Board Diversity and Risk-taking of Property/Casualty Insurance Companies

February 2019

Abstract

We examine the impact of board diversity on the risk-taking behaviour of property/casualty insurance companies. Using a unique data set of insurance companies allows us to have a wide spectrum of risk measures, cover private companies and financial industry other than depository institutions. We find that greater female representation on board of directors is negatively associated with asset risk only. While it increases the total and insurance risk of the firm. These effects seem to be moderated by the structure of the firms, the complexity of firm operations and The different effects on risks could explain why there is inconclusive literature on the relation of board gender diversity and risk. As for the ethnicity of board members, we find no evidence that ethnic diversity is significantly associated with any measure of risk.

Key words: Board of Directors, Property/Casualty Insurance, Corporate Governance, Risk, Diversity

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Failures of property/casualty (P/C) insurance companies have been found to be associated with their governance both in Canada and Europe (Leadbetter and Stodolak ,2009; European Insurance and Occupational Pensions Authority ,2018). Academic literature has examined aspects of governance such as share ownership and board characteristics and committees showing that these do impact the risks of insurance companies (Cheng, Elyasiani and Jia ,2011; Eling and Marek, 2013; Ho, Lai and Lee, 2013). The board characteristics so far studied though exclude personal characteristics of members. Hambrick and Mason (1984) propose that personal values, which can be shaped by gender and ethnicity, of board members can influence board decisions and hence risk strategies set. This paper examines how the riskiness of the company is affected by gender and ethnic diversity of board members in P/C companies.

Governance of P/C insurance companies has been identified among the most important reasons of insolvency and failure. Leadbetter and Stodolak (2009), in a review of Canadian insurer solvencies, note that over 60 percent of involuntary market exits can be "ultimately traced to a strategic risk or operational decision by the company" (p 8). Similarly, in the European Union, the European Insurance and Occupational Pensions Authority (2018) finds that failure of control and proper governance are linked to the internal risk of 180 insurance companies' "failures or near misses" since 1999.

The effect of corporate governance on risk of insurance companies has been examined from the perspective of ownership, compensation, blockholders and board characteristics. In a study of life-health insurers, Cheng, Elyasiani and Jia (2011) find that institutional ownership is associated with lower total risk. Eling and Marek (2013) examine U.K. and German stock insurers and find that higher executive and board compensation, greater monitoring and a greater number

of blockholders is associated with lower risk taking. Less research has been undertaken on the impact of board composition in mitigating or encouraging risk-taking behaviours of management. Ho, Lai and Lee (2013), in a study of U.S. insurers, look at the relationship between organizational form, number of board members and board composition. They find that CEO/chairperson duality and board size are associated with higher leverage risk and larger boards are associated with greater overall risk.

In addition to the traditional measures of board composition, board diversity – both gender and ethnic - may also impact risk taking. Hambrick and Mason (1984) propose, in the "upper echelon" theory, that the personal values of the top management are reflected in the firm's strategic decisions. This theory is extended on the board members by Canella, Finkelstein and Hambrick (2008), where board members are involved in setting the strategic goals of the firm and overlook them. Canella, Finkelstein and Hambrick (2008) explain that the involvement and hence the reflection of board member values might depend on the contextual environment on the firm. Those personal values can be shaped by gender or ethnicity of the board members and affect the riskiness of the company (Hambrick and Mason, 1984).

In addition to the academic evidence on the importance of personal values among which are gender and ethnicity, industry leaders have based their opinions and recommendations in regard to personal characteristics of board members and risk. Gender is one of the most debated issues, for instance. After the 2008 financial crisis, financial industry leaders have stated that women can decrease the risks of financial institutions. Notably, in 2011, Michel Barnier, Europe's internal markets commissioner, proposed one third of the boards of banks to be women to alleviate unison of thought and thus be more efficient in problem solving. More recently in 2018, Christine Lagarde, Managing Director of the International Monetary Fund (IMF), stated that "Higher share

of women on the boards …is associated with greater stability…. if it had been Lehman Sisters rather than Lehman Brothers, the world might well look a lot different today*".*

When focusing on the board members and managers, academic literature does not find conclusive results to ascertain the industry leaders. Sila, Gonzalez and Hagendorff (2016), in a study on non-financial U.S. firms between 1996 and 2010, find no evidence that female boardroom representation does not appear to impact firm risk. Similarly, Gianetti and Zhao (2018) also find no relationship between firm performance volatility and the percentage of females on the board, and Adams and Ragunathan (2015) conclude that banks with female directors did not have lower risk during the financial crisis. However, Berger, Kick and Schaeck (2014) examine portfolio choices of banks and find that banks with greater female board representation have riskier portfolios. They argue this is because female board members tend to have less expertise (i.e. younger or less education) than male counterparts. While Faccio, Marchica and Mura (2016) find that firms run by female CEOs are less risky in terms of lower leverage, less volatile earnings, and a higher chance of survival. The inconclusive findings of corporate finance literature on female leaders and risk usually do not agree with the economic and psychology literature which find that an average woman is more risk averse than an average man (Croson, Gneezy and Rey-Biel, 2012; Croson and Gneezy, 2009; Eckel and Grossman, 2008; Levin et. Al, 1988; Fehr-Duda et. Al, 2006; Byrnes et.al 1999). Therefore, the effect of gender diversity of the board of directors on risk of the company is still a valid academic research question.

