Board Gender Diversity and Firm Performance:
The Role of Firm Size

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August 2021

Abstract:

We examine the moderating effect of firm size on the relationship between board gender diversity and firm performance in firms listed on the TSX index over the period 2010-2019. We find that board gender diversity is positively related to firm performance and that firm size negatively moderates such relationship, implying that smaller firms benefit the most from gender diversity within their boards. We examine how the Ontario Securities Commission gender diversity rule affects the moderating effect of firm size and find that the gender diversity rule negatively affects the relationship between women on boards and firm performance, and that the moderating effect of firm size continues to hold after the implementation of the policy. We also analyze board gender diversity and firm size effects across key industries and the results show that the board gender diversity effect on performance is positive and strongest in Consumer Staples, Utilities and Real Estate, and that it is negative and significant in Industrials. The moderating effect of firm size is at play in most industries. Our results are robust to the use of different measures of gender diversity and performance and to the correction of endogeneity issues. In addition, they can help explain some of the inconsistent results on the effect of board gender diversity currently observed in the literature.

JEL: G18, G38, G34
Keywords: gender diversity; governance; regulation; firm size; performance

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1. Introduction

There is an increasing concern about gender diversity on corporate boards, which has led to the implementation of various regulations and policies aimed to encourage female board nomination and representation worldwide. For example, in 2003, Norway pioneered the implementation of a gender-based quota for board composition. The law required that boards of every public limited company should comprise of at least 40% female directors by 2008 with possible legal actions against non-compliant firms. In 2007, Spain legislated the Gender Equality Act, also requiring corporate entities to have at least 40% female representation in their boards. Other countries, including France and Italy have also passed legislation mandating female board representation (Chapple & Humphrey, 2014). More recently, in 2018, California became the first state in the US to legally induce corporate board diversity with a law mandating that every public company in the state have at least one female director. The Diversity Disclosure Requirement in Canada enforces disclosure on whether the board has adopted a written policy concerning the employment of women directors.

Initiatives to increase the number of female directors on boards are built upon the premise that this will not only improve social justice, but also governance and firm performance, by introducing more skills, ideas, discussions and perspectives to corporate boards' decision making (Shamsul et al., 2015; Adams & Ferreira, 2009). The relationship between board gender diversity and firm performance has been a subject of great interest to researchers, but the empirical findings so far are mixed. Some studies suggest that board gender diversity positively impacts firm performance (e.g., Campbell & Mínguez-Vera, 2008; Martín-Ugedo & Minguez-Vera, 2014; Kim & Starks, 2016), whereas others suggest that board gender diversity negatively impacts firm performance (e.g., Adams & Ferreira, 2009; Ahern & Dittmar, 2012), and a third group of studies finds no link between gender diversity and firm performance (e.g. Carter et al., 2010; Rose, 2007).

The conflict in empirical findings has been attributed to differences in countries, time periods, institutional environments, cultures, as well as methodological deficiencies experienced by various researchers (Campbell & Minguez-Vera, 2008; Low et al., 2015, Costa et al., 2001). Specifically, a common issue found in multiple studies is the presence of endogeneity between board gender diversity and firm performance, as firm performance can affect both the incentive of women to join the boards, as well as the motivation of boards to hire women directors (Conyon & He, 2017; Liu et al., 2014; Dang et al., 2018; Martín-Ugedo & Minguez-Vera, 2014).

More recently, it has been suggested that the effect of possible moderating variables must be examined to properly uncover whether and how gender diversity affects firm performance (Kochan et al., 2003; Miller & del Carmen Triana, 2009). For instance, the impact of board gender diversity may be enhanced or restricted depending on the organizational culture, organizational structure and growth orientation of the firm (Dwyer et al., 2003; Boyd et al., 2011; Li & Chen, 2018). The relationship between a critical mass of women and firm performance may also be influenced by a firm's innovation activity, measured as R&D expenditure (Cabeza-García et al., 2019). Some evidence even suggests that the relationship between board diversity and firm performance is moderated by national governance quality and that firms in countries with good national governance quality benefit from a more gender-diverse board (Nguyen et al., 2021).

In the following, we aim to examine the moderating role of firm size on the relationship between board gender diversity and firm performance. Although firm size is a key driver of a firm's operations, structure and the quality of its board, its possible role on the impact of board gender diversity has not been thoroughly analyzed. Past research considered firm size only as a positional feature of a firm at a given point in time, and most studies on board gender diversity only include firm size as a control variable. Yet, firm size affects a firm's organizational structure (Ahmadi et al., 2018) and may enhance or constrain firms' activities, such as the sharing of creative ideas, group information processing and overall decision making (Li & Chen, 2018; Smeltzer et al., 1988). Therefore, firm size may either enhance or hamper the effect that board gender diversity has on firm decision making, creativity, communication and thus, firm performance.

Larger firms tend to have highly bureaucratic and complex structures, which may lead to a wider distribution of power and makes it more difficult for members to cooperate and reach consensus. This can diminish the effect of board gender diversity on firm decision making and problem solving (Gong et al., 2013; Nahavandi & Malekzadeh, 1993). On the other hand, smaller firms tend to have simpler and less bureaucratic structures, which facilitates communication among members, increases management discretion (Xie, 2014), and strengthens a gender-diverse board's impact on firm strategic choices and decision making. In addition, SME boards are more likely to be smaller, and so each director can seize greater power (Mınguez-Vera & Martin, 2011). They also tend to be less formalized, with each member involved in a variety of tasks and hence having a greater chance to influence firm decisions (Martín-Ugedo & Minguez-Vera, 2014; Forbes & Milliken, 1999). As a result, such conditions may strengthen a gender-diverse board's impact on decision making. Firm size may also influence the extent to which creative ideas are shared and implemented (Gong et al., 2013). For example, larger firms may experience higher network latency and a greater number of vertical layers, which slows down communication and inhibits the open and fast sharing of

ideas and knowledge (Xie et al., 2010). In contrast, smaller firms tend to be more flexible and experience less hierarchy-related pressures, which enables the implementation of creative ideas more quickly, and strengthens a gender-diverse board's impact on firm strategic choices and decision making (Xie, 2014).

Overall, the impact of board gender diversity in small firms can be different than that in large firms and current practices of promoting board gender diversity may not necessarily lead to similar performance effects in small versus large firms. Examining the moderating role of firm size would lead to a better understanding of the relationship between board gender diversity and firm performance and can help explain some of the inconsistent results on the effect of board gender diversity currently observed in the literature.

In this study we examine the moderating effect of firm size on the relationship between board gender diversity and firm performance using Canadian firms listed on the TSX Composite Index over the period 2010-2019. We employ three different measures of board gender diversity (percentage of female directors on board, number of female directors on board, and a dummy measure indicating the presence of female directors) and we employ two measures of firm performance (Return on Assets and Return on Equity). Our results show a positive relationship between board gender diversity and firm performance. This relationship is negatively moderated by firm size where the effect of board gender diversity is attenuated in larger firms compared to smaller ones and indicates that smaller firms benefit the most from gender diversity within their boards. We also find that the Ontario Securities Commission (OSC) gender diversity rule negatively affects the relationship between board gender diversity and firm performance; however, the moderating effect of firm size continues to hold after the implementation of the rule. In addition, our results show that the board gender diversity effect on performance is positive and strongest in Consumer Staples, Utilities and Real Estate and that it is negative and significant in Industrials.

Our analysis makes use of panel data methodology, which is more powerful than other methods in controlling for unobservable heterogeneity and addresses the possible endogeneity of the relationship between board gender diversity and firm performance. The use of different measures of gender diversity and firm performance, and the correction of endogeneity issues, ensure our results are robust. Given its specificity (including corporate ownership concentration with high family and dual class ownership; different provincial legislations related to gender diversity; dual legal system with different levels of investor protections; less developed director market than its U.S. neighbour), Canada represents a unique case to study the moderating effect of firm size on the relationship between board gender diversity and firm performance.

