21 No.2, pp.113-130.
- Improving the Gender Balance on British Boards: Women on Boards Davies Review Five Year Summary, October 2015.
- Jizi M. (2017), "The Influence of board composition on sustainable development disclosure", *Business Strategy and the Environment*, Vol.26 No.5, pp.640-655.
- Jizi, M. and Dixon, R. (2017), "Are risk management disclosures informative or tautological? evidence from the u.s. banking sector", *Accounting Perspectives*, Vol. 16 No. 1, pp.7-30.
- Joecks, J, Pull, K. and Vetter, K. (2013), "Gender Diversity in the Boardroom and Firm Performance: What Exactly Constitutes a "Critical Mass?", *Journal of Business Ethics*, Vol. 118, pp.61-72.
- Kang, E., Ding, D. and Charoenwong, C. (2009), "Investor reaction to women directors", *Journal of Business Research*, Vol. 63 No. 8, pp.888-894.
- Kelan, E. (2016), "The Language of Female Leadership", *Equality, Diversity and Inclusion: An International Journal*, Vol. 35 No. 5/6, pp.383-385.
- Kochhar, R. (1996), "Explaining firm capital structure: The role of agency theory vs. transaction cost economics", *Strategic Management Journal*, Vol.17 No.9, pp.713-728.
- Konrad, A., Kramer, V. and Erkut, S. (2008), "Critical mass: the impact of three or more women on corporate boards", *Organizational Dynamics*, Vol. 37, pp.145-64.

- Krishnan, G. and Parsons, L. (2008), "Getting to the bottom line: An exploration of gender and earnings quality", *Journal of Business Ethics*, Vol.78 No. 1-2, pp.65-76.
- Liao, L., Luo, L. and Tang, Q. (2015), "Gender diversity, board independence, environmental committee and greenhouse gas disclosure", *The British Accounting Review*, Vol. 47 No. 4, pp.409-424.
- Liu, Y., Wei, Z., and Xie, F. (2014), "Do women directors improve firm performance in China?", *Journal of Corporate Finance*, Vol. 28, pp.169-184.
- Loukil, N. and Yousfi, O. (2015), "Does gender diversity on corporate boards increase risk-taking?" *Canadian Journal of Administrative Sciences*, Vol. 33, pp.66-81
- Lückerath-Rovers, M. (2013), "Women on boards and firm performance", *Journal of Management & Governance*, Vol. 17 No. 2, pp. 491-509.
- Mallin C., and Michelon G. (2011), "Board reputation attributes and corporate social performance: an empirical investigation of the US best corporate citizens", *Accounting and Business Research*, Vol. 41 No. 2, pp.119-144.
- Lenard, M., Yu, B., York, A. and Wu, S. (2014), "Impact of board gender diversity on firm risk", *Managerial Finance*, Vol. 40 No. 8, pp.787-803.
- McGuire, J., Sundgren, A., Schneeweis, T., (1988), "Corporate social responsibility and firm financial performance", *Academy of Management Journal*, Vo.31, pp. 854–872.
- Palvia, A., Vahamaa, E. and Vahamaa, S. (2015), "Are female CEOs and Chairwomen more conservative and risk averse? Evidence from the banking industry during the financial crisis", *Journal of Business Ethics*, Vol. 131, pp.577-594.
- Post, C., and Byron, K. (2015), "Women on boards and firm financial performance: A meta-analysis". *Academy of Management Journal*, Vol. 58 No. 5, pp.1546-1571.
- Ramdani, D. and Witteloostuijn, A. (2010), "The impact of board independence and CEO duality on firm performance: A quantile regression analysis for Indonesia, Malaysia, South Korea and Thailand" *British Journal of Management*, Vol. 21 No. 3, pp.607-627.
- Rishani, M., Mallah, M., Houssami, S. and Ismail, H. (2015), "Lebanese perceptions of the glass ceiling", *Equality, Diversity and Inclusion: An International Journal*, Vol. 34 Issue: 8, pp.678-691,
- Ryan, M. and S. A. Haslam (2005), "The glass cliff: evidence that women are over- represented in precarious leadership positions", *British Journal of Management*, Vol. 16, pp.81–90.
- Sabatier, M (2015)," A women's boom in the boardroom: effects on performance?" *Applied Economics*, Vol. 47, No. 26, pp.2717–2727
- Schubert, R. (2006), "Analyzing and managing risks – on the importance of gender difference in risk attitudes", *Managerial Finance*, Vol. 32 No. 9, pp.706-715.
- Sealy, R., Doldor, E., Vinnicombe, S., Terjesen, S., Anderson, D., and Atewologun, D. (2017). Expanding the notion of dialogic reading zones for impactful research: The case of women on boards research. *British Journal of Management*, Vol. 28, pp.64–83.

- Seierstad, C. and Opsahl, T. (2011), "For the few not the many? The effects of affirmative action on presence, prominence, and social capital of female directors in Norway", *Scandinavian Journal of Management*, Vol. 27 No. 1, pp.44-54.
- Shrader, C., Blackburn, V. and Iles, P. (1997), "Women in management and firm financial performance: an explorative study", *Journal of Managerial Issues*, Vol. 9 No. 3, pp. 355-72.
- Senbet, L., and John, K. (1998), "Corporate governance and board effectiveness", *Journal of Banking & Finance*, Vol. 22 No. 4, pp.371-403.
- Shi, L., Swinkels, L., and Van der Lecq, F. (2017), "Board diversity and self-regulation in Dutch pension funds", *Equality, Diversity and Inclusion: An International Journal*, Vol. 28 Issue: 5, pp.939-963.
- Siciliano, J. (1996), "The relationship of board member diversity to organizational performance" *Journal of Business Ethics*, Vol. 15 No. 12, pp.1313-1320.
- Singh, V. and Vinnicombe, S. (2004), "Why so few women directors in top UK boardrooms? Evidence and theoretical explanations", *Corporate Governance: An International Review*, Vol. 12 No. 4, pp.479-88.
- Smith, N., Smith, V. and Verner, M. (2006),"Do women in top management affect firm performance? A panel study of 2,500 Danish firms", *International Journal of Productivity and Performance Management*, Vol 55 No. 7, pp.569-593.
- Srinidhi B., Gul F. and Tsui J. (2011), "Female directors and earnings quality. Contemporary Accounting Research, Vol. 28 No. 5, pp.1610-1644.
- Tanaka, T. (2014), "Gender diversity in the boards and the pricing of publicly traded corporate debt: evidence from Japan", *Applied Financial Economics*, Vol. 24 No. 4, pp. 247–258
- Terjesen, S., Sealy, R. and Singh, V. (2009), "Women directors on corporate boards: A review and research agenda", *Corporate governance: an international review*, Vol. 17 No.3, pp.320-337.
- Van Knippenberg, D., De Dreu, C. and Homan, A. (2004), "Work group diversity and group performance: an integrative model and research agenda", *Journal of Applied Psychology*, Vol. 89 No. 6, pp.1008–1022.
- Vathunyoo, S., Gonzalez, A. and Hagedorff, J. (2016). "Women on board: Does boardroom gender diversity affect firm risk?." *Journal of Corporate Finance*, Vol. 36, pp.26-53.
- Walls, J., Berrone P., and Phan, P. (2012), "Corporate governance and environmental performance: is there really a link?", *Strategic Management Journal*, Vol. 33 No. 8, pp.885-913.
- Women on Boards, Davies Review Annual Report, 2015.