RESEARCH ARTICLE

Women on Boards of Philippine Publicly Traded Firms: Does Gender Diversity Affect Corporate Risk-Taking Behavior?

Ailyn A. Shi,[1*] Michelle Kris A. Ong Yiu,[1] Louie Angelo S. Ricafrente,[1]
Angelo A. Unite,[1] and Michael J. Sullivan[2]
[1]De La Salle University, Manila, Philippines
[2]University of Nevada Las Vegas, Las Vegas, USA
*ailyn.shi@dlsu.edu.ph

Abstract: The notion that corporate boards should be more gender-diverse is attracting greater attention around the world. Some scholars argue that gender diversity on boards improves firm performance and induces more prudent corporate decision-making. This rationale is based on the hypothesis that women are less overconfident and are innately more risk-averse than men. Other researchers argue that firms having more female directors are associated with greater corporate risk-taking, as past studies show that risk-seeking women tend to be appointed to the board. Still, another strand of literature argues that risk-aversion does not vary between homogeneously male boards and more gender-diverse boards. In this paper, we investigate the relationship between board diversity for Philippine firms and corporate risk-taking over the period 2003 to 2015. We use four alternative measures of corporate risk-taking and employ the two-step system generalized method of moments estimation technique to account for endogeneity issues that may influence this relationship. Overall, we find some evidence that greater female participation in the boardroom increases financial risk-taking, proxied by the leverage and current ratio, but decreases riskiness of firm outcomes, proxied by the volatility of return on assets. This suggests that greater gender diversity in Philippine corporate boards, while addressing the usual equality, social, and fairness considerations, also has economic consequences that may or may not be desirable with respect to firm risk.

Keywords: Board diversity, Corporate risk-taking, Philippine corporations, System Generalized Method of Moments

Female representation on corporate boards has become increasingly more common in recent years around the world. However, the increase in the percentage of women on boards has been slow. For S&P 500 firms, the percentage of women on boards rose from 19.2% to 21.2% between 2014 and 2016 (Catalyst, 2015, 2017). Similarly, for Fortune 500 firms, women held 20.2% of board seats in 2016, an increase from 15.7% in 2010 and 16.6% in 2012 (Deloitte & Alliance for Board Diversity, 2017). For companies listed on the STOXX Europe 600 index, boards had an average of 2.8 female members in 2015, compared with 1.5 in 2011 and 2.1 in 2013 (European Women on Boards & Institutional Shareholder Services, Inc., 2016).

Consistent with the findings in developed markets, emerging markets also exhibit an increase, although rather slow, in the representation of women in boardrooms. For example, Unite et al. (2015) found that women hold 14.97% of board seats in PSE-listed firms in 2014, compared with 13.03% in 2008. Among firms included in the MSCI Emerging Markets Index, female directors comprise 8.4% of board members in 2015 compared to 7.1% in 2014 (Lee et al., 2015). In 2016, the percentage of women on boards of publicly listed firms in Hong Kong and India was 12.4% and 6.9%, respectively, constituting a less than 2% increase from 2013 figures (Ngai et al., 2017; "Less than 7% women part of boardrooms in corporate India," 2016). Although progress has been slow, board diversity has gradually improved.

Corporate boards are expected to become more diverse due to efforts in many countries to empower women. The ratification of the treaty on the United Nations' Convention on the Elimination of All Forms of Discrimination Against Women has led to the improved socioeconomic status of women worldwide: for example, the Philippines and Spain have improved maternity leave and child care initiatives for working mothers, and Honduras has initiated policies to make agricultural training and loans available to female farmers (Convention on the Elimination of All Forms of Discrimination Against Women, 1979). In addition, initiatives to increase the number of women on corporate boards have been widely implemented. Most member countries of the United Nations have imposed gender quotas or soft law regulations, such as guidelines promoting good corporate governance pertaining to corporate boards (Smith, 2014). For instance, in 2014, Norway adopted a quota mandating that corporate boards be at least 40% female. Other countries have followed suit by adopting either mandatory quotas or voluntary targets. However, as of 2016, most of these countries have yet to reach the 40% quota.

Similar initiatives to promote gender diversity in corporate boards have also been implemented in the Philippines. Specifically, both the 2019 Code of Corporate Governance for Public Companies and Registered Issuers and the 2017 Code of Corporate Governance for Publicly Listed Companies promulgated by the Philippine Securities and Exchange Commission (SEC) recommend boards of Philippine publicly traded firms to adopt a diversity policy, which includes increasing the number of female directors (SEC, 2019, 2016). Such policy aims to avoid groupthink within firms and ensure that optimal decision-making is achieved.

The primary purpose of imposing these board gender-related policies was to eliminate gender inequality. The question then becomes, "what are the economic implications of gender diversity on corporate boards?" Results of studies investigating this question are mixed. For instance, Smith (2014) found that the overall effect of increasing board diversity on corporate performance is ambiguous, but having women on corporate boards improves decision-making processes and attendance. Other studies found a significant and positive relationship between board diversity and firm performance (Carter et al., 2003; Campbell & Minguez-Vera, 2008; Smith & Parrotta, 2015).

For developed markets, there is extensive literature investigating the effects of board diversity on a firm's risk-taking behavior. This research demonstrates that gender-diverse boards behave differently than male-dominated boards because of the difference in risk appetite between genders. This is important because excessive risk-taking may result in a higher probability of default, whereas moderate risk-taking may optimize firm profitability (Khaw et al., 2016). Therefore, it is argued that having women on company boards may mitigate financial difficulty crises due to the inherent risk-averse nature of women relative to men (Adams & Funk, 2012; Croson & Gneezy, 2009; Jianakoplos & Bernasek, 1998; Sunden & Surette, 1998). Consistent with this argument, Adams and Ferreira (2004) and Hillman et al. (2007) found a negative link between board diversity and corporate risk-taking. Sila et al. (2016) found an insignificant relationship between board diversity and corporate risk-taking.

Research investigating the effects of board diversity within emerging markets has been less prevalent. For example, Loukil and Yousfi (2016) found that the presence of women on Tunisian boards increases a firm's cash holdings but has no effect on corporate risk-taking. In contrast, Khaw et al. (2016) found a significant, negative relationship between Chinese corporate board diversity and corporate risk-taking. Similarly, Setiyono and Tarazi (2018) found an inverse relationship between Indonesian corporation board diversity and the volatility of firm income. We find no studies that analyze the relationship between board diversity and corporate risk-taking for Philippine firms.

Our study seeks to augment the existing literature on board diversity and corporate risk-taking by providing evidence from an emerging market. We use annual firm-level data of non-financial firms listed on the Philippine Stock Exchange from 2003 to 2015. We construct an unbalanced panel of firm-level data and examine the impact of board diversity on corporate risk-taking, as measured by the leverage ratio, the current ratio, the annual growth rate of assets, and the volatility of return on assets (ROA). We also address endogeneity issues that may affect this relationship by using the two-step Arellano-Bover/Blundell-Bond system generalized method of moments (GMM) estimation technique.

The rest of the paper is organized as follows: In section 2, we present the relevant literature and theoretical underpinnings related to board diversity and corporate risk-taking and develop our hypotheses. In section 3, we discuss the data and methodology employed in this study. In section 4, we report the results of our empirical analysis, and in section 5, we summarize our results and conclude.

Review of Related Literature, Theoretical Framework, and Hypotheses Development

Diversity not only encompasses gender and race, but also religion, ethnicity, age, other demographics, and sexual preferences. The idea of diversity was initially established to justify more inclusion of people who were excluded because of unconscious bias or stereotyping (Nelson, 2014). Although diversity has its roots in ethical and social considerations, the economic rationale for greater diversity in workplaces has been gaining traction in recent years because of the many benefits it is purported to confer to firm stakeholders. For example, more diverse organizations have been found to manifest better financial results, and organizations with greater racial diversity have higher sales and market shares (Nelson, 2014). Moreover, diversity influences the perception and purchasing power of consumers and enhances innovation (Nelson, 2014; Sen & Bhattacharya, 2001). These purported benefits of diversity have led to considerable research exploring the effects of diversity on corporate boards and management teams. Because gender is argued to be a richer demographic variable than age, race, or educational background (Krishnan & Park, 2005), this study focuses on the gender diversity of corporate boards and its effects on firm risk-taking behavior.

Board-level Gender Diversity and the Risk-taking Behavior of Firms

Prior literature suggests that behavioral differences between men and women influence risk-taking behavior. Croson and Gneezy (2009) studied the social, competitive, and risk preferences of men and women and established three general underlying differences: (a) women are more risk-averse than men, (b) women are more vulnerable to social cues, and (c) men are more competitive than women. In addition, a meta-analysis by Byrnes et al. (1999) compared the risk-taking preferences between males and females and concluded that men are expected to take on more risk. Wilson and Daly's (1985) sociobiological model also explains the presence of gender differences. Their theory suggests that men have historically experienced more competition than women. Barber and Odean (2001) also empirically established that men exhibit overconfident and riskier behavior when it comes to personal financial decisions, such as stock trading. These imply that men are more confident and are more inclined to take on risks than women are.

These innate behavioral differences between men and women may lead to different corporate decisions. From an agency theory perspective, the actions of managers (agents) may deviate from that of the owners of the firm (principals) because of contrasting interests (Fama & Jensen, 1983). As rational individuals, agents seek to maximize their personal gain at the expense of profit maximization, creating agency costs to shareholders (Fama & Jensen, 1983). Eisenhardt (1989) also argued that the differences in risk attitude between the agents and principals could lead to agency costs. For instance, managers may choose more conservative research-intensive projects at the expense of riskier projects with higher potential gains for the shareholders (John et al., 2008). To mitigate the losses incurred from agency costs, Jensen and Meckling (1976) and Fama and Jensen (1983) emphasized the importance of the board of directors, which serve as the instruments to monitor and control managers. This agency theory-based argument concludes that outside or independent directors are reliable monitors of the firm (Carter et al., 2003). Moreover, according to Adams and Ferreira (2009) and Carter et al. (2010), female directors are deemed to be more "independent" than male directors because women are more effective firm monitors than men. Post and Byron (2015) argued that as the proportion of women directors increases, board effectiveness improves, leading to better firm performance.