This paper contributes to the corporate governance and board diversity literature and to a nascent literature that examines the influence of different board compositions on a firm's strategies, decision making processes and value (Mınguez-Vera & Martin, 2011). The empirical

evidence on the relationship between board gender diversity and firm performance is mixed (Campbell & Minguez-Vera, 2008; Carter et al., 2003; Erhardt et al., 2003; Adams & Ferreira, 2009; Smith et al., 2006; Rose, 2007; Joecks et al., 2013; Ahern & Dittmar, 2012). In addition, extent literature indicates that the relationship between gender diversity and firm performance is affected by several variables (Forbes & Milliken, 1999; Miller & del Carmen Triana, 2009). Li and Chen (2018) study the effect of size on the relationship between board gender diversity and performance of Chinese firms. We add to this literature by going beyond examining the direct relationship between board gender diversity and firm performance, to focus on the moderating effect of firm size on the board gender diversity-performance relationship of Canadian firms. Overall, this study helps explain some of the inconsistent results observed in the extant literature and improves our understanding of how group composition can impact board effectiveness and firm performance, and how firm size can moderate such relationship.

The remainder of the paper is organized as follows: Section 2 gives a review of the literature. Section 3 describes the data and methodology used. Section 4 presents and discusses the main empirical results. Finally, in Section 5, we conclude our study.

2. Literature Review

2.1. Theoretical Framework

The theoretical association between board gender diversity and firm value is derived from human capital theory, agency theory, resource dependency theory and social identity theory. Most theories argue that diversity is beneficial to a firm. For example, the human capital theory of Becker (1964) argues that an individual's education, experience and skills are assets to an organization that can improve productivity and performance. Differences in gender, therefore, represent various human capital features that can further benefit an organization (Terjesen et al., 2009).

The agency theory postulates that corporate governance mechanisms can reduce asymmetric information between the firm and shareholders (Chung et al., 2010; Charles et al., 2018). Hence, the board's qualities in terms of experiences, skills and knowledge is vital (Hillman & Dalziel, 2003) in order to effectively protect shareholder interests and act as a reliable source of information and counsel for shareholders (Fama & Jensen, 1983). Carter et al. (2003) suggest that a more diverse board improves this effectiveness, as including more women on boards enhances board independence and power, and women may provide advice, skills, perspectives and knowledge which typically vary from those of male directors (Hillman et al., 2007; Kim & Starks 2017; Daily & Dalton, 2003).

According to the resource dependency theory, organizational behaviour is affected by external resources. Among the resources that link the corporation to the external world are the board of directors as they bring in legitimacy, access to information, and advice to the firm (Pfeffer & Salancik, 2003). Hillman et al. (2000) extend the resource dependence theory by providing a taxonomy of director types and suggest that a more diverse board represents more valuable resources which should lead to better firm performance. Diversity on boards also induces better understanding of the marketplace, improves the firm's reputation and enables a broader view of the business environment (Solakoglu & Demir, 2016).

A few theories, however, argue that greater diversity may lead to negative outcomes. The social identity theory, for instance, posits that as a group becomes more heterogeneous, with different skills and perspectives, communication is affected and the group becomes more difficult to manage and less efficient in reaching consensus and decisions (Smith et al., 2006). Similarly, Williams & O'Reilly (1998) argue that heterogeneous groups are less cooperative and experience more emotional conflicts. Li & Hambrick (2005) argue that diversity and demographic diversity in particular, may lead to in-group versus out-group stereotyping, and therefore obstructs the board decision-making processes. Given the conflicting theories, the impact of board gender diversity on firm governance and value seems to be an empirical question.

2.2. Board Gender Diversity and Firm Performance

The link between board gender diversity and firm performance has attracted considerable attention from researchers but the evidence is mixed (Campbell & Minguez-Vera, 2008; Carter et al., 2003; Erhardt et al., 2003; Adams & Ferreira, 2009; Smith et al., 2006; Rose, 2007; Joecks et al., 2013; Ahern & Dittmar, 2012), with some studies providing evidence of a positive relationship (e.g., Campbell & Mínguez-Vera, 2008; Martín-Ugedo & Minguez-Vera, 2014; Kim & Starks, 2016; Liu et al., 2014; Ahmadi et al., 2018; Carter et al., 2003) and others providing evidence of a negative relationship (e.g., Adams & Ferreira, 2009; Ahern & Dittmar, 2012; Matsa & Miller, 2013), or no relationship (e.g., Torchia et al., 2011; Liu et al., 2014; Carter et al., 2010; Rose, 2007).

For example, using a sample of 68 publicly traded Spanish firms over the period 1995-2000, Campbell & Minguez-Vera (2008) find that board diversity has a positive impact on firm value, whereas firm value has no influence on gender diversity. Using a sample of 3,876 public firms from 47 countries, (Terjesen et al., 2015) find that the presence of more female directors may enhance firm performance as measured by Tobin's Q and ROA. The results also suggest that independent directors do not contribute to firm performance unless the board is gender diverse. Using a larger sample of 3000 US firms over the period 2007-2014, Conyon & He

(2017) show that the presence of female directors has a positive effect on firm performance; and that the effect of female directors is stronger in high-performing firms relative to low-performing firms.

In contrast, using a panel of publicly listed Nordic firms, Ahern & Dittmar (2012) find that a mandated gender quota led to a negative impact on firm performance. They argue that imposing a restriction on the choice of directors can lead to economically large declines in value. Using a sample of US firms, Adams & Ferreira (2009) find that greater gender diversity could lead to over monitoring in well-governed firms, which can decrease shareholder value and firm performance. Evidence from Germany suggests that gender diversity negatively affects firm performance initially, but once diversity reaches a "critical mass", it starts to positively affect firm performance (Joecks et al., 2013). Using a sample of Danish firms, Rose (2007) finds that there is no significant link between female board representation and firm performance, as measured by Tobin' Q. This is consistent with Randøy et al., (2006) who fail to find a significant impact of board gender diversity on stock performance or ROA of 500 large companies from Denmark, Norway, and Sweden. Similarly, Carter et al., (2010) do not find evidence that board gender diversity impacts performance for a sample of US firms. Shamsul et al., (2015) examine 841 Malaysian firms and find that female directors create value for some firms, but decrease it for others, as measured by Tobin's Q and ROA and that board gender diversity positively impacts accounting performance but negatively impacts market performance.

The inconsistent evidence on the impact of board gender diversity on firm performance has been linked to difference in time frames, countries, poor estimation methods, methodological limitations and the failure to account for possible endogeneity (Campbell & Minguez-Vera, 2008; Wang & Clift, 2009; Low et al., 2015). Dwyer et al., (2003) help reconcile some of these conflicting results and show that an appropriately configured and supportive organizational environment need to be in place before the positive effects of gender diversity can be fully realized. Finally, while most extant research on gender diversity has focused on large publicly traded companies, Mínguez-Vera & Martin (2011) highlight the importance of investigating small and medium-sized firms, which play a significant role in most countries and account for about 99% of the total number of firms in developed economies and generate most employment creation.

2.3. BGD, Firm Performance, and the Role of Firm Size

Only a few studies consider the role of firm size in determining the relationship between board gender diversity and firm performance. For instance, Mínguez-Vera & Martin (2011) examine the impact of board gender diversity on Spanish SMEs which are more important than

large firms in terms of number, employment and sales. Using a panel data setup over the period 1998-2003, Mínguez-Vera & Martin (2011) find a negative association between women's presence on boards and firm performance, which may be explained by women's high risk aversion, leading to the adoption of more conservative and less risky strategies. The results also indicate that SMEs with a family member or a financial institution as the majority shareholder are characterized by less debt, greater assets and larger boards with more women directors.

Ruiz-Jimenez et al., (2016) argue that SMEs generally lack the slack resources and administrative systems that aid large companies in their decision-making processes and therefore, must rely more on the skills of their managers. Using a sample of 205 small- and medium- sized Spanish technology firms, they show that including more women on top management teams positively impacts decision-making and promotes the development of organizational capabilities. Similarly, using a sample of non-financial Spanish SMEs over the period 2003-2008 and GMM estimation[1], Martín-Ugedo & Minguez-Vera (2014) show that the presence of women on boards leads to a positive effect on the performance of small firms, but no significant effect on the performance of medium-sized firms. They also find that a firm's operational and financial risk is negatively linked to board gender diversity, indicating that women prefer to work in firms with lower risk. Dang et al., (2018) analyze the relationship between women on corporate boards (WOCB) and firm performance for a sample of French SMEs listed over the period 2010–2014. Results suggest that the percentage of WOCB has a positive and significant effect on firm performance as measured by ROA. However, other measures of board gender diversity, including a dummy variable that indicates the presence of at least one female director on the board, the Blau index and the total number of female directors on board, are positively associated to performance but not statistically significant.