The gender diversity in corporate finance literature as well as in the industry enjoyed a lot of attention, whereas the literature discussing the effect of ethnic diversity is less well developed. Ethnic diversity can have a significant effect on business strategies including the risk strategies (Hambrick and Mason, 1984, Hofstede, 1985, House et. Al (2004,2007,2014),). Bernile, Bhagwat

and Yonker (2018), in a study of nonfinancial U.S. firms, includes the ethnicity of members into an index of overall diversity. They find that board diversity has a moderating effect on stock volatility when firm fundamental risk is higher. More diverse boards are also associated with greater investments in innovation. Giannetti and Zhao (2018) find that firms' ancestral diverse boards tend to be more innovative (more patents and corporate strategies that differ from their peers) but they also have more board meetings, greater board turnover and make less predictable decisions, with higher return volatility. On the other hand, they do not find evidence of higher risks in terms of investing more or higher leverage. Nguyen, Hagendorff and Eshraghi (2018) study the ancestral origins of CEOs and they find that CEOs whose ancestral origins lie in cultures that emphasize uncertainty avoidance display lower risk. The recent literature on ethnic diversity and risk is limited and inconclusive. Overall diversity including ethnic seems to decrease volatility of stock returns, while not affecting leverage risk. On the other hand, ancestral origins of CEOs have a significant effect on stock volatility depending on their ancestral origin cultural values. This creates a gap and need to further explore how board members' ethnic diversity affects different risks of companies.

The relationship between board gender or ethnic diversity and risk taking has not been studied in the P/C insurance industry. Because risk governance for insurance firms is key for the continuity of a healthy business, using the insurance industry allows us to examine a wide spectrum of risk measures. The profitability and persistence of successful business of insurance companies depends on their ability to accurately evaluate and manage the various types of risks they incur. Also, insurance companies provide the opportunity to investigate the effect of corporate governance on risk management in financial institutions other than depository institutions. These two types of businesses differ and studies covering deposit institutions do not reflect on the

insurance companies. In this research, we examine gender and ethnic board diversity and their effect on risk-taking of Canadian property/casualty insurance companies. Using these companies allows us to look at private financial institutions, as well as public, which are usually not included in the board diversity literature due to scarcity of such data.

Our sample consists of 125 firms from 1999 till 2017, collected from both A.M. Best from MSA Research. We measure board diversity by both ethnic background and female representation. We examine the relationship between these board diversity variables and risk-taking measures - total risk, investment risk, leverage risk, underwriting risk, solvency risk, and insurance risk.

We control for relevant firm specific characteristics - CEO duality, insider proportion, number of board members, long tail, reinsurance, geographic and line of business distribution, domesticity of the firm, group membership, return on assets and firm size. We employ 2 stage least square (2SLS) regression, with instrumental variables (IV) for female proportion and ethnic diversity. We use the proportion of females on boards of peer companies and distance to airport from headquarters as an IV for female proportion. And we use the ethnic diversity Herfindahl Index of peers and distance from the firm's headquarters to the major airport as an IV for ethnic diversity. We also use event study to test how is risk affected when there is a significant change in the diversity of the board.

Consistent with Ho, Lai and Lee (2013), we find that board gender diversity affects some firm risks but not the others. This finding can explain the inconclusiveness of literature regarding the relation of board diversity to risk. Where the literature that studies board diversity more frequently considers public firms, their measure of risk is usually related to variation in stock returns or limited to specific types of accounting risk (Sila, Gonzalez and Hagendorff, 2016; Gianetti and Zhao, 2017; Bernile, Bhagwat and Yonker, 2018). Consistent with economic and

psychology studies and with the findings of Faccio, Marchica and Mura (2016) we find that firms with greater female representation have significantly lower asset risk, and significantly higher total risk and insurance risk. But we do not find evidence that the other measures of risk are significantly associated with gender diversity. These results differ when moderated by the organizational structure of the insurance company and complexity of business (as measured by lines of business being majorly written in commercial lines rather than personal lines), this seems to be in agreement with the "upper echelon" proposition for board members. Higher female proportions significantly increase total and underwriting risks for mutual companies, while more female on boards decrease asset risk for stock companies. Females also seem to be able to decrease asset risks when the operations of the company are not complex (dominated by personal lines), but they increase the total risk for more complex firms (dominated by commercial lines).

As for the ethnic diversity, while we find in general no evidence that ethnic diversity of board members is significantly associated with any measure of risk, we find that ethnic diversity in mutual firms' boards increases leverage and total risk.

Considering the inconclusive literature on the effect of board gender diversity on risk and less developed literature on ethnic diversity and the increased attention of regulators and practitioners to the issue of diversity, this study contributes into resolving the dilemma of whether diversity would increase or decrease riskiness of financial institutions.

The paper proceeds as follows. After the introduction, we proceed with the hypothesis formulation. Then the data and methodology which includes how we construct the sample, what variables are used to estimate risk, and what regressions are run to perform tests and present summary statistics. Following that, we present the empirical results of the 2SLS regressions. We

then extend the study and proceed with difference-in-difference event study to investigate the effect of a change in diversity on the risk of a firm and robustness tests. And last is the conclusion.

Hypothesis Formulation:

The "Upper Echelon" theory proposed by Hambrick (1984) relates the strategic decision of a company to the personal values of the firm's top management. This hypothesis is extended to the personal values of board of directors' effect on the strategic decisions of the companies as well (Carnell, Finkelstein and Hambrick, 2008). Among those strategic decisions is the risk management and hence the riskiness of the company.

Personal