From a resource dependency theory perspective, a more gender-diverse board provides firms a broader pool of talent (Carter et al., 2010). However, such appointments may be indicative of tokenism, wherein organizations or firms hire women only to give the impression of social or racial equality (Zimmer, 1988; Adams & Ferreira, 2009). As evidence, Farrell and Hersch (2005) analyzed a sample of Fortune 500 firms during the period of 1990 to 1999 and found that the appointment of women in boardrooms is more likely only if another woman, as opposed to a man, has been replaced or has stepped down from the board.

The upper echelons theory further explains why and how board diversity influences the firms' level of risk-taking and decision-making (Hambrick, 2007). This theory states that the values, knowledge, and experience of the board of directors influence how they understand information and make prudent decisions (Carpenter et al., 2004). A more diversified board offers a wider range of perspectives that can affect the decision-making of the board, thus minimizing internal and external risks faced by firms (Carter et al., 2010).

To date, most studies found that the increased presence of females in the board entails fewer risk-taking activities for the firm because women are more innately risk-averse, more ethical, and less aggressive than men are. Boards chaired by females are also posited to have lower levels of corporate risk-taking because firms with female Chairs are more likely to appoint women on boards (Chen et al., 2016). For instance, Khaw et al. (2016) studied a sample of non-financial listed firms in China from 1999 to 2010 and found a significant and negative relationship between gender diversity in the board and corporate risk-taking. They found that having only men in boardrooms intensifies corporate risk-taking behavior. Likewise, Adams and Ferreira (2004) and Hillman et al. (2007) studied a sample of U.S. firms and found a negative link between total firm risk and board-level gender diversity.

Moreover, in the context of Tunisian boardrooms, Loukil and Yousfi (2016) found that women's presence tends to increase a firm's cash holdings, which indicates lower leverage for the firm. Huang and Kisgen (2013) also found that firms with male executives issue more debt and engage in more acquisitions than firms with female executives. For a sample of U.S. commercial banks, Palvia et al. (2015) found that smaller banks chaired by females hold higher and more conservative levels of equity capital and are associated with lower default risk during the financial crisis. Finally, Chen et al. (2016) found that future performance volatility induced by greater research and development (R&D) investment is mitigated when there are more female directors on the board.

However, more recent studies argue that an increase in female representation in the boardroom does not always correspond to less risky behavior (Sila et al., 2016). For instance, Sila et al. (2016) studied a sample of U.S. listed firms from 1996 to 2010 and observed that firms with greater proportions of women on boards take on similar risk to firms with male-dominated boards. Moreover, in Norway, after introducing a female representation quota in their boardrooms, Matsa and Miller (2013) found no change in the leverage of firms and assert that risk aversion may not be a distinctive part of women's approach to corporate decision-making. Bruna et al. (2019) also found no significant relationship between board gender diversity and corporate risk-taking for their sample of French publicly listed companies. In contrast, Adams and Funk (2012) studied a sample of Swedish publicly listed firms and found that female directors tend to be more risk-loving and are enticed to make riskier decisions. This is because women who make it to the board in the first place have been handpicked as already having a high taste for stimulation and a low need for security (Adams & Funk, 2012). For their sample of Indian-listed firms, Saeed et al. (2019) also found that women directors operating in high-technology firms take on more risk than their female counterparts in non-high-technology firms. Their finding implies that women directors in high-technology sectors are commonly handpicked from a larger pool of talented female candidates, all of whom must prioritize innovation and are, consequently, risk-seeking.

Based on the preceding discussions, we hypothesize that:

H1: Based on agency theory and the upper echelons theory, there is a negative relationship between board diversity and corporate risk-taking.

H2: Based on findings of previous research, greater female participation in the boardroom may either have a positive or insignificant effect on corporate risk-taking.

Methods

Sample and Data Collection

Our initial sample consists of all firms whose common shares are publicly traded in the Philippine Stock Exchange (PSE) during the period 2003 to 2015. We eliminate financial firms from our sample because such firms have different regulatory structures that subject them to certain requirements, restrictions, and guidelines that help maintain the integrity of the financial system (Ely, 2008). Sila et al. (2016) also suggested that findings from the financial sector on the relationship between board-level gender diversity and corporate decision-making may not apply to other sectors. This is because women in the financial sector are found to be less risk-averse than women in other industries (Sapienza et al., 2009). According to the PSE Industry Classification System, financial firms are classified as "financials."

We also exclude firms that did not trade during the year from our sample. Thus, our final sample consists of an unbalanced panel of more than 2,000 firm-years for each measure of corporate risk-taking employed.

We hand-collect data on the board's and directors' characteristics (i.e., board size, board independence, and gender diversity) from the Annual Reports submitted by our sample firms to the PSE and the SEC. Raw data used to compute for family ownership are gathered from the Annual Reports and the Public Ownership Reports. Raw financial data used to construct corporate risk-taking measures are obtained from the Thomson Reuters financial database and the Annual Reports.

Variable Definitions and Measurements

Dependent Variable: Corporate Risk-Taking

According to Gilley et al. (2002), corporate risk-taking is not limited to the financial dimension; rather, it is a multidimensional concept that will yield ambiguous results if summarized into a single dimension. Corporate risk-taking can be viewed through either financial risk-taking, managerial risk-taking, or the total riskiness of outcomes faced by the firm.

Financial Risk-Taking. One dimension of corporate risk-taking is financial risk-taking, which is commonly proxied for by the leverage ratio *(LEV)* or by the liquidity or current ratio (*CURRENT)* (Loukil & Yousfi, 2016). On the one hand, leverage ratios describe the firm's use of debt financing and measure its solvency or its ability to meet its financial commitments. Loukil and Yousfi (2016), John et al. (2008), and Faccio et al. (2016) showed that leverage ratios are directly proportional to corporate risk-taking: greater use of leverage implies a greater degree of risk-taking because the firm is relying on external sources of financing. This increases the probability of default whenever a negative shock affects the firm's operating and financial conditions (Loukil & Yousfi, 2016). Similar to Faccio et al. (2011), we define our leverage ratio as the ratio of total liabilities to the book value of total assets.

On the other hand, the liquidity or current ratio is defined as the ratio of current assets to current liabilities. It measures a firm's riskiness through its ability to pay short-term debts; low cash ratios, especially values below 1, imply that the firm is more susceptible to default. Loukil and Yousfi (2016) argued that the cash ratio is inversely related to corporate risk-taking: firms that hold more cash can easily adapt to uncertain conditions than firms that are relatively illiquid.

Managerial Risk-Taking. Another dimension of corporate risk-taking is managerial risk-taking. The tenets of managerial risk-taking argue that human behavior, initially posited by March and Shapira (1987) to be immeasurable in financial models, is a significant factor that accounts for much of corporate decision-making. Since managerial risk-taking takes into account human behavior, it serves as an important proxy measure of corporate risk-taking. We measure managerial risk-taking using the annual growth rate of assets (*GrASSETS*).

According to Loukil and Yousfi (2016), a higher growth rate of assets is associated with lower corporate risk-taking because assets are inherently less risky than growth options in place (Berk et al., 1999). Such growth options usually provide discretionary opportunities to invest capital in productive assets like plant and equipment at some future point in time (Schwartz & Trigeorgis, 2001). Thus, when a firm invests in assets by exercising these growth options, the risky options are replaced with less risky assets, and firm risk declines (Loukil & Yousfi, 2016). In this study, we define the growth rate of assets as the difference between the natural logarithm of the book value of total assets of the current period and the natural logarithm of the book value of total assets of the previous period.

R&D Intensity is also an ideal measure of corporate risk-taking because even though investments in research are value-enhancing, the returns of such ventures are uncertain (Sila et al., 2016; Loukil & Yousfi, 2016; Saeed et al., 2016). However, in this study, we do not use R&D Intensity to proxy for corporate risk-taking because, out of around 200 PSE-listed firms per year in our sample, only 19 firms on average (246 firm-years out of 2,563 firm-years) have invested in R&D.

Another ideal measure of managerial risk-taking comes in the form of risky business acquisitions. In this regard, the write-down of goodwill is how losses from risky acquisitions are reflected in financial reporting (Kravet, 2014). The International Accounting Standards (IAS) 36 "Impairment of Assets" requires firms to assess at the end of each reporting period whether there is any indication that an asset, such as goodwill arising from a business acquisition, is impaired (i.e., the asset's carrying amount/reported balance sheet amount is higher than its fair value less any costs of disposal; IFRS, n.d.a). If so, then the firm must recognize a goodwill write-down/impairment loss and allocate the loss to reduce the carrying amount of the asset. Because less risky acquisitions have smaller potential losses, such acquisitions are less likely to lead to goodwill write-downs (Kravet, 2014), implying that the recognition of goodwill impairment losses may indicate riskier corporate acquisitions and, therefore, is a signal of greater managerial risk-taking.

We hand-collected data on impairment losses on goodwill over the period 2006 to 2015 from our sample firms' consolidated financial statements. The sample period begins in 2006 because it was only during that year when the International Financial Reporting Interpretations Committee (IFRIC) issued IFRIC 10 "Interim Financial Reporting and Impairment," which concludes that recognized impairment losses should not be reversed in subsequent interim financial statements nor in annual financial statements (IFRS, n.d.b). We created a dummy variable (*GWIMP*) that takes the value of one when a firm has recognized impairment losses on goodwill, and zero otherwise. However, out of around 250 PSE-listed firms per year in our sample, only 24 firms, on average (51 firm-years out of 2,007 firm-years), have recognized impairment losses on goodwill. This lack of variability in *GWIMP* observations suggests that the appropriate estimation techniques controlling for unobserved firm-specific effects cannot be carried out, and so, we do not consider impairment losses on goodwill as a risk-taking proxy in this study.