A few studies examine the moderating effect of size on board gender diversity, including Li & Chen's (2018) study on the moderating role of firm size on the relationship between board gender diversity and firm performance in developing economies. Using a panel setup of A-share-listed non-financial Chinese firms for the period 2007-2012 and Tobin's Q as a measure of firm performance, they find that board gender diversity has a positive impact on firm performance, but that this impact becomes negative as the size of the firm increases. Specifically, the interaction effect between board gender diversity and firm size is found to be negative and significant implying that firm size attenuates the positive relationship between women on boards and firm performance. Adusei (2019) studies whether firm size moderates the relationship between board gender diversity and technical efficiency for 418 microfinance institutions (MFIs) located in 64 countries over the period 2010-2014. Results show that the

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[1] The GMM estimation method is more efficient than the two-stage least squares (2SLS) estimation method in samples with a large number of companies and a small number of years.

interaction effect between women on boards and the size of an MFI is positive and statistically significant. This indicates that large MFIs seeking to improve their technical efficiency should explore the possibility of improving gender diversity on their boards.

Although these studies provide a better understanding of the relationship between board gender diversity and firm performance, they present a few issues. For instance, Ruiz-Jimenez et al.'s (2016) use a cross-sectional analysis to examine their research question, however, without conducting a longitudinal analysis, it is difficult to reach a reliable conclusion on the relationship examined. Also, women have previously been poorly represented in the Spanish workforce, which reflects deep-rooted societal attitudes toward them (Mínguez-Vera & Martin, 2011), and can undermine the efficacy of gender diversity on boards. Additionally, the current studies examine the moderating effect of firm size in two countries only, namely Spain and China. Therefore, comparison of the results with other cultural and institutional contexts is important when analyzing board diversity and its effects.

While many studies provide evidence for a relationship between board gender diversity and firm performance, the literature also demonstrates that moderating variables such as firm size may alter this relationship. Further research is necessary to elucidate current findings, and to specifically examine differences in terms of board gender diversity effect that can be related to firm size. If firm size does impede the positive impact that board gender diversity may have on firm performance, larger firms must take measures to make use of and benefit from the unique skills, experiences, knowledge and values that women can bring to boards (Li & Chen, 2018).

3. Data & Methodology

3.1 Data

Our sample consists of all Canadian firms listed on the TSX composite index, over the period 2010-2019, including firms that entered or exited the index. To avoid redundancies, we exclude ETFs, iShares and investment funds. We also remove firms with total debt greater than total assets to reach a final sample of 371 firms in 11 industries. The TSX index constituents were retrieved from the Bloomberg Index Constituent database. GICS categorizations, financial statement and corporate governance data were obtained from Bloomberg.

3.2 Variables

Consistent with the literature on board gender diversity, we use return on assets (ROA) and return on equity (ROE) as our primary measures of firm performance (e.g., Mínguez-Vera & Martin, 2011; Dang et al., 2018; Shamsul et al., 2015; Lui et al., 2014). ROA measures a firm's efficiency at utilizing its assets to sustain business activities and operations, while ROE measures a firm's efficiency at generating income and growth from its equity financing; together, both measures provide a clear image of management's effectiveness. We calculate ROA by dividing net income by total assets and ROE by dividing net income by shareholder's equity.

We use three measures of board gender diversity which have been commonly used in the literature (see for instance, Abad et al., 2017) to examine the moderating effect of size on the relationship between board gender diversity and performance. First, we use the percentage of female board members, calculated as the number of women on the board of directors divided by the total number of directors. Second, we include the total number of female board members. Third, we include a dummy variable that equals 1 if there is at least 1 female director on the board and 0 otherwise. Unlike, Li & Chen (2018), we use the natural logarithm of the end of year market capitalization, not total assets, as our measure of firm size. Consistent with the literature, we control for a set of individual, board, and firm characteristics that may have an impact on firm performance. At the individual level, we control for directors' tenure, independence and share ownership. At the board level, we control for the number of board meetings held per year and CEO duality. At the firm level, we control for firm age, leverage and sales growth.

3.3 Methodology

The multivariate regression model that we estimate is as follows:

$$Perf_{it} = \beta_0 + \beta Div_{it} + \beta Div_{it} * Size_{it} + \sum \beta_j CV_{jit} + \eta_t + \varepsilon_{it}$$

Where i refers to firm; t refers to time; the variable $Perf_{it}$ represents the measure of performance used, i.e., ROE and ROA; Div_{it} is board gender diversity, including three alternative measures – the number of women on board, the percentage of women on board, and a dummy variable which indicates the presence of at least one female on board; to examine the moderating effect of firm size on the relationship between board gender diversity and firm performance we introduce the interaction term $Div_{it} * Size_{it}$; and CV_{jit} represents the individual-level, board-level and firm-level control variables; the expressions $\eta_t + \varepsilon_{it}$ refer to time effects, and random disturbance, respectively. To control for unobservable heterogeneity

and omitted variables, the model is estimated using an unbalanced panel data set (Campbell & Minguez-Vera, 2008; Low et al., 2015). We also control for year effects to capture the influence of aggregate (time-series) trends and use robust clustered standard errors (at the firm level) to account for heteroskedasticity.

4. Empirical Results

4.1. Univariate Analysis

Table 1 (Panel A) represents the descriptive statistics of the variables used in this study. The ROA (ROE) of the sample firms has a mean of 0.024 (0.061) with a standard deviation of 0.092 (0.167). The percentage of females on board (FEPER) and number of females on board (FENUM) have a mean (standard deviation) of 0.159 (0.120) and 1.656 (1.408), respectively, indicating high variability in female board members across firms. Firm size (SIZE), as measured by the natural logarithm of the end of year market capitalization, ranges from 3.529 to 11.913 with a mean of 8.162, indicating firm size varies significantly across firms. The mean firm age is 25.377, indicating that most firms examined are mature. Descriptive statistics of other governance variables, including individual-level, board-level and firm-level control variables, are also presented in Table 1 (Panel A).

Table 1 (Panel B) reports the correlation matrix showing correlation coefficients between all variables included in this study and reports the Variance Inflation Factors (VIF) on all variables used in our main model. Specifically, the correlation between the percentage of women on board and ROA is 0.042 and the correlation between the number of women on board and ROA is 0.052; both indicate a positive relationship between board gender diversity and firm performance, statistically significant at the 5% level. In addition, the correlations between the percentage of women on board and firm size and the number of women on board and firm size are 0.365 and 0.505, respectively, also statistically significant at the 5% level. Overall, the correlation results and the VIF values indicate no evidence of a potential multicollinearity problem.

Table 1 (Panel C) reports board gender diversity distribution by industry over the period 2010-2019. The results indicate that the Financial sector has the highest number of female board members, with an average of about 77 female board members over the study period, whereas the Health Care sector contains the lowest number of female directors on boards, with an average of about 10 female board members. The Communication Services and Financials sectors show the highest percentage of female board members, with an average of 25% and 24% female representation in the board, respectively, whereas the Materials sector has the

lowest percentage of female board members, with an average of 12% female representation in the board.

[PLEASE INSERT TABLE 1 HERE]

Figure 1 represents the change in female representation in the board within Canadian firms listed on the TSX composite index between 2010 and 2019. The percentage of women on board shows a substantial improvement over the sample period and progresses from about 10.10% in 2010 to 26.06% in 2019. In addition, the average number of female directors on a board in 2010 is only 1.008 but increases to 2.508 in 2019. Figure 2 shows the number of women on board at the aggregate level, which is less than 250 in 2010, but more than doubles and increases to 572 in 2019.