Riskiness of Firm Outcomes. The final dimension of corporate risk-taking involves the riskiness inherent in firm outcomes. This is commonly measured in the literature by the volatility of the operating return on assets (*volROA*) of the firm (Bruna et al., 2019; Faccio et al., 2016; Khaw et al., 2016; Faccio et al., 2011; John et al., 2008), which we define as the standard deviation of accounting returns, as measured by the ratio of net income to the book value of total assets, over a three-year ahead overlapping period, including the current year, that is, 2003–2005, 2004–2006, 2005–2007, and so forth. The intuition is simple: investments in risky projects imply high-risk operations, which, in turn, result in high volatility of corporate earnings (John et al., 2008; Bruna et al., 2019). Volatility of returns is a commonly used proxy in the financial literature.

Independent Variables

Gender Diversity in the Board. The measure of gender diversity in the boardroom varies widely across the literature. Some studies (Carter et al., 2010; Loukil & Yousfi, 2016) use the number of females in the boardroom as a measure of board-level gender diversity, whereas others (Carter et al., 2003; Loukil & Yousfi, 2016) use a dummy variable that takes the value of one when at least one woman is present in the board, and zero otherwise. However, Unite et al. (2019) argued that although the number of female board members is a good indicator of the presence of women on the board, it is not the most ideal measure of board-level gender diversity because it captures the degree of concentration of members in only one gender category (i.e., the female category). Furthermore, the increased presence of women on the board does not always correspond to greater gender diversity in the board, especially when considering boards with female proportions that are already greater than 50%.

In this study, one proxy for board-level gender diversity is the proportion of female directors on the board (GD_P). We calculate this proportion by dividing the total number of female directors on the board by the total number of directors on the board. Although used as a standard measure of board-level gender diversity in the literature (Loukil & Yousfi, 2016; Nguyen et al., 2015; Campbell & Minguez-Vera, 2008; Rose, 2007; Adams & Ferreira, 2009; Khaw et al., 2016; Unite et al., 2019), the proportion of women board members is still not the most ideal measure to capture the extent of gender diversity in the boardroom because having a greater concentration of women in boardrooms does not always imply greater gender diversity. For example, further increasing the number of women on boards with already more than 50% women will lead to lesser, rather than greater, gender diversity in the board.

Unite et al. (2019) and Campbell and Minguez-Vera (2008) cited other more appropriate measures for board-level gender diversity. These measures are indices devised by Blau (1977) and Shannon (1948). Because the Blau and Shannon indices consider the number of gender categories and the distribution of board members between the two-gender classification, Campbell and Minguez-Vera (2008) argued that these two indices are more appropriate proxies for board-level gender diversity. Both indices are also commonly employed to measure biodiversity in ecology (Baumgartner, 2006) and are also widely used in the field of economics (Al-Shaer & Zaman, 2016; Campbell & Minguez-Vera, 2008; Unite et al., 2019).

The Blau index (GD_B) is measured as $Blau = 1 - \sum_{i=1}^{n} P_i^2$ where P_i is the percentage of board members in each gender category i, and n is the number of categories (i.e., two gender categories: male and female). If there are only two categories, then the values of the Blau index can range from 0 (a perfectly homogeneous board) to a maximum of 0.5 (the board has an equal proportion of male and female members). In the case of Philippine listed firms, Unite et al. (2019) found that a zero Blau index value signifies a homogeneously male board because none of the firms listed in the Philippine Stock Exchange has a board that is completely comprised of female board members.

On the other hand, the Shannon index (GD_S), or most commonly known as the Shannon index, is computed as $Shannon = -\sum_{i=1}^{n} P_i \cdot \ln P_i$ where P_i and n are as previously defined. In contrast with the Blau index, values of the Shannon index range from 0 to 0.693, where 0 represents a completely homogeneous board, whereas 0.693 signifies an equal proportion of male and female board members. Again, in the case of Philippine listed firms, a Shannon index with a value of 0 represents a board that is completely comprised of male directors since there are no firms traded in the Philippine Stock Exchange with completely homogeneous female boards (Unite et al., 2019). Compared to the Blau index, the Shannon index is more sensitive to small differences in the gender composition of boards since it is a logarithmic measure of diversity (Campbell & Minguez-Vera, 2008). Because the logarithm of 0 is not defined, we follow Campbell and Minguez-Vera (2008) and adopt the convention that $P_i lnP_i$ is equal to 0, if P_i is 0.

Unite et al. (2019) observed that during the period 2003 to 2014, the average proportion of women members in boards of Philippine listed firms is 14%, which suggests that the typical board of a PSE-listed firm is predominantly male. They also observe that only around 2.2% of PSE-listed firms have more than 50% women on the board, yet around 66.8% of PSE-listed firms have at least one female in the boardroom. All in all, they observed that higher values for both the Blau and Shannon indices seem to imply greater proportions of female board members. Because boards of Philippine listed firms are found to be consistently and predominantly male, it is reasonable to suggest that an increase in the proportion of females in boards of Philippine listed firms is likely to lead to greater gender diversity in boards and, therefore, imply higher Blau and Shannon index values (Unite et al., 2019).

Presence of Female Chairperson. Consistent with the theory that boards chaired by females are associated with less risk-taking behavior, we include in our models a dummy variable that takes the value of one when the firm's board of directors is chaired by a woman, and zero otherwise (*FCHAIR*). Chen et al. (2016) also argued that boards chaired by women are more likely to appoint female directors. Therefore, any significant effect of female directors on corporate risk-taking is likely to also manifest in boards that are chaired by women.

Indeed, we find in our sample of Philippine listed firms that boards chaired by women have, on average, a greater proportion of female directors (0.3002) than boards chaired by men (0.1330) and that the difference is statistically significant (t-statistic = 13.0704; p-value of 0.000). We likewise find that boards with female Chairs have, on average, a higher Blau index value (0.3826) and a higher Shannon index value (0.5660) than boards with male Chairs (Blau value of 0.1895 and Shannon value of 0.2981); the differences are also statistically significant (t-statistic = 20.6623 and t-statistic = 24.1886, respectively). Such findings are consistent with those of Chen et al. (2016) for U.S. firms and indicate that female-led boards may have the same effect on corporate risk-taking as greater board-level gender diversity does. Although the correlation coefficients between *FCHAIR* and GD_P (0.2415), *FCHAIR* and GD_B (0.2434), and *FCHAIR* and GD_S (0.2314) are all positive and statistically significant, we detect no issues of multicollinearity for all three pairs of variables for all of our models.

Family Ownership. Unite et al. (2008) and La Porta et al. (1999) classified a firm as family-controlled when at least 20% of its total outstanding shares are owned by the largest shareholder or by the controlling family, arguing that having 20% of voting rights is usually enough to have effective control of a firm. However, we use the absolute percentage of total outstanding shares owned by a family or the largest individual shareholder to proxy for family ownership within the firm (*FOWN*), irrespective of any ownership threshold, because such measure encompasses not only the firms with families having a majority ownership stake but also those with families having only a minority stake in the firm.

Board Characteristics and Other Control Variables. We also control for variables that have been found in the literature to influence corporate risk-taking. Board independence (*BIND*) is measured as the ratio of the number of independent directors in the board to the total number of directors in the board, whereas board size (*BSIZE*) is measured as the natural logarithm of the total number of directors in the board.

We also control for other variables that may affect corporate risk-taking. For instance, firm size (*FSIZE*) is measured as the natural logarithm of the book value of total assets, whereas firm age (*FAGE*) is proxied by the natural logarithm of the number of years from the date of incorporation of the firm. Moreover, to account for the effects of past firm performance, as measured by return on assets (*ROA*), on corporate risk-taking, we also use the one-year lag of the return on assets (ROA_{t-1}) as a control variable in Equations (1), (3), and (4).

Model Specification and Estimation Procedure

We use regression analysis on unbalanced panel data to analyze the relationship between board-level gender diversity and corporate risk-taking. We adopt the models of Loukil and Yousfi (2016) and Khaw et al. (2016) and include a family ownership variable, as well as industry dummy variables and year dummy variables to control for fluctuations in corporate risk-taking behavior due to macroeconomic or market-wide shocks that vary across industries and over time. Specifically, we estimate the following equations:

Financial Risk-Taking

$$\begin{aligned} LEV_{it} &= \beta_0 + \beta_1 GD_{k,it} + \beta_2 FCHAIR_{it} + \beta_3 FCHAIR_{it} xGD_{k,it} + \beta_4 BSIZE_{it} + \\ &\beta_5 BIND_{it} + \beta_6 FOWN_{it} + \beta_7 FSIZE_{it} + \beta_8 FAGE_{it} + \beta_9 ROA_{i,t-1} + \delta' PSE_{it} + \gamma' YEAR_t + u_{it} \end{aligned} \quad (1)$$

$$\begin{aligned} \ln\left(CURRENT_{it}\right) &= \beta_0 + \beta_1 GD_{k,it} + \beta_2 FCHAIR_{it} + \beta_3 FCHAIR_{it} xGD_{k,it} + \beta_4 BSIZE_{it} + \beta_5 BIND_{it} + \\ &\beta_6 FOWN_{it} + \beta_7 FSIZE_{it} + \beta_8 FAGE_{it} + \beta_9 LEV_{it} + \beta_{10} GrASSETS_{it} + \delta' PSE_{it} + \gamma' YEAR_t + u_{it} \end{aligned} \quad (2)$$