[PLEASE INSERT FIGURE 1 AND FIGURE 2 HERE]

4.2. Board Gender Diversity and Firm Performance: The Moderating Effect of Firm Size

In this section, we test the relationship between board gender diversity and firm performance and most importantly the moderating effect of firm size on the relationship between board gender diversity and firm performance. Table 2 shows the regression results using ROA as the measure of performance and the percentage of women on board (FEPER) as the measure of board gender diversity. The results are shown using different model specifications, where we include board gender diversity (model 1), size (model 2), individual and board level (model 3) and firm level effects (model 4). The results show that after controlling for size, individual- and board- and firm-level control variables, the coefficient of board gender diversity (FEPER) remains positive and statistically significant at the 5% level (model 4), indicating that the presence of female board members has a positive effect on firm performance, as measured by ROA. This is consistent with a strand of the gender diversity literature which finds diversity to have a positive effect on firm performance (e.g., Campbell & Mínguez-Vera, 2008; Martín-Ugedo & Minguez-Vera, 2014; Kim & Starks, 2016; Liu et al., 2014; Ahmadi et al., 2018; Carter et al., 2003). The coefficient of firm size (SIZE) also remains positive and statistically significant at the 1% level, which indicates that larger firms tend to perform better than smaller firms. There are several reasons for this; for instance, larger firms tend to be more recognized and established than smaller firms, which helps insulate them against unforeseen events in the economy. Larger firms may also have greater access to funding and more opportunities for economies of scale, thus they are able to mitigate costs and enhance financial performance. Moreover, larger firms may have greater organizational resources and capabilities to undertake higher production capacity while alleviating risks (Alvarez & Barney,

2001). Our variable of interest, which measures the moderating effect of firm size, is the interaction term between board gender diversity and firm size (FEPER*SIZE). The coefficient of the interaction term (FEPER*SIZE) is negative and significant in all model specifications, which indicates that the effect of board gender diversity on firm performance is inversely related to size and that smaller firms benefit the most from gender diversity within their boards.

[PLEASE INSERT TABLE 2 HERE]

The control variables results show that board average tenure has a positive and significant impact on firm performance, whereas the impact of both the number of independent directors on board and CEO duality is not significant. Interestingly, a higher number of board meetings has a significantly negative impact on firm performance. Frequent meetings may result in a waste of managerial time and may increase financial burden due to travel expenses and sitting allowances (Eluyela et al., 2018). Moreover, most meetings consist of routine tasks which can limit the opportunities for outside directors to exercise influence over management (Vafeas, 1999). The results also show that sales growth has a positive and significant impact on firm performance, whereas firm age has a negative and significant impact.

We also test our model using the number of women on board as a measure of board gender diversity (Table 3). The results are consistent with Table 2 results and overall show higher significance with the gender diversity coefficient (FENUM), firm size coefficient (SIZE) and interaction coefficient (FENUM*SIZE) being statistically significant at the 1% level, when individual, board and firm characteristics are controlled for (model 4).

[PLEASE INSERT TABLE 3 HERE]

4.3. Board Gender Diversity, Firm Performance and Firm Size: The Effect of Board Gender Diversity Regulation

In line with the global push for gender diversity on corporate boards, the Ontario Securities Commission (OSC) introduced a comply-or-explain gender policy in December 2014 that requires companies listed on the TSX to annually disclose the number and percentage of female board members[2]. In this section we examine whether and how the OSC gender diversity rule affects the moderating effect of firm size on the relationship between board gender diversity and firm performance. To this effect we add a dummy variable (REG) to our basic model, that

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[2] Amendment Instrument for National Instrument 58-101, Disclosure of Corporate Governance Practices

equals 1 for the years post the gender diversity rule (i.e., 2015 – 2019) and 0 for years pre (i.e., 2010-2014).

Table 4 shows the regression results using different model specifications, where we include board gender diversity (model 1), size (model 2), individual and board level (model 3) and firm level (model 4) effects, in addition to the gender diversity rule effect. As shown in Table 4, after including all individual-level, board-level and firm-level control variables in the model (model 4), the coefficient of board gender diversity (FEPER) remains positive and statistically significant at the 1% level. Interestingly however, the interaction term (FEPER*REG) is negative and statistically significant at the 5% level, which suggests that the gender diversity rule negatively affects the relationship between women on board and firm performance. This suggests that imposing policies to increase the number of female directors on boards may not always be the best strategy to promote diversity. For instance, restrictive rules on gender diversity can lead to excessive focus on representation, while overlooking the actual integration of female directors into firm governance, which can in turn negatively impact firm performance (Green & Homroy, 2018). Gender quotas can also lead to the appointment of women directors due to social pressure, rather than based on merit and qualification, which can in turn decrease shareholders' value (Mínguez-Vera & Martin, 2011; Adams & Ferreira 2009). Besides, such policies imply that less experienced women will join boards because the supply of qualified female directors is thin. Although the comply-or-explain policy seems to have a negative impact on firm performance, the interaction term (FEPER*REG*SIZE) indicates that the moderating effect of size still holds after the implementation of the policy and, consistent with our previous findings, that the effect of board gender diversity on performance is higher for smaller firms.

[PLEASE INSERT TABLE 4 HERE]

4.4. Board Gender Diversity, Firm Performance and Firm Size: The Industry Effect

In the following we analyze board gender diversity and firm size effects across key industries. We use the GICS structure which encompasses 11 sectors to classify all companies in our sample. First, we focus our analysis on the Financials sector which has the highest female board members' representation in our sample (See Table 1-Panel C) by including a dummy variable (IND) to our model that equals 1 if a firm is in the Financials sector and 0 otherwise. As shown in Table 5 (Panel A), the interaction term (FEPER*IND) is positive and significant at the 1% level and the interaction term (FEPER*IND*SIZE) is negative and significant at the 1% level. This indicates a positive relationship between board gender diversity and firm performance for financial firms and that this relationship is negatively moderated by the firm

size, where the positive relationship between board gender diversity and firm performance is stronger for smaller financial firms. Our results also indicate that the board gender diversity effect (FEPER) and the moderating effect of size (FEPER*SIZE) are on average insignificant for other sectors. To further examine this result and to better understand the relationship between gender diversity, firm performance and firm size in other sectors, we rerun the main model regression (model 4) using each of the other 10 sectors as the industry dummy (IND) and the results are reported in Table 5 (Panel B). The results indicate that the board gender diversity effect on performance (FEPER*IND) is positive and strongest in Consumer Staples, Utilities and Real Estate and that it is negative and significant in Industrials. The results also indicate that the moderating effect of firm size (FEPER*IND*SIZE) is negative and strongest in Consumer Staples, Utilities and Real Estate, which is consistent with overall findings, whereas it is positive and significant for the Industrials sector, meaning that the negative relationship between board gender diversity and firm performance is accentuated in larger firms.

[PLEASE INSERT TABLE 5 HERE]

4.5. Robustness Checks

4.5.1. Results using other measures of board gender diversity and firm performance:

We run several diagnostic regressions using alternative measures of board gender diversity and firm performance. Table 6 reports regressions' results using a dummy variable (FEDUM) which equals 1 if the firm has at least one female board member and 0 otherwise, to measure board gender diversity, whereas Table 7 reports regressions' results using ROE as a measure of firm performance. In both cases, after including all control variables (model 4), we find that the gender diversity coefficients are positive and statistically significant, and the interaction term coefficients are negative and statistically significant. This indicates the robustness of our results to alternative measures of board gender diversity and performance.

[PLEASE INSERT TABLE 6 AND TABLE 7 HERE]

4.5.2. Endogeneity issue:

Two sources of endogeneity can bias our estimates of the effect of board gender diversity – omitted unobservable firm characteristics and the reverse causality between board gender diversity and firm performance. For instance, innovative and better performing firms can be more prone to hiring female directors, reversing the causality between gender diversity

and firm performance. Failing to account for endogeneity causes errors in the significance and magnitude of the estimated relationship, which can lead to inaccurate results and interpretations (Charles et al., 2018). To control for these possible sources of endogeneity, we carry the estimations using a panel setup, lagged independent variables and two-stage least squares (IV-2SLS). The panel data setup is employed in all reported regressions and is used to eliminate unobservable heterogeneity among firms in our sample (both fixed and time-varying).

Given that board members take time to influence firm performance, instead of a contemporaneous relationship, we use a one-year lagged board gender diversity measure and one-year lagged board characteristic variables in our main regression (Liu et al., 2014). The results are reported in Table 8 and are consistent with the results from the main panel data regression analysis in Table 2.