Managerial Risk-Taking

$$\begin{aligned} GrASSETS_{it} &= \beta_0 + \beta_1 GD_{k,it} + \beta_2 FCHAIR_{it} + \beta_3 FCHAIR_{it} xGD_{k,it} + \beta_4 BSIZE_{it} + \beta_5 BIND_{it} + \\ &\beta_6 FOWN_{it} + \beta_7 FSIZE_{it} + \beta_8 FAGE_{it} + \beta_9 \ln\left(CURRENT_{it}\right) + \beta_{10} ROA_{i,t-1} + \delta' PSE_{it} + \gamma' YEAR_t + u_{it} \end{aligned} \quad (3)$$

Riskiness of Firm Outcomes

$$volROA_{it} = \beta_0 + \beta_1 GD_{k,it} + \beta_2 FCHAIR_{it} + \beta_3 FCHAIR_{it} xGD_{k,it} + \beta_4 BSIZE_{it} + \beta_5 BIND_{it} + \beta_6 FOWN_{it} + \beta_7 FSIZE_{it} + \beta_8 FAGE_{it} + \beta_9 LEV_{it} + \beta_{10} GrASSETS_{it} + \beta_{11} ROA_{i,t-1} + \delta ' PSE_{it} + \gamma ' YEAR_t + u_{it} \quad (4)$$

We use the PSE Industry Classification System to construct our industry dummies. In our regressions, we use the mining and oil sector as our base industry dummy, and we use 2015 as our base year dummy. We also winsorize our corporate risk-taking variables (i.e., leverage ratio, current ratio, growth rate of assets, and volatility of return on assets), as well as our past firm performance variable, at the 1st and 99th percentiles to mitigate the effect of outliers. Moreover, because the current ratio values in our sample are highly skewed to the right (skewness value = 5.80), we take the natural logarithm of the current ratio in Equations (2) and (3) to have the data behave more in line with the normality assumption.

Similar to Sila et al. (2016), we employ the two-step Arellano-Bover/Blundell-Bond system generalized method of moments (GMM) estimation technique to estimate Equations (1) to (4) because two-step GMM gives more asymptotic efficient estimates than one-step GMM (Roodman, 2009). Moreover, the system GMM method addresses the issues of unobserved heterogeneity, reverse causality, and dynamic endogeneity (i.e., past corporate risk-taking affects current levels of board-level gender diversity). Similar to Sila et al. (2016), we augment Equations (1) to (4) by including one- and two-period lags of the dependent variable as additional independent variables and by treating all independent variables as endogenous except for firm age and the industry and year dummy variables. Moreover, for all model specifications, we follow Sila et al. (2016) and instrument our endogenous variables by two of their past values.

Sila et al. (2016) and Hermalin and Weisbach (2001) noted that board characteristics are not exogenous variables because boards are endogenously chosen by firms to suit their operating environment. In line with this, there are three endogeneity issues that should always be addressed when analyzing the effects of board-level gender diversity on corporate risk-taking. First, individual and unobserved characteristics that might simultaneously affect board appointments and corporate risk-taking (i.e., unobserved heterogeneity) may bias our regression results in the opposite direction. Panel data methods, such as fixed and random effects estimation techniques, are commonly used to account for omitted and unobserved individual firm-specific factors that may significantly affect both board appointments and corporate risk-taking, that is, firm culture and corporate social responsibility (Sila et al., 2016). Secondly, the issue of reverse causality implies that a firm's level of risk-taking affects board appointments as much as board appointments affect corporate risk-taking, that is, women may also self-select into firms with lower corporate risk-taking because they are inherently risk-averse (Adams & Ferreira, 2009). With regards to this, fixed or random effects estimators will be insufficient; instrumental variable approaches are commonly used to address reverse causality. Lastly, Wintoki et al. (2012) noted that reverse causality issues in corporate governance are usually dynamic. In our study, this implies that past realizations of corporate risk-taking behavior affect current female representation in boards. This is because board appointments are usually made before the effects of current risk-taking become observable; thus, the existing board considers only past realizations of risk-taking when making decisions pertaining to board appointments (Sila et al., 2016). In this regard, the Arellano-Bover/Blundell-Bond system GMM estimation method may be employed to account for both reverse causality and dynamic endogeneity. Similarly, this estimation technique controls for unobserved heterogeneity through the method of first differencing, which eliminates any potential unobserved firm-specific effects that may affect both board appointments and corporate risk-taking.

To test for the validity of the instrument set used in system GMM, we employ the Arellano-Bond first- and second-order autocorrelation test and the Hansen test for overidentifying restrictions. Failure to reject the null hypotheses of no second-order autocorrelation and that the instrument set used is exogenous, respectively, implies that the moment conditions and instruments used are valid (Roodman, 2009). We likewise check the validity of the subset instruments used at levels and differences, and those used as standard instrumental variables (IVs), using the difference-in-Hansen tests of exogeneity. Again, failure to reject the null hypothesis of exogenous instruments indicates that the instruments used are valid. Furthermore, all standard errors reported in our estimations are robust to both heteroskedasticity and within-firm serial correlation.

Results

Table 1 reports the descriptive statistics on the dependent and independent variables used in this study. We report the annual means, standard deviations, and minimum and maximum values of each variable across all years. The leverage ratio and the current ratio have mean values of 0.5785 and 6.8123, respectively, whereas the annual growth rate of assets and the volatility of ROA have mean values of 0.0998 and 0.0986%, respectively.

We observe that, similar to Unite et al. (2019), there is no firm in our sample that has a homogeneously female board, that is, the maximum proportion of women on the board of a PSE-listed firm is 0.80. Likewise, similar to Unite et al. (2019), we find that the average proportion of women on boards of PSE-listed firms is only 0.14, whereas only 4.77% of PSE-listed firms, on average, have boards that are chaired by women. These indicate that most Philippine publicly listed firms have boardrooms that are dominated by men. Furthermore, we observe that the board of a typical PSE-listed firm consists of approximately nine members, of which 25% are independent directors. In terms of family ownership, we observe that family ownership is prevalent among Philippine publicly listed firms, that is, a single family or individual shareholder owns, on average, 46.49% (almost half) of the total outstanding shares of a typical PSE-listed firm. The average PSE-listed firm is also 38 years of age, has total assets worth PhP 33,003 million in book value, and has a past (one-year-lagged value) ROA of -0.01%.

Table 1

Summary of Descriptive Statistics

	Mean	Std. Dev.	Min	Max
RISK-TAKING MEASURES				
Leverage ratio	0.578502	0.923713	0.001330	7.135621
Current ratio	6.812311	21.200370	0.013662	162
Annual growth rate of assets	0.099829	0.400583	-1.171507	2.322964
Volatility of ROA (in %)	0.098589	0.274985	0.000563	2.231557
BOARD CHARACTERISTICS				
Proportion of females in the board	0.141017	0.147544	0	0.80
Blau index	0.198714	0.169122	0	0.50
Shannon index	0.310866	0.246760	0	0.693147
Presence of female Chairperson	0.047656	0.213080	—	—
Board size	9.067240	2.105957	3	15
Board independence	0.250824	0.099430	0	0.818182
OWNERSHIP STRUCTURE				
Family ownership (in %)	46.485740	30.305700	0	99.972201
CONTROL VARIABLES				
Firm age	38.108010	23.489510	0.037645	112.386721
Firm size (in PhP million)	33,003	101,000	100,000	1,369,670
Past firm performance (in %)	-0.011330	0.239278	-1.609756	0.448258

Table 2

Regression Results Using the Two-Step Arellano-Bover/Blundell-Bond System GMM Procedure

	Proportion of Females		Blau Index		Shannon Index	
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL A: ***Leverage (LEV)***						
Board-level gender diversity	**0.3433** (0.4568)	**0.4061** (0.4481)	**0.1295** (0.2687)	**0.1028** (0.2866)	**0.1026** (0.1894)	**0.0958** (0.1970)
Presence of female chairperson	**0.6644** (0.4223)	**1.0688 *** (0.5563)	**0.6820 *** (0.4138)	**-0.2688** (0.6092)	**0.6987** (0.4255)	**-0.4914** (0.8150)
Gender diversity x Female chairperson		**-1.3494** (1.6744)		**2.4419** (2.0125)		**2.0789** (1.7515)
Board size	**-0.2011** (0.2073)	**-0.2194** (0.2035)	**-0.1837** (0.1950)	**-0.1714** (0.1860)	**-0.1719** (0.1975)	**-0.1508** (0.1938)
Board independence	**-0.0989** (0.3959)	**-0.1192** (0.4224)	**-0.2561** (0.3610)	**-0.2814** (0.3817)	**-0.2364** (0.3913)	**-0.2475** (0.3782)
Family ownership	**0.0016** (0.0015)	**0.0017** (0.0015)	**0.0016** (0.0014)	**0.0016** (0.0014)	**0.0016** (0.0014)	**0.0017** (0.0014)
Firm size	**-0.0229** (0.0187)	**-0.0238** (0.0193)	**-0.0257** (0.0224)	**-0.0262** (0.0217)	**-0.0263** (0.0216)	**-0.0269** (0.0216)
Firm age	**0.0255** (0.0308)	**0.0194** (0.0303)	**0.0203** (0.0282)	**0.0215** (0.0287)	**0.0196** (0.0289)	**0.0204** (0.0290)
Past firm performance	**0.0084** (0.1717)	**0.0199** (0.1746)	**-0.0101** (0.1565)	**-0.0153** (0.1543)	**-0.0057** (0.1539)	**-0.0097** (0.1515)
Past leverage (LEV_{t-1})	**0.7454 ***** (0.0707)	**0.7491 ***** (0.0713)	**0.7480 ***** (0.0656)	**0.7403 ***** (0.0675)	**0.7438 ***** (0.0669)	**0.7361 ***** (0.0678)
Past leverage (LEV_{t-2})	**0.1061 *** (0.0601)	**0.1076 *** (0.0614)	**0.1070 ***** (0.0537)	**0.1069 ***** (0.0541)	**0.1103 ***** (0.0549)	**0.1106 ***** (0.0544)
Constant	**0.8389** (0.6505)	**0.9188** (0.6423)	**0.9414** (0.7146)	**0.9191** (0.6818)	**0.9240** (0.6897)	**0.8800** (0.6966)
AB Test for AR(1) *p-value*	**0.033**	**0.033**	**0.029**	**0.029**	**0.030**	**0.029**
AB Test for AR(2) *p-value*	**0.843**	**0.764**	**0.840**	**0.803**	**0.812**	**0.772**
Hansen test *p-value*	**0.725**	**0.701**	**0.778**	**0.791**	**0.725**	**0.767**
Difference in Hansen tests of exogeneity of instrument subsets:						
Instruments for GMM-Style:						
Hansen test excluding group *p-value*	**0.533**	**0.726**	**0.965**	**0.737**	**0.942**	**0.770**
Difference (null H = exogenous) *p-value*	**0.718**	**0.621**	**0.540**	**0.719**	**0.502**	**0.674**
Instruments for IV-Style:						
Hansen test excluding group *p-value*	**0.626**	**0.571**	**0.730**	**0.689**	**0.699**	**0.668**
Difference (null H = exogenous) *p-value*	**0.919**	**0.975**	**0.747**	**0.959**	**0.606**	**0.940**