[PLEASE INSERT TABLE 8 HERE]

The IV-2SLS method is also used to address the endogeneity between the gender diversity variables and firm performance (e.g., Adams & Ferreira, 2009; Liu et al., 2014; Low et al., 2015; Li & Chen, 2018). A valid instrument must have a strong correlation with the instrumented regressor (board gender diversity) and a low correlation with the dependent variable (firm performance); for this purpose, we use the percentage of women directors in the firm's industry (FEIND). The percentage of women directors employed at a firm can be affected by the supply of women directors in the firm's industry (Liu et al., 2014) and a firm's board composition is likely to correlate with their industry peers' due to similar business activities and investment opportunities (Yang & Zhao, 2014). In unreported first stage regressions, we find that the percentage of women directors in the firm's industry significantly correlates with the percentage of women directors on board at a 1% significance level. In the second-stage regressions (Table 9), the results indicate that the IV-2SLS method supports our earlier findings in Table 2.

[PLEASE INSERT TABLE 9 HERE]

5. Conclusion

In this paper, we examine the moderating role of firm size on board gender diversity and present new evidence on the relationship between board gender diversity and firm performance. We examine a panel of 371 Canadian firms listed on the TSX composite index during the period 2010-2019. We use several measures of board gender diversity, and ROA and

ROE as measures of firm performance. Our results show that firm size attenuates the positive relationship between board gender diversity and firm performance and that women directors have a higher significant impact on the performance of smaller firms compared to larger ones, which suggests that unlike larger firms, smaller firms offer a better setup for women directors to exert their full potential. This finding is significant because it provides a possible explanation for the conflicting results of previous studies on board gender diversity and firm performance.

The findings in our paper suggest that the benefits of gender diversity on the board may be limited for some firms, and that the organization's context must be considered to better reap the benefits of gender diversity (Li & Chen, 2018). Evidence that firm size attenuates the positive impact of board gender diversity on firm performance indicates that larger firms must take measures to exploit the benefits of appointing women directors on the board, including their skills, knowledge and ideas. Therefore, larger firms may need to reassess their communication methods and organizational structures to improve discussion among the board of directors and facilitate decision making and the integration of women directors. In addition, our findings indicate that imposing policies to increase gender diversity on boards in large firms may adversely impact firm performance. Women who are included in boards due to the enforcement of policies or quotas may be perceived as less competent, which may undermine their effectiveness. The moderating effect of firm size, however, persists following the implementation of the comply-or-explain board gender diversity policy.

In this paper we only consider the gender diversity of the board, but there are other types of board diversity (e.g., ethnicity and age) which may have an impact on firm performance and whose role can be moderated by firm size and are therefore worth examining. In addition, we mainly focus on measures of financial performance, however, nonfinancial measures of performance (e.g., social performance) are becoming highly important and are therefore worth examining. Nowadays, boards are increasingly held responsible for issues relating to CSR and sustainability (Rao & Tilt, 2016), and even though there is a growing amount of literature suggesting that female directors can influence various board decisions, the impact of firm size on such relationship is not well understood and represents another venue for future research. Lastly, this study examines the impact of board gender diversity on firm performance in the Canadian context, however, institutional and cultural systems are important when examining board gender diversity and its effect on firm performance (Terjesen & Singh, 2008). Therefore, cross-country studies are primordial to better understand the role of firm size on the impact of board gender diversity on the firm.

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Appendix A: Variable Definitions

Variable	Definition
ROA	ROA = Net Income/Total Assets
ROE	ROE = Net Income/Shareholder's Equity
FEPER	Percentage of female directors on board
FENUM	Number of female directors on board
FEDUM	1 if there is at least 1 female director on board, 0 otherwise
IndDirectors	Number of independent directors on board
AvgTenure	Average tenure of directors on board
Meetings/Yr	Number of board meetings held per year
CEODuality	1 if the chairman of the board is also the CEO, 0 otherwise
RatioShares	Insider shares/Institutional shares
FirmAge	Number of years since the firm was established
Leverage	Total Company Debt/Shareholder's Equity
SalesGrowth	Growth in the net sales of the company
SIZE	Natural logarithm of market capitalization
FEIND	Number of female directors in the firm's industry

Table 1: Statistics - Panel A: Descriptive statistics

Descriptive Stats							
Variable	Obs	Mean	Std. Dev.	Min	Max	25th Percentile	75th Percentile
IndDirectors	2,336	7.607	2.654	0.000	19.000	6.000	9.000
FEPER	2,329	0.159	0.120	0.000	0.570	0.083	0.250
FENUM	2,329	1.656	1.408	0.000	7.000	1.000	2.000
FEDUM	2,329	0.764	0.425	0.000	1.000	1.000	1.000
AvgTenure	1,573	7.620	3.262	0.420	24.890	5.510	9.210
Meetings/Yr	2,327	9.055	3.972	2.000	39.000	6.000	11.000
CEODuality	2,343	0.133	0.339	0.000	1.000	0.000	0.000
RatioShares	2,318	0.103	0.425	0.000	7.412	0.006	0.062
FirmAge	2,170	25.377	25.814	0.000	198.000	8.000	33.750
ROA	2,321	0.024	0.092	-0.778	0.566	0.004	0.061
ROE	2,212	0.061	0.167	-0.994	0.933	0.010	0.139
Leverage	2,243	0.781	1.813	-24.413	31.163	0.220	0.964
SIZE	2,331	8.162	1.294	3.529	11.913	7.205	9.038
SalesGrowth	2,170	12.780	38.710	-86.807	606.619	-1.878	19.378

Notes: Outliers that are 100x times larger or smaller than the value of the average observation, ROA/ROE observations >|1|, and firms with total debt greater than total assets are removed.

Table 1: Statistics - Panel B: Multicollinearity Analysis

Correlation Matrix

	Ind Directors	FEPER	FENUM	FEDUM	Avg Tenure	Meetings Yr	CEO Duality	Ratio Shares	Firm Age	ROA	ROE	Leverage	SIZE	Sales Growth
Ind Directors	1													
FEPER	0.400*	1												
	(0.0000)													
FENUM	0.633*	0.921*	1											
	(0.0000)	(0.0000)												
FEDUM	0.423	0.733*	0.654*	1										
	(0.0000)	(0.0000)	(0.0000)											
Avg Tenure	-0.023	0.012	0.058*	0.010	1									
	(0.3579)	(0.6437)	(0.0245)	(0.6790)										
Meetings Yr	0.108*	0.080*	0.087*	0.057*	-0.225*	1								
	(0.0000)	(0.0001)	(0.0000)	(0.0076)	(0.0000)									
CEO Duality	-0.191*	-0.100*	-0.127*	-0.133*	0.042	-0.076*	1							
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0982)	(0.0002)								
Ratio Shares	-0.081*	-0.022	-0.032	-0.015	0.100*	-0.054*	0.021	1						
	(0.0001)	(0.2874)	(0.1297)	(0.4866)	(0.0001)	(0.0092)	(0.3067)							
Firm Age	0.352*	0.245*	0.349*	0.192*	0.257*	0.062*	-0.069*	0.155*	1					
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0042)	(0.0016)	(0.0000)						
ROA	0.012	0.042*	0.052*	0.038	0.159*	-0.112*	0.013	0.018	0.013	1				
	(0.5547)	(0.0428)	(0.0126)	(0.0777)	(0.0000)	(0.0000)	(0.5314)	(0.4007)	(0.5586)					
ROE	0.105*	0.116*	0.147*	0.071*	0.120*	-0.076*	0.010	0.007	0.095*	0.861*	1			
	(0.0000)	(0.0000)	(0.0000)	(0.0008)	(0.0000)	(0.0005)	(0.6790)	(0.7332)	(0.0000)	(0.0000)				
Leverage	0.117*	0.159*	0.153*	0.108*	0.054*	0.107*	0.028	-0.002	0.116*	-0.034	0.046*	1		
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0389)	(0.0000)	(0.1830)	(0.9367)	(0.0000)	(0.1130)	(0.0302)			
SIZE	0.550*	0.365*	0.505*	0.320*	0.087*	-0.005	0.010	-0.012	0.209*	0.205*	0.261*	0.064*	1	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0007)	(0.8194)	(0.6396)	(0.5527)	(0.0000)	(0.0000)	(0.0000)	(0.0026)		
Sales Growth	-0.093*	-0.087*	-0.096*	-0.086*	-0.125*	0.069*	0.062*	0.005	-0.088*	0.140*	0.102*	-0.041	0.024	1
	(0.0000)	(0.0001)	(0.0000)	(0.0001)	(0.0000)	(0.0017)	(0.0038)	(0.8132)	(0.0001)	(0.0000)	(0.0000)	(0.0585)	(0.2751)	

Notes: P-values are included in parenthesis to depict the statistical significance of each pair of correlations. * p<0.05

Variance Inflation Factors (VIF)

Variable	VIF	1/VIF
FEPER	1.57	0.635
SIZE	1.56	0.639
IndDirectors	1.76	0.568
AvgTenure	1.19	0.838
Meetings/Yr	1.12	0.891
CEODuality	1.09	0.916
RatioShares	1.08	0.928
FirmAge	1.31	0.762
Leverage	1.06	0.945
SalesGrowth	1.1	0.910

Notes: This is a measure of multicollinearity: A large VIF (>10) on an independent
variable indicates a highly collinear relationship to the other variables.

Table 1: Statistics - Panel C: Board Gender Diversity Distribution by Industry (2010-2019)

Sector	Total No. of Women on Boards
Energy	551
Materials	546
Industrials	451
Consumer Discretionary	182
Consumer Staples	274
Health Care	99
Financials	775
IT	138
Comm Services	291
Utilities	300
Real Estate	194

Notes: Total Number of Female Directors on Boards in Key Sectors throughout the period 2010-2019

Annual Number of Female Directors on Boards in Each Sector

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
Energy	30	36	37	38	50	59	67	71	79	84	**55.1**
Materials	20	27	33	34	48	59	61	78	91	95	**54.6**
Industrials	23	26	26	32	36	36	53	61	77	81	**45.1**
Consumer Discretionary	12	13	11	10	13	20	23	26	27	27	**18.2**
Consumer Staples	16	16	19	23	27	29	33	40	35	36	**27.4**
Health Care	6	5	9	9	9	7	11	13	12	18	**9.9**
Financials	53	57	62	66	77	82	85	97	99	97	**77.5**
IT	7	8	11	11	13	15	18	15	18	22	**13.8**
Comm Services	23	27	30	29	28	33	31	31	31	28	**29.1**
Utilities	17	18	19	20	29	31	33	42	45	46	**30**
Real Estate	5	6	8	12	15	21	26	32	31	38	**19.4**

Annual Percentage of Female Directors on Boards in Each Sector

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
Energy	0.07	0.09	0.08	0.08	0.10	0.11	0.15	0.16	0.19	0.22	**0.13**
Materials	0.05	0.06	0.07	0.07	0.11	0.14	0.15	0.16	0.21	0.23	**0.12**
Industrials	0.11	0.12	0.13	0.14	0.14	0.15	0.22	0.24	0.27	0.30	**0.18**
Consumer Discretionary	0.12	0.13	0.13	0.11	0.13	0.14	0.16	0.18	0.17	0.18	**0.14**
Consumer Staples	0.13	0.13	0.16	0.19	0.22	0.24	0.28	0.33	0.32	0.32	**0.23**
Health Care	0.14	0.14	0.19	0.20	0.24	0.24	0.24	0.28	0.26	0.26	**0.22**
Financials	0.16	0.17	0.21	0.20	0.23	0.24	0.25	0.30	0.30	0.31	**0.24**
IT	0.20	0.18	0.20	0.16	0.19	0.19	0.18	0.17	0.21	0.24	**0.19**
Comm Services	0.19	0.22	0.24	0.23	0.24	0.26	0.26	0.26	0.32	0.32	**0.25**
Utilities	0.17	0.18	0.17	0.18	0.23	0.25	0.27	0.29	0.30	0.31	**0.23**
Real Estate	0.05	0.06	0.08	0.09	0.11	0.14	0.16	0.19	0.21	0.24	**0.13**

Notes: The 11 sectors of the Global Industry Classification Standard (GICS) are used to classify firms of the TSX composite index in key industries

Figure 1 – Average Number & Percentage of Female Directors on Board (2010-2019)
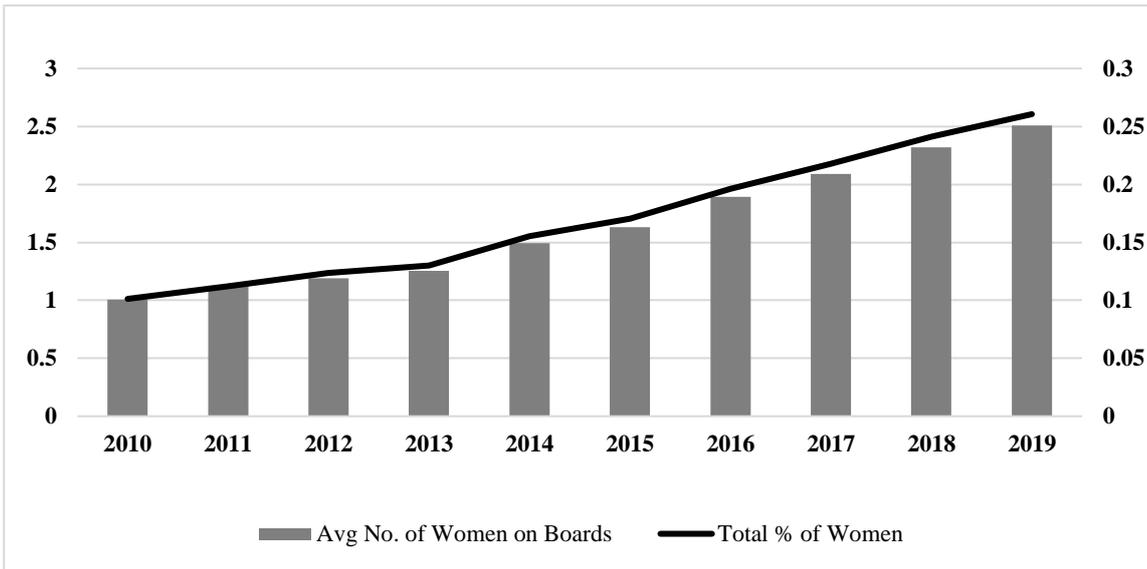
Figure 2 – Aggregate Number of Women on Board (2010-2019)
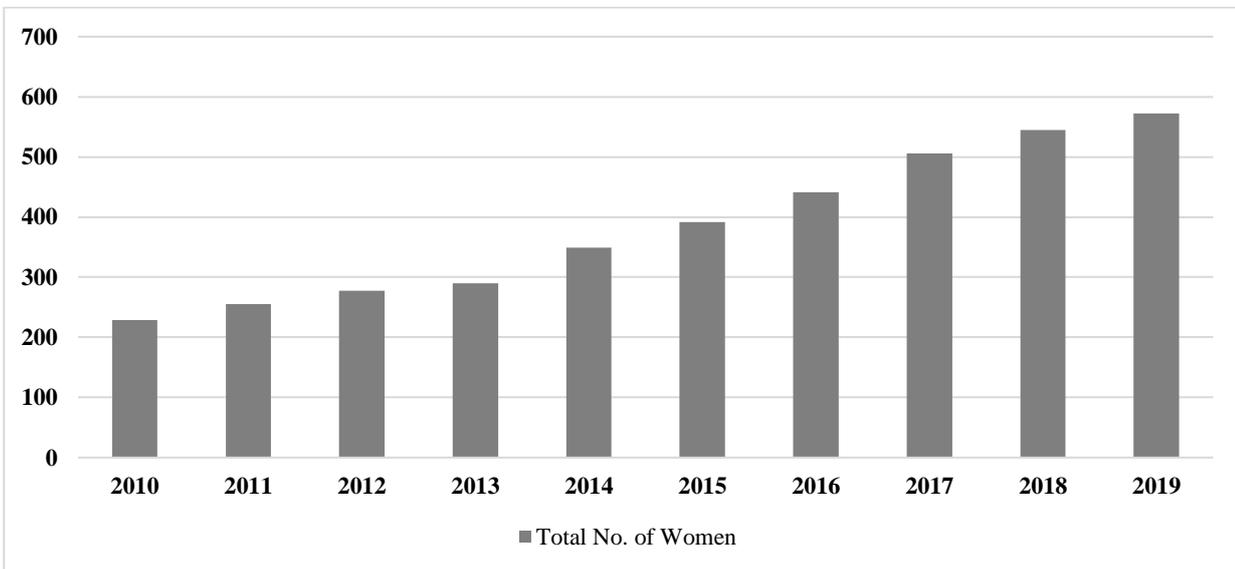
Note: Figures 1&2 show female board representation in firms listed on the TSX Composite Index during the period 2010-2019.