*Coefficients are in bold; standard errors are in parentheses; * significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level*

	Proportion of Females		Blau Index		Shannon Index	
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL B: ***Current Ratio (lnCurrent)***						
Board-level gender diversity	**-0.7844 *** (0.4374)	**-0.7693 *** (0.4474)	**-0.5883** (0.4339)	**-0.5640** (0.4367)	**-0.3868** (0.2832)	**-0.4115** (0.2723)
Presence of female chairperson	**-0.5363** (0.3507)	**-0.3585** (0.7085)	**-0.6147 *** (0.3655)	**1.0275** (1.1433)	**-0.6366** (0.4003)	**1.7495** (1.5251)
Gender diversity x Female chairperson		**-0.5126** (1.9439)		**-4.4518** (3.1163)		**-4.4035** (2.8288)
Board size	**-0.1767** (0.2937)	**-0.1129** (0.3088)	**-0.1515** (0.2976)	**-0.1585** (0.2985)	**-0.1444** (0.3126)	**-0.1762** (0.2810)
Board independence	**-0.5285** (0.6930)	**-0.4220** (0.7097)	**-0.4212** (0.7522)	**-0.4178** (0.7486)	**-0.3572** (0.7388)	**-0.4348** (0.7218)
Family ownership	**-0.0004** (0.0022)	**-0.0004** (0.0023)	**-0.0006** (0.0023)	**-0.0007** (0.0023)	**-0.0004** (0.0023)	**-0.0006** (0.0023)
Firm size	**-0.0652 ***** (0.0250)	**-0.0681 ***** (0.0252)	**-0.0687 ***** (0.0251)	**-0.0672 ***** (0.0258)	**-0.0685 ***** (0.0259)	**-0.0653 ***** (0.0251)
Firm age	**0.0357** (0.0464)	**0.0247** (0.0507)	**0.0460** (0.0495)	**0.0392** (0.0522)	**0.0447** (0.0487)	**0.0452** (0.0507)
Leverage	**-0.2980 ***** (0.0655)	**-0.2991 ***** (0.0647)	**-0.3116 ***** (0.0691)	**-0.2889 ***** (0.0693)	**-0.3153 ***** (0.0691)	**-0.2857 ***** (0.0686)
Annual growth rate of assets	**0.0814** (0.1550)	**0.0769** (0.1608)	**0.0468** (0.1620)	**0.0459** (0.1631)	**0.0345** (0.1627)	**0.0288** (0.1576)
Past current ratio ($lnCURRENT_{t-1}$)	**0.5579 ***** (0.0731)	**0.5543 ***** (0.0742)	**0.5576 ***** (0.0755)	**0.5546 ***** (0.0749)	**0.5565 ***** (0.0746)	**0.5517 ***** (0.0718)
Past current ratio ($lnCURRENT_{t-2}$)	**0.0844 *** (0.0503)	**0.0860 *** (0.0499)	**0.0864 *** (0.0513)	**0.0892 *** (0.0513)	**0.0900 *** (0.0512)	**0.0923 *** (0.0512)
Constant	**2.4474 **** (0.9621)	**2.3816 **** (1.0175)	**2.4420 **** (0.9477)	**2.4705 ***** (0.9371)	**2.4082 **** (0.9643)	**2.4662 ***** (0.9293)
AB Test for AR(1) *p-value*	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
AB Test for AR(2) *p-value*	**0.315**	**0.306**	**0.298**	**0.287**	**0.283**	**0.274**
Hansen test *p-value*	**0.972**	**0.966**	**0.958**	**0.970**	**0.943**	**0.973**
Difference in Hansen tests of exogeneity of instrument subsets:						
Instruments for GMM-Style:						
Hansen test excluding group *p-value*	**0.842**	**0.806**	**0.900**	**0.852**	**0.910**	**0.860**
Difference (null H = exogenous) *p-value*	**0.951**	**0.946**	**0.917**	**0.947**	**0.888**	**0.951**
Instruments for IV-Style:						
Hansen test excluding group *p-value*	**0.938**	**0.898**	**0.920**	**0.910**	**0.952**	**0.875**
Difference (null H = exogenous) *p-value*	**0.994**	**1.000**	**0.977**	**1.000**	0.378	1.000

*Coefficients are in bold; standard errors are in parentheses; * significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level*

	Proportion of Females		Blau Index		Shannon Index	
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL C: ***Annual Growth Rate of Assets (GrASSETS)***						
Board-level gender diversity	**0.1734** (0.2180)	**0.1879** (0.2304)	**0.1188** (0.1880)	**0.1059** (0.1826)	**0.0514** (0.1283)	**0.0491** (0.1204)
Presence of female chairperson	**-0.0693** (0.1576)	**0.0584** (0.2671)	**-0.0558** (0.1538)	**-0.5021** (0.5173)	**-0.0819** (0.1392)	**-0.5184** (0.5774)
Gender diversity x Female chairperson		**-0.4449** (0.7635)		**1.1562** (1.1739)		**0.7667** (0.9143)
Board size	**0.3521 ***** (0.1235)	**0.3492 **** (0.1367)	**0.3153 **** (0.1329)	**0.3154 **** (0.1319)	**0.3090 **** (0.1308)	**0.3153 **** (0.1309)
Board independence	**0.3155** (0.2683)	**0.2689** (0.2945)	**0.2768** (0.2931)	**0.2638** (0.3016)	**0.2740** (0.3216)	**0.2788** (0.2914)
Family ownership	**0.0006** (0.0008)	**0.0006** (0.0009)	**0.0007** (0.0008)	**0.0007** (0.0009)	**0.0008** (0.0008)	**0.0009** (0.0009)
Firm size	**0.0344 **** (0.0137)	**0.0338 **** (0.0139)	**0.0325 **** (0.0142)	**0.0332 **** (0.0153)	**0.0296 **** (0.0139)	**0.0312 **** (0.0144)
Firm age	**-0.0610 **** (0.0255)	**-0.0674 ***** (0.0251)	**-0.0589 **** (0.0249)	**-0.0617 **** (0.0251)	**-0.0629 **** (0.0249)	**-0.0625 **** (0.0247)
ln(Current Ratio)	**0.0333** (0.0206)	**0.0315** (0.0192)	**0.0320 *** (0.0194)	**0.0335 *** (0.0191)	**0.0308 *** (0.0177)	**0.0306** (0.0189)
Past firm performance	**-0.5050 **** (0.2006)	**-0.5021 **** (0.1938)	**-0.4869 **** (0.2017)	**-0.4784 **** (0.1980)	**-0.4838 **** (0.2066)	**-0.4838 **** (0.2031)
Past growth rate of assets ($GrASSETS_{t-1}$)	**0.1252 **** (0.0533)	**0.1254 **** (0.0532)	**0.1246 **** (0.0516)	**0.1238 **** (0.0525)	**0.1283 **** (0.0556)	**0.1278 **** (0.0544)
Past growth rate of assets ($GrASSETS_{t-2}$)	**-0.0364** (0.0343)	**-0.0363** (0.0336)	**-0.0331** (0.0344)	**-0.0353** (0.0348)	**-0.0326** (0.0350)	**-0.0340** (0.0348)
Constant	**-1.3000 ***** (0.4357)	**-1.2383 ***** (0.4743)	**-1.1560 ***** (0.4323)	**-1.1614 ***** (0.4400)	**-1.0624 **** (0.4111)	**-1.1128 ***** (0.4135)
AB Test for AR(1) *p-value*	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
AB Test for AR(2) *p-value*	**0.634**	**0.633**	**0.593**	**0.648**	**0.604**	**0.645**
Hansen test *p-value*	**0.995**	**0.998**	**0.995**	**0.980**	**0.992**	**0.995**
Difference in Hansen tests of exogeneity of instrument subsets:						
Instruments for GMM-Style:						
Hansen test excluding group *p-value*	**0.943**	**0.941**	**0.912**	**0.888**	**0.919**	**0.900**
Difference (null H = exogenous) *p-value*	**0.985**	**0.993**	**0.989**	**0.960**	**0.981**	**0.988**
Instruments for IV-Style:						
Hansen test excluding group *p-value*	**0.954**	**0.969**	**0.906**	**0.959**	**0.952**	**0.967**
Difference (null H = exogenous) *p-value*	**1.000**	**1.000**	**1.000**	**0.970**	**1.000**	**1.000**

Coefficients are in bold; standard errors are in parentheses; * significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level

	Proportion of Females		Blau Index		Shannon Index	
	(1)	(2)	(3)	(4)	(5)	(6)
PANEL D: ***Volatility of ROA (volROA)***						
Board-level gender diversity	**-0.1595** (0.1471)	**-0.1207** (0.1631)	**-0.2065** ** (0.0841)	**-0.1968** ** (0.0827)	**-0.1251** ** (0.0586)	**-0.1260** ** (0.0621)
Presence of female chairperson	**-0.1196** (0.0819)	**0.0978** (0.2357)	**-0.0775** (0.0816)	**0.5112** (0.3357)	**-0.1490** * (0.0814)	**-0.1708** (0.5452)
Gender diversity x Female chairperson		**-0.7585** (0.7478)		**-1.5134** * (0.8335)		**0.0396** (0.9074)
Board size	**-0.0433** (0.0933)	**-0.0478** (0.0900)	**-0.0700** (0.0662)	**-0.0788** (0.0689)	**-0.0495** (0.0828)	**-0.0487** (0.0839)
Board independence	**-0.1380** (0.1065)	**-0.1545** (0.1134)	**-0.1494** (0.0847)	**-0.1190** (0.0999)	**-0.1248** (0.1300)	**-0.1251** (0.1342)
Family ownership	**0.0009** (0.0007)	**0.0009** (0.0006)	**0.0005** (0.0006)	**0.0005** (0.0006)	**0.0008** (0.0006)	**0.0008** (0.0007)
Firm size	**-0.0177** ** (0.0089)	**-0.0168** * (0.0091)	**-0.0142** ** (0.0069)	**-0.0141** ** (0.0067)	**-0.0188** ** (0.0083)	**-0.0188** ** (0.0083)
Firm age	**-0.0054** (0.0137)	**-0.0074** (0.0140)	**-0.0120** (0.0133)	**-0.0122** (0.0133)	**-0.0059** (0.0123)	**-0.0060** (0.0120)
Leverage	**0.0080** (0.0113)	**0.0101** (0.0109)	**0.0140** (0.0100)	**0.0188** * (0.0112)	**0.0114** (0.0100)	**0.0112** (0.0099)
Annual growth rate of assets	**-0.1731** *** (0.0435)	**-0.1723** *** (0.0440)	**-0.1283** *** (0.0391)	**-0.1244** *** (0.0392)	**-0.1659** *** (0.0429)	**-0.1661** *** (0.0437)
Past firm performance	**0.2001** (0.1319)	**0.2022** (0.1329)	**0.0989** (0.1082)	**0.0979** (0.1072)	**0.2202** * (0.1215)	**0.2196** * (0.1207)
Past volatility ($volROA_{t-1}$)	**0.7264** *** (0.0901)	**0.7171** *** (0.0899)	**0.6662** *** (0.0826)	**0.6621** *** (0.0817)	**0.7277** *** (0.0888)	**0.7274** *** (0.0884)
Past volatility ($volROA_{t-2}$)	**-0.0538** (0.0327)	**-0.0471** (0.0317)	**-0.1160** ** (0.0497)	**-0.1193** ** (0.0489)	**-0.0672** ** (0.0337)	**-0.0670** ** (0.0336)
Constant	**0.6276** ** (0.2911)	**0.6269** ** (0.2885)	**0.7123** *** (0.2282)	**0.7295** *** (0.2225)	**0.6846** *** (0.2629)	**0.6829** *** (0.2593)
AB Test for AR(1) *p-value*	**0.002**	**0.002**	**0.003**	**0.003**	**0.002**	**0.002**
AB Test for AR(2) *p-value*	**0.700**	**0.680**	**0.490**	**0.436**	**0.610**	**0.613**
Hansen test *p-value*	**0.997**	**0.996**	**0.999**	**0.999**	**0.998**	**0.997**
Difference in Hansen tests of exogeneity of instrument subsets:						
Instruments for GMM-Style:						
Hansen test excluding group *p-value*	**0.927**	**0.946**	**0.127**	**0.186**	**0.589**	**0.474**
Difference (null H = exogenous) *p-value*	**0.995**	**0.992**	**1.000**	**0.999**	**0.997**	**0.998**
Instruments for IV-Style:						
Hansen test excluding group *p-value*	**0.997**	**0.996**	**0.997**	**0.999**	**0.997**	**0.997**
Difference (null H = exogenous) *p-value*	**0.659**	**0.569**	**0.999**	**0.691**	**0.776**	**0.654**

Coefficients are in bold; standard errors are in parentheses; * significant at 0.10 level; ** significant at 0.05 level; *** significant at 0.01 level

Table 2 reports the results of estimating the effects of board-level gender diversity on the three dimensions of corporate risk-taking: managerial risk-taking, financial risk-taking, and the riskiness of firm outcomes. Panels A and B of Table 2 use *LEV* and ln(*CURRENT*) as measures of financial risk-taking, panel C uses *GrASSETS* as a measure of managerial risk-taking, and panel D uses *volROA* to measure the riskiness of firm outcomes. Column (1) presents the estimation results using the proportion of women in the board as a measure of board-level gender diversity, column (2) presents the estimates using the Blau Index, and column (3) reports the estimates using the Shannon Index as a proxy for board-level gender diversity.

Panel A of Table 2 reports the results of estimating Equation (1), where the leverage ratio (*LEV*) is employed as the measure of risk-taking. We find that board-level gender diversity has no statistically significant effect on *LEV*, regardless of the gender diversity measure used, although there is some evidence that the presence of a female Chairperson (*FCHAIR*) is associated with higher *LEV* (i.e., greater risk-taking). We also find that past corporate risk-taking, measured by the one- and two-period lags of *LEV*, has a positive and significant relationship with current corporate risk-taking, although we do not find evidence that family ownership and other board characteristics (i.e., board size and board independence) significantly affect the risk-taking behavior of firms.

On the other hand, Panel B of Table 2 reports the results of estimating Equation (2), where ln(*CURRENT*) is used to measure risk-taking. When we use the proportion of women in the board to proxy for gender diversity, we find that board-level gender diversity has a negative, albeit weakly significant, relationship with ln(*CURRENT*). This result suggests that a greater presence of women on the board is associated with lower firm liquidity, which implies greater corporate risk-taking. Similarly, we find some evidence that firms with boards chaired by women are associated with lower ln(*CURRENT*) values, implying greater risk-taking, although this effect seems to manifest only when the Blau index is used as the proxy for gender diversity.

Moreover, Panel B results show that firm size has a significant and negative effect on ln(*CURRENT*), regardless of the gender diversity measure employed. We also find a significant inverse relationship between ln(*CURRENT*) (i.e., short-term borrowing) and *LEV* (i.e., long-term borrowing) across all gender diversity measures used. We likewise find that past corporate risk-taking, as measured by the one- and two-period lags of ln(*CURRENT*), has a positive and significant relationship with current corporate risk-taking.

Panel C of Table 2 reports the results of estimating Equation (3), where *GrASSETS* is employed as the risk-taking measure. Similar to our results in Panel A, we find that board-level gender diversity has an insignificant effect on *GrASSETS*, regardless of the gender diversity measure used. Female-led boards also seem to have no discernible effect on *GrASSETS* compared to male-led boards. We also find that (a) board size has a positive and significant effect on *GrASSETS*, which implies that larger boards lead to lesser corporate risk-taking; (b) ln(*CURRENT)* has a positive effect on *GrASSETS*, indicating that high liquidity leads to lower corporate risk-taking; (c) past firm performance has a negative and significant effect on *GrASSETS*, implying that better performance in the past results to greater corporate risk-taking; (d) larger firms and younger firms enjoy higher *GrASSETS* and, therefore, undertake lesser corporate risk-taking; and (e) past corporate risk-taking, as measured by the one-period lag of *GrASSETS*, has a positive and statistically significant effect on current corporate risk-taking.

Finally, Panel D of Table 2 reports the results of estimating Equation (4), where the volatility of *ROA* (*volROA*) is our proxy for corporate risk-taking. Contrary to our results in Panels A and B, we find that greater board-level gender diversity is significantly associated with lower *volROA* (i.e., lesser corporate risk-taking) when we use the Blau and Shannon indices to proxy for gender diversity. We also find some evidence that firms with female-chaired boards are associated with lower *volROA*, and that the negative gender diversity-*volROA* relationship is more prominent among female-chaired boards than male-chaired boards. Likewise, we find evidence that (a) higher *GrASSETS* is associated with lower *volROA* (i.e., lesser corporate risk-taking), (b) larger firms undertake fewer risky activities, (c) higher *LEV* is associated with higher *volROA*, (d) greater past firm performance is associated with higher *volROA*, and that (e) past corporate risk-taking, as measured by the one- and two-period lags of *volROA*, has a significant positive and negative effect, respectively, on current risk-taking.

As robustness checks, we reran Equation (1) with the ratio of total debt to the book value of total assets and the ratio of long-term debt to the book value of total assets as alternative measures of leverage. We find that board-level gender diversity, regardless of the gender diversity measure used, does not have any statistically significant effect on either measure of leverage, although there still remains some evidence of a weakly significant and positive relationship between *FCHAIR* and leverage. We also re-estimated Equations (1) to (4) using other measures of family ownership, that is, (a) family and individual shareholder ownership using a 50% ownership threshold, (b) family and individual shareholder ownership using a 20% ownership threshold, (c) a dummy variable that takes the value of 1 when a family or individual shareholder owns at least 50% of the firm, and 0 otherwise; (d) a dummy variable that takes the value of 1 when a family or individual shareholder owns at least 20% of the firm, and 0 otherwise; and (e) a dummy variable that takes the value of 1 when a family or dominant individual shareholder exists, regardless of the ownership threshold used. We still find qualitatively similar results for all of our estimations, regardless of the gender diversity and family ownership measure used. These results are available upon request from the authors.