Table 2: The effect of firm size on the relationship between board gender diversity and firm performance using the percentage of women on board as the measure of board gender diversity

DEPENDENT VARIABLE: ROA				
INDEPENDENT VARIABLES				
	Model 1	**Model 2**	**Model 3**	**Model 4**
FEPER	0.015	0.398***	0.523***	0.417**
	(0.0280)	(0.1520)	(0.1990)	(0.2020)
SIZE		0.044***	0.045***	0.036***
		(0.0051)	(0.0069)	(0.0066)
IndDirectors			-0.004**	-0.003
			(0.0020)	(0.0020)
AvgTenure			0.003**	0.004***
			(0.0012)	(0.0013)
Meetings/Yr			-0.002**	-0.002**
			(0.0009)	(0.0009)
CEODuality			-0.014	-0.016
			(0.0105)	(0.0113)
RatioShares				0.013
				(0.0105)
FirmAge				-0.0003*
				(0.0001)
Leverage				-0.002*
				(0.0012)
SalesGrowth				0.0002***
				(7.12e-05)
FEPER*SIZE		-0.057***	-0.067***	-0.052**
		(0.0180)	(0.0234)	(0.0236)
Constant	0.036***	-0.299***	-0.268***	-0.211***
	(0.0060)	(0.0396)	(0.0543)	(0.0519)
R-squared	0.037	0.077	0.129	0.128
Observations	2,309	2,299	1,545	1,347

Notes: The first number in each cell is the regression coefficient and the value in the parenthesis is the associated robust standard error.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3: The effect of firm size on the relationship between board gender diversity and firm performance using the number of women on board as the measure of board gender diversity

DEPENDENT VARIABLE: ROA				
INDEPENDENT VARIABLES				
	Model 1	**Model 2**	**Model 3**	**Model 4**
FENUM	0.003	0.035***	0.049***	0.042***
	(0.0022)	(0.0122)	(0.0151)	(0.0152)
SIZE		0.043***	0.044***	0.036***
		(0.0049)	(0.0064)	(0.0061)
IndDirectors			-0.003*	-0.003
			(0.0020)	(0.0023)
AvgTenure			0.003***	0.004***
			(0.0012)	(0.0013)
Meetings/Yr			-0.002**	-0.002**
			(0.0009)	(0.0010)
CEODuality			-0.014	-0.015
			(0.0106)	(0.0113)
RatioShares				0.013
				(0.0107)
FirmAge				-0.0003**
				(0.0001)
Leverage				-0.002*
				(0.0012)
SalesGrowth				0.0002***
				(7.21e-05)
FENUM*SIZE		-0.005***	-0.006***	-0.005***
		(0.0014)	(0.0017)	(0.0017)
Constant	0.034***	-0.297***	-0.265***	-0.211***
	(0.0059)	(0.0375)	(0.0509)	(0.0480)
R-squared	0.039	0.084	0.133	0.131
Observations	2,309	2,299	1,545	1,347

Notes: The first number in each cell is the regression coefficient and the value in the parenthesis is the associated robust standard error.

*** p<0.01, ** p<0.05, * p<0.1

Table 4: The impact of the OSC gender diversity rule on the moderating effect of firm size on the relationship between board gender diversity and firm performance

DEPENDENT VARIABLE: ROA				
INDEPENDENT VARIABLES				
	Model 1	**Model 2**	**Model 3**	**Model 4**
FEPER	0.037	0.807***	0.909***	0.891***
	(0.0263)	(0.2110)	(0.2650)	(0.2800)
REG	-0.024***	-0.033***	-0.015	-0.012
	(0.0051)	(0.0081)	(0.0094)	(0.0099)
SIZE		0.049***	0.049***	0.041***
		(0.0057)	(0.0072)	(0.0071)
IndDirectors			-0.004**	-0.003
			(0.0018)	(0.0021)
AvgTenure			0.003***	0.004***
			(0.0012)	(0.0013)
Meetings/Yr			-0.002***	-0.002**
			(0.0009)	(0.0010)
CEODuality			-0.018*	-0.019*
			(0.0103)	(0.0114)
RatioShares				0.013
				(0.0114)
FirmAge				-0.0002*
				(0.0001)
Leverage				-0.003**
				(0.0013)
SalesGrowth				0.0003***
				(7.54e-05)
FEPER*SIZE		-0.110***	-0.108***	-0.105***
		(0.0254)	(0.0305)	(0.0328)
FEPER*REG		-0.240*	-0.327**	-0.383**
		(0.1280)	(0.1450)	(0.1650)
FEPER*REG*SIZE		0.038***	0.040***	0.046***
		(0.0134)	(0.0139)	(0.0166)
Constant	0.024***	-0.343***	-0.336***	-0.289***
	(0.0049)	(0.0446)	(0.0551)	(0.0546)
R-squared	0.008	0.063	0.110	0.105
Observations	2,309	2,299	1,545	1,347

Notes: The dummy variable (REG) equals 1 for the years post the gender diversity rule (i.e. 2015 – 2019) and 0 for years pre (i.e. 2010-2014). The first number in each cell is the regression coefficient and the value in the parenthesis is the associated robust standard error.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 5 - Panel A: Board Gender Diversity and Firm Size Effect in the Financials Industry

DEPENDENT VARIABLE: ROA	
INDEPENDENT VARIABLES	**Financials**
FEPER	0.292
	(0.2210)
IND	-0.016
	(0.0207)
SIZE	0.036***
	(0.0068)
IndDirectors	-0.002
	(0.0020)
AvgTenure	0.004***
	(0.0013)
Meetings/Yr	-0.00219**
	(0.0010)
CEODuality	-0.016
	(0.0114)
RatioShares	0.013
	(0.0108)
FirmAge	-0.0003**
	(0.0001)
Leverage	-0.002*
	(0.0012)
SalesGrowth	0.0002***
	(7.13e-05)
FEPER*SIZE	-0.037
	(0.0260)
FEPER*IND	0.763***
	(0.1940)
FEPER*IND*SIZE	-0.081***
	(0.0198)
Constant	-0.215***
	(0.0534)
R-squared	0.134
Observations	1,347

Notes: The dummy variable (IND) equals 1 if a firm is in the Financials sector and 0 otherwise. The first number in each cell is the regression coefficient and the value in the parenthesis is the associated robust standard error.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 5 - Panel B: Board Gender Diversity and Firm Size Effect Across Different Industries