Discussion

Overall, our findings on the effects of board-level gender diversity on corporate risk-taking are mixed. On the one hand, we find some evidence that female-chaired boards and a greater proportion of women on the board increase financial risk-taking, proxied by the leverage ratio (*LEV*) and the current ratio (ln(*CURRENT*)), perhaps due to the inherent preference for risk and stimulation by women who were able to make it to the board in the first place (Adams & Funk, 2012). On the other hand, we also find evidence to support the general consensus that female-chaired boards and greater board-level gender diversity lead to lower riskiness of firm outcomes, proxied by the volatility of ROA (*volROA*). This result supports the theory that women are more conservative and more risk-averse than men and is consistent with the overall findings of Chen et al. (2016) for U.S. firms, Khaw et al. (2016) for Chinese firms, Palvia et al. (2015) for U.S. commercial banks, Setiyono and Tarazi (2018) for Indonesian firms, and Loukil and Yousfi (2016) for Tunisian boardrooms. Altogether, our mixed results indicate that greater board diversity impacts corporate risk-taking differently, depending on the dimension of risk-taking examined.

We also find some evidence that better past firm performance leads to greater corporate risk-taking, only when we use the volatility of ROA (*volROA*) and the growth rate of assets (*GrASSETS*) to proxy for risk-taking. This may indicate that firms with good previous performance tend to adopt riskier strategies to increase their competitive advantages further. When it comes to firm size, we find that larger firms tend to have lower firm liquidity (i.e., undertake greater risk-taking activities), perhaps because they tend to rely heavily on debt financing. However, when using *GrASSETS* and *volROA* as measures of risk-taking, we find that larger firms undertake fewer risk-taking activities. This latter finding is consistent with that of Yang and Chen (2009), who argue that larger firms may not be as flexible in adapting to market fluctuations and may want to protect their image by engaging in fewer risky activities. All in all, our contrasting findings on the relationship between firm size and corporate risk-taking indicate that ln(*CURRENT*) and *GrASSETS* both capture different aspects of corporate risk-taking.

Younger firms and firms with larger boards have also been found to undertake fewer risk-taking activities, only when *GrASSETS* is used as the risk-taking measure. Younger firms may not have as much knowledge and access to risk and growth opportunities in the marketplace as older firms do. Furthermore, according to the tenets of resource dependency theory, larger boards allow for more individual financial and managerial expertise that can bring about more prudent decision-making and reduce excessive risk-taking. Finally, we find that previous year corporate-risk taking positively influences current corporate risk-taking, regardless of the risk-taking measure employed.

Conclusion

From developed markets to emerging ones, female firm leaders are slowly becoming more ubiquitous. The progress in promoting gender parity in workplaces around the world is still relatively sluggish. Nevertheless, the issue of gender diversity in corporate boards continues to attract increased attention because of the benefits women are said to confer to firms. One such economic benefit is that women on boards are posited to improve firm performance and contribute to better corporate governance because they are known to possess more favorable traits in value judgment and are keener and stricter firm monitors than their male counterparts are. Moreover, women are posited to contribute to greater risk-aversion when firm decision-making is concerned. The latter is consistent with the theoretical assumption that women are inherently less competitive and more risk-fearing than men.

Using an unbalanced panel of approximately 2,000 firm-years from 2003 to 2015 and a GMM estimation procedure that addresses endogeneity issues, we find different effects of board-level gender diversity on corporate risk-taking, depending on the dimension of risk-taking examined. On the one hand, we find evidence of a negative and significant relationship between board-level gender diversity and riskiness of firm outcomes; on the other hand, we find some evidence of a positive, albeit weakly significant, effect of female-chaired boards and gender diversity in the board on financial risk-taking. Such mixed findings support those of Matsa and Miller's (2013), who also found inconsistent evidence across their estimations that women directors prefer safer financial strategies. In contrast with earlier literature that found a consistent and inverse relationship between board diversity and firm risk-taking, our study, along with other more recent ones (Sila et al., 2016; Bruna et al., 2019; Matsa & Miller, 2013), use estimation methods that take into account possible endogeneity issues between board characteristics and corporate decision-making and allows for causative interpretation. Against this background, we conclude that our ambiguous findings on the relationship between the presence of women in corporate boards and firm risk-taking suggest that women director appointments can also have economic consequences that may or may not be desirable with respect to firm risk. Therefore, regulations that recommend increased diversity in the boardroom on the basis of addressing the usual social inequality or gender disparity concerns may still offer a more cautious route than do those that are grounded on improving the level of corporate risk-taking.

Declaration of ownership:

This report is our original work.

Conflict of interest:

None.

Ethical clearance:

This study was approved by our institution.

References

Adams, R. B., & Ferreira, D. (2004). *Gender diversity in the boardroom* (European Corporate Governance Institute Finance Working Paper No. 57). http://www.cfr-cologne.de/download/researchseminar/SS2006/genderECGI.pdf

Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics, 94(2),* 291–309. https://doi.org/10.1016/j.jfineco.2008.10.007

Adams, R. B., & Funk, P. (2012). Beyond the glass ceiling: Does gender matter? *Management Science*, *58*(2), 219–235. https://doi.org/10.1287/mnsc.1110.1452

Al-Shaer, H., & Zaman, M. (2016). Board gender diversity and sustainability reporting quality. *Journal of Contemporary Accounting & Economics, 12*(3), 210–222. https://doi.org/10.1016/j.jcae.2016.09.001

Barber, B., & Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The Quarterly Journal of Economics, 116*(1), 261–292. https://www.jstor.org/stable/2696449

Baumgärtner, S. (2006). *Measuring the diversity of what? And for what purpose? A conceptual comparison of ecological and economic biodiversity indices*. https://ssrn.com/abstract=894782

Berk, J. B., Green, R. C., & Naik, V. (1999). Optimal investment, growth options, and security returns. *The Journal of Finance*, *54*(5), 1553–1607. https://doi.org/10.1111/0022-1082.00161

Blau, P. M. (1977). *Inequality and heterogeneity*. The Free Press.

Bruna, M. G., Dang, R., Scotto, M.-J., & Ammari, A. (2019). Does board gender diversity affect firm risk-taking? Evidence from the French stock market. *Journal of Management and Governance, 23,* 915–938. https://doi.org/10.1007/s10997-019-09473-1

Byrnes, J. P., Miller, D. C., & Schafer, W. D. (1999). Gender differences in risk taking: A meta-analysis. *Psychological Bulletin*, *125*(3), 367–383. https://doi.org/10.1037/0033-2909.125.3.367

Campbell, K., & Mínguez-Vera, A. (2008). Gender diversity in the boardroom and firm financial performance. *Journal of Business Ethics, 83*(3), 435–451. https://doi.org/10.1007/s10551-007-9630-y

Carpenter, M. A., Geletkanycz, M. A., & Sanders, W. G. (2004). Upper echelons research revisited: Antecedents, elements, and consequences of top management team composition. *Journal of Management, 30*(6)*,* 749–778. https://doi.org/10.1016/j.jm.2004.06.001

Carter, D. A., D'Souza, F., Simkins, B. J., & Simpson, W. G. (2010). The gender and ethnic diversity of US boards and board committees and firm financial performance. *Corporate Governance: An International Review, 18*(5), 396–414. https://doi.org/10.1111/j.1467-8683.2010.00809.x

Carter, D. A., Simkins, B. J., & Simpson, W. G. (2003). Corporate governance, board diversity, and firm value. *The Financial Review*, *38*(1), 33–53. https://doi.org/10.1111/1540-6288.00034

Catalyst. (2015, January 13). *2014 Catalyst census: Women board directors*. Catalyst. https://www.catalyst.org/research/2014-catalyst-census-women-board-directors/

Catalyst. (2017, August 22). *2016 Catalyst census: Women and men board directors*. Catalyst. https://www.catalyst.org/research/2016-catalyst-census-women-and-men-board-directors/

Chen, S., Ni, X., & Tong, J. Y. (2016). Gender diversity in the boardroom and risk management: A case of R&D investment. *Journal of Business Ethics, 136,* 599–621. https://doi.org/10.1007/s10551-014-2528-6

*Convent*ion on the Elimination of All Forms of Discrimination Against Women. 1979. Retrieved May 18, 2020 from http://www.ohchr.org/EN/ProfessionalInterest/Pages/CEDAW.aspx

Croson, R., & Gneezy, U. (2009). Gender differences in preferences. *Journal of Economic Literature*, *47*(2), 448–474. https://doi.org/10.1257/jel.47.2.448

Deloitte & Alliance for Board Diversity. (2017). *Missing pieces report: The 2016 board diversity census of women and minorities on Fortune 500 boards*. Deloitte Development LLC. https://www2.deloitte.com/us/en/pages/center-for-board-effectiveness/articles/board-diversity-census-missing-pieces.html

Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of Management Review*, *14*(1), 57–74. https://doi.org/10.5465/amr.1989.4279003

Ely, B. (2008). *Financial regulation: The concise encyclopedia of economics* (2nd ed.). Library of Economics and Liberty.

European Women on Boards & Institutional Shareholder Services, Inc. (2016, April). *Gender diversity on European boards: Realizing Europe's potential, progress and challenges*. European Women on Boards. http://www.votre-administrateur.com/wp-content/uploads/2017/02/EWoB-Gender-Diversity-On-European-Boards.pdf

Faccio, M., Marchica, M., & Mura, R. (2011). Large shareholder diversification and corporate risk-taking. *The Review of Financial Studies, 24*(11), 3601–3641. https://doi.org/10.1093/rfs/hhr065

Faccio, M., Marchica, M., & Mura, R. (2016). CEO gender, corporate risk-taking, and the efficiency of capital allocation. *Journal of Corporate Finance, 39,* 193–209. https://doi.org/10.1016/j.jcorpfin.2016.02.008

Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The Journal of Law and Economics*, *26*(2), 301–326. https://doi.org/10.1086/467037

Farrell, K. A., & Hersch, P. L. (2005). Additions to corporate boards: The effect of gender. *Journal of Corporate Finance*, *11*(1-2), 85–106. https://doi.org/10.1016/j.jcorpfin.2003.12.001

Gilley, K. M., Walters, B. A., & Olson, B. J. (2002). Top management team risk taking propensities and firm performance: Direct and moderating effects. *Journal of Business Strategies, 19*(2), 95–114.