DEPENDENT VARIABLE: ROA										
INDEPENDENT VARIABLES	**Energy**	**Materials**	**Industrials**	**Consumer Desc**	**Consumer Staples**	**Health Care**	**IT**	**Comm Services**	**Utilites**	**Real Estate**
FEPER	0.365	0.461***	0.483**	0.410**	0.423**	0.453**	0.432**	0.420**	0.396*	0.399*
	(0.2220)	(0.1670)	(0.2170)	(0.2030)	(0.2060)	(0.2100)	(0.2060)	(0.2090)	(0.2070)	(0.2090)
IND	-0.024*	-0.022	0.057***	0.056***	-0.009	-0.066	0.033	-0.027	-0.002	0.019
	(0.0135)	(0.0177)	(0.0205)	(0.0209)	(0.0351)	(0.0946)	(0.0238)	(0.0241)	(0.0172)	(0.0133)
SIZE	0.036***	0.034***	0.037***	0.035***	0.037***	0.037***	0.037***	0.037***	0.036***	0.036***
	(0.0066)	(0.0068)	(0.0066)	(0.0066)	(0.0067)	(0.0066)	(0.0066)	(0.0067)	(0.0066)	(0.0066)
IndDirectors	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003	-0.003
	(0.0021)	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)	(0.0020)
AvgTenure	0.004***	0.004***	0.004***	0.004***	0.004***	0.004**	0.004***	0.004***	0.004***	0.004***
	(0.0014)	(0.0013)	(0.0014)	(0.0014)	(0.0013)	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0014)
MeetingsYr	-0.002**	-0.002**	-0.002**	-0.002**	-0.002**	-0.002**	-0.002**	-0.002**	-0.002**	-0.002**
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0010)
CEODuality	-0.017	-0.016	-0.016	-0.017	-0.015	-0.014	-0.016	-0.016	-0.016	-0.016
	(0.0112)	(0.0112)	(0.0111)	(0.0112)	(0.012)	(0.0117)	(0.0104)	(0.0114)	(0.0114)	(0.0114)
RatioShares	0.013	0.0123	0.014	0.013	0.0108	0.014	0.012	0.013	0.013	0.012
	(0.0106)	(0.0103)	(0.0107)	(0.0101)	(0.010)	(0.0109)	(0.0100)	(0.0106)	(0.0106)	(0.0101)
FirmAge	-0.0003**	-0.0002	-0.0003**	-0.0003**	-0.0003*	-0.0003*	-0.0003**	-0.0003*	-0.0003*	-0.0002*
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Leverage	-0.002*	-0.002**	-0.002*	-0.002	-0.002*	-0.002	-0.002*	-0.002*	-0.002*	-0.002*
	(0.0013)	(0.0012)	(0.0012)	(0.0013)	(0.0012)	(0.0014)	(0.0012)	(0.00124)	(0.0012)	(0.0012)
SalesGrowth	0.0002***	0.0002***	0.0002***	0.0002***	0.0002***	0.0002***	0.0002***	0.0002***	0.0002***	0.0002***
	(7.10e-05)	(7.15e-05)	(7.16e-05)	(7.10e-05)	(7.13e-05)	(7.16e-05)	(6.97e-05)	(7.13e-05)	(7.12e-05)	(7.14e-05)
FEPER*SIZE	-0.047*	-0.058***	-0.059**	-0.050**	-0.054**	-0.056**	-0.053**	-0.053**	-0.050**	-0.050**
	(0.0256)	(0.0200)	(0.0251)	(0.0237)	(0.0242)	(0.0243)	(0.0237)	(0.0242)	(0.0240)	(0.0240)
FEPER*IND	0.056	-0.667	-0.622**	-0.521	1.152*	0.014	0.311	0.139	0.444*	0.893*
	(0.3070)	(0.5650)	(0.2650)	(0.7850)	(0.6640)	(0.2930)	(0.8620)	(0.2140)	(0.2470)	(0.5030)
FEPER*IND*SIZE	-0.002	0.092	0.059**	0.050	-0.109*	-0.001	-0.068	-0.006	-0.051*	-0.114*
	(0.0339)	(0.0640)	(0.0301)	(0.0831)	(0.0625)	(0.0527)	(0.114)	(0.0236)	(0.0270)	(0.0642)
Constant	-0.199***	-0.188***	-0.215***	-0.224***	-0.208***	-0.209***	-0.218***	-0.214***	-0.211***	-0.213***
	(0.0528)	(0.0524)	(0.0515)	(0.0527)	(0.0522)	(0.0516)	(0.0522)	(0.0525)	(0.0520)	(0.0523)
R-squared	0.135	0.134	0.152	0.137	0.142	0.131	0.134	0.127	0.128	0.130
Observations	1,347	1,347	1,347	1,347	1,347	1,347	1,347	1,347	1,347	1,347

Notes: The dummy variable (IND) equals 1 if a firm is in the associated sector and 0 otherwise. The first number in each cell is the regression coefficient and the value in the parenthesis is the associated robust standard error *** p<0.01, ** p<0.05, * p<0.1

Table 6: Robustness Check using FEDUM as a Measure of Board Gender Diversity

DEPENDENT VARIABLE: ROA				
INDEPENDENT VARIABLES				
	Model 1	**Model 2**	**Model 3**	**Model 4**
FEDUM	0.004	0.180***	0.207***	0.180**
	(0.0067)	(0.0556)	(0.0787)	(0.0781)
SIZE		0.052***	0.053***	0.044***
		(0.0068)	(0.0099)	(0.0094)
IndDirectors			-0.005***	-0.003*
			(0.0017)	(0.0019)
AvgTenure			0.003***	0.004***
			(0.0012)	(0.0013)
Meetings/Yr			-0.002**	-0.002**
			(0.0009)	(0.0010)
CEODuality			-0.015	-0.016
			(0.0105)	(0.0114)
RatioShares				0.014
				(0.0109)
FirmAge				-0.0003*
				(0.0001)
Leverage				-0.003**
				(0.0013)
SalesGrowth				0.0002***
				(7.29e-05)
FEDUM*SIZE		-0.025***	-0.026**	-0.022**
		(0.0070)	(0.0099)	(0.0097)
Constant	0.035***	-0.299***	-0.333***	-0.276***
	(0.0070)	(0.0396)	(0.0788)	(0.0753)
R-squared	0.037	0.083	0.130	0.132
Observations	2,309	2,299	1,545	1,347

Notes: The first number in each cell is the regression coefficient and the value in the parenthesis is the associated robust standard error. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 7: Robustness Check using ROE as a Measure of Firm Performance

DEPENDENT VARIABLE: ROE				
INDEPENDENT VARIABLES				
	Model 1	**Model 2**	**Model 3**	**Model 4**
FEPER	0.099*	0.395	0.636**	0.571**
	(0.0509)	(0.2400)	(0.2510)	(0.2570)
SIZE		0.069***	0.069***	0.061***
		(0.0075)	(0.0093)	(0.0093)
IndDirectors			-0.007**	-0.005
			(0.0032)	(0.0035)
AvgTenure			0.003	0.003
			(0.0021)	(0.0024)
Meetings/Yr			-0.004**	-0.004**
			(0.0018)	(0.0019)
CEODuality			-0.022	-0.027
			(0.0214)	(0.0223)
RatioShares				0.026
				(0.0217)
FirmAge				6.58e-05
				(0.0003)
Leverage				0.001
				(0.0069)
SalesGrowth				0.0004***
				(0.0001)
FEPER*SIZE		-0.053*	-0.072**	-0.061**
		(0.0280)	(0.0294)	(0.0301)
Constant	0.070***	-0.466***	-0.564***	-0.524***
	(0.0126)	(0.0609)	(0.0731)	(0.0736)
R-squared	0.045	0.096	0.129	0.117
Observations	2,200	2,192	1,449	1,330

Note: The first number in each cell is the regression coefficient and the value in the parenthesis is the associated robust standard error.

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 8: Main Regression Results using Lagged Independent Variables

DEPENDENT VARIABLE: ROA	
INDEPENDENT VARIABLES	
L.FEPER	0.407**
	(0.2000)
SIZE	0.041***
	(0.0075)
L.IndDirectors	-0.008***
	(0.0016)
L.AvgTenure	0.003*
	(0.0014)
L.Meetings/Yr	-0.001*
	(0.0008)
L.CEODuality	-0.012
	(0.0175)
RatioShares	0.010
	(0.0114)
FirmAge	-3.39e-05
	(0.0001)
Leverage	-0.004**
	(0.0015)
SalesGrowth	0.0002*
	(0.0001)
L.FEPER*SIZE	-0.050**
	(0.0232)
Constant	-0.028
	(0.0579)
R-squared	0.149
Observations	1,086

Notes: The board gender diversity measure (FEPER) and board characteristic variables are lagged one period. The first number in each cell is the regression coefficient and the value in the parenthesis is the associated robust standard error. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 9: IV-2SLS Method - 2nd Stage Regression Results

DEPENDENT VARIABLE: ROA	
INDEPENDENT VARIABLES	
FEPER	0.670***
	(0.2360)
SIZE	0.026***
	(0.0058)
IndDirectors	-0.008***
	(0.0028)
AvgTenure	0.005***
	(0.0017)
Meetings/Yr	-0.002**
	(0.0011)
CEODuality	-0.008
	(0.0152)
Ratiohares	0.019
	(0.0132)
FirmAge	-0.0005**
	(0.0002)
Leverage	-0.003
	(0.0016)
SalesGrowth	0.0003***
	(8.77e-05)
FEIND*SIZE	-0.054**
	(0.0220)
Constant	-0.150***
	(0.0476)
R-squared	0.043
Observations	1,347

Notes: The percentage of women directors in the firm's industry (FEIND) is used as an instrumental variable. The first number in each cell is the regression coefficient and the value in the parenthesis is the associated robust standard error. *** $p<0.01$, ** $p<0.05$, * $p<0.1$