Hambrick, D. C. (2007). Upper echelons theory: An update. *Academy of Management Review, 32*(2), 334–343. https://doi.org/10.5465/amr.2007.24345254

Hermalin, B. E., & Weisbach, M. S. (2001). *Boards of directors as an endogenously determined institution: A survey of the economic literature* (National Bureau of Economic Research Working Paper No. 8161). http://www.nber.org/papers/w8161.pdf

Hillman, A. J., Shropshire, C., & Cannella, A. A., Jr. (2007). Organizational predictors of women on corporate boards. *Academy of Management Journal, 50*(4)*,* 941–952. https://doi.org/10.5465/amj.2007.26279222

Huang, J., & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics*, *108*(3), 822–839. https://doi.org/10.1016/j.jfineco.2012.12.005

IFRS. (n.d.a). *IAS 36 impairment of assets.* https://www.ifrs.org/issued-standards/list-of-standards/ias-36-impairment-of-assets/

IFRS. (n.d.b). *IFRIC 10 interim financial reporting and impairment.* https://www.ifrs.org/issued-standards/list-of-standards/ifric-10-interim-financial-reporting-and-impairment/

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, *3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Jianakoplos, N. A., & Bernasek, A. (1998). Are women more risk averse? *Economic Inquiry, 36*(4), 620–630. https://doi.org/10.1111/j.1465-7295.1998.tb01740.x

John, K., Litov, L., & Yeung, B. (2008). Corporate governance and risk-taking. *The Journal of Finance, 63*(4), 1679–1728. https://doi.org/10.1111/j.1540-6261.2008.01372.x

Khaw, K. L.-H., Liao, J., Tripe, D., & Wongchoti, U. (2016). Gender diversity, state control, and corporate risk-taking: Evidence from China. *Pacific-Basin Finance Journal, 39*, 141–158. https://doi.org/10.1016/j.pacfin.2016.06.002

Kravet, T.D. (2014). Accounting conservatism and managerial risk-taking: Corporate acquisitions. *Journal of Accounting and Economics, 57*(2-3), 218–240. https://doi.org/10.1016/j.jacceco.2014.04.003

Krishnan, H. A., & Park, D. (2005). A few good women—on top management teams. *Journal of Business Research, 58*(12)*,* 1712–1720. https://doi.org/10.1016/j.jbusres.2004.09.003

La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. *Journal of Finance, 54*(2), 471–517. https://doi.org/10.1111/0022-1082.00115

Lee, L.-E., Marshall, R., Rallis, D., & Moscardi, M. (2015, November). *Women on boards: Global trends in gender diversity on corporate boards*. MSCI Inc. https://www.msci.com/documents/10199/04b6f646-d638-4878-9c61-4eb91748a82b

Less than 7% women part of boardrooms in corporate India. (2016, March 7). DNA India. http://www.dnaindia.com/money/report-less-than-7-women-part-of-boardrooms-in-corporate-india-2186400

Loukil, N., & Yousfi, O. (2016). Does gender diversity on corporate boards increase risk-taking? *Canadian Journal of Administrative Sciences, 33*(1)*,* 66–81. https://doi.org/10.1002/cjas.1326

March, J. G., & Shapira, Z. (1987). Managerial perspectives on risk and risk taking. *Management Science*, *33*(11), 1404–1418. https://doi.org/10.1287/mnsc.33.11.1404

Matsa, D. A., & Miller, A. R. (2013). A female style in corporate leadership? Evidence from quotas. *American Economic Journal: Applied Economics*, *5*(3), 136–169. https://doi.org/10.1257/app.5.3.136

Nelson, B. (2014). The data on diversity. *Communications of the ACM*, *57*(11), 86–95. https://doi.org/10.1145/2597886

Ngai, F., Chan, F., & Yu, M. (2017). *Women on boards Hong Kong 2017*. Community Business Limited. https://www.heidrick.com/Knowledge-Center/Publication/Women-on-boards-Hong-Kong-2017

Nguyen, T., Locke, S., & Reddy, K. (2015). Does boardroom gender diversity matter? Evidence from a transitional economy. *International Review of Economics & Finance, 37*, 184–202. https://doi.org/10.1016/j.iref.2014.11.022

Palvia, A., Vähämaa, E., & Vähämaa, 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, 131,* 577–594. https://doi.org/10.1007/s10551-014-2288-3

Post, C., & Byron, K. (2015). Women on boards and firm financial performance: A meta-analysis. *Academy of Management Journal, 58*(5)*,* 1546–1571. https://doi.org/10.5465/amj.2013.0319

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. *The Stata Journal, 9*(1)*,* 86–136. https://doi.org/10.1177/1536867X0900900106

Rose, C. (2007). Does female board representation influence firm performance? The Danish evidence. *Corporate Governance: An International Review*, *15*(2), 404–413. https://doi.org/10.1111/j.1467-8683.2007.00570.x

Saeed, A., Belghitar, Y., & Yousaf, A. (2016). Firm-level determinants of gender diversity in the boardrooms: Evidence from some emerging markets. *International Business Review, 25*(5), 1076–1088. https://doi.org/10.1016/j.ibusrev.2016.01.002

Saeed, A., Mukarram, S. S., & Belghitar, Y. (2019). Read between the lines: Board gender diversity, family ownership, and risk-taking in Indian high-tech firms. *International Journal of Finance & Economics,* 1–23. https://doi.org/10.1002/ijfe.1784

Sapienza, P., Zingales, L., & Maestripieri, D. (2009). Gender differences in financial risk aversion and career choices are affected by testosterone. *Proceedings of the National Academy of Sciences*, *106*(36), 15268–15273. https://doi.org/10.1073/pnas.0907352106

Schwartz, E. S., & Trigeorgis, L. (2001). *Real options and investment under uncertainty: Classical readings and recent contributions*. MIT Press.

Securities and Exchange Commission. (2019, December 19). *MC No. 24 s.2019 – Code of corporate governance for public companies and registered issuers*. https://www.sec.gov.ph/mc-2019/mc-no-24-s-2019-code-of-corporate-governance-for-public-companies-and-registered-issuers/

Securities and Exchange Commission. (2016, December 1). *MC No. 19 s.2016 – Code of corporate governance for publicly-listed companies.* https://www.sec.gov.ph/mc-2016/mc-no-19-s-2016the-2016-rules-of-procedure-of-the-securities-and-exchange-commission/

Sen, S., & Bhattacharya, C. B. (2001). Does doing good always lead to doing better? Consumer reactions to corporate social responsibility. *Journal of Marketing Research*, *38*(2), 225–243. https://doi.org/10.1509/jmkr.38.2.225.18838

Setiyono, B., & Tarazi, A. (2018). Does diversity of bank board members affect performance and risk? Evidence from an emerging market. In B. Díaz Díaz, S. Idowu, & P. Molyneux (Eds.), *Corporate governance in banking and investor protection* (pp. 185–218). Springer. https://doi.org/10.1007/978-3-319-70007-6_9

Shannon, C. E. (1948). A mathematical theory of communication. *Bell System Technical Journal*, *27*(3), 379–423. https://doi.org/10.1002/j.1538-7305.1948.tb01338.x

Sila, V., Gonzalez, A., & Hagendorff, J. (2016). Women on board: Does boardroom gender diversity affect firm risk? *Journal of Corporate Finance, 36*, 26–53. https://doi.org/10.1016/j.jcorpfin.2015.10.003

Smith, N. (2014). *Gender quotas on boards of directors: Little evidence that gender quotas for women on boards of directors improve firm performance*. IZA World of Labor. https://wol.iza.org/uploads/articles/7/pdfs/gender-quotas-on-boards-of-directors.pdf

Smith, N., & Parrotta, P. (2015). Why so few women on boards of directors? Empirical evidence from Danish companies in 1998–2010. *Journal of Business Ethics, 147*(2), 445–467. https://doi.org/10.1007/s10551-015-2974-9

Sunden, A. E., & Surette, B. J. (1998). Gender differences in the allocation of assets in retirement savings plans. *The American Economic Review, 88*(2), 207–211. https://www.jstor.org/stable/116920

Unite, A., Sullivan, M., Brookman, J., Majadillas, M., & Taningco, A. (2008). Executive pay and firm performance in the Philippines. *Pacific-Basin Finance Journal*, *16*(5), 606–623. https://doi.org/10.1016/j.pacfin.2006.12.002

Unite, A., Sullivan, M., & Shi, A. (2015). *Women on top: Diversity in gender and education profiles of top management and board of directors of Philippine publicly traded firms* (De La Salle University - Angelo King Institute Working Paper No. 2015-034). https://www.dlsu-aki.com/uploads/1/0/2/2/102266760/2015-33.pdf

Unite, A., Sullivan, M., & Shi, A. (2019). Board diversity and performance of Philippine firms: Do women matter? *International Advances in Economic Research, 25*(1), 65–78. https://doi.org/10.1007/s11294-018-09718-z

Wilson, M., & Daly, M. (1985). Competitiveness, risk-taking, and violence: The young male syndrome. *Ethology and Sociobiology, 6*(1), 59–73. https://doi.org/10.1016/0162-3095(85)90041-X

Wintoki, M. B., Linck, J. S., & Netter, J. M. (2012). Endogeneity and the dynamics of internal corporate governance. *Journal of Financial Economics, 105*(3), 581–606. https://doi.org/10.1016/j.jfineco.2012.03.005

Yang, C., & Chen, K. (2009). Are small firms less efficient? *Small Business Economics, 32*(4), 375–395. https://doi.org/10.1007/s11187-007-9082-x

Zimmer, L. (1988). Tokenism and women in the workplace: The limits of gender-neutral theory. *Social Problems, 35*(1), 64–77. https://doi.org/10.2307/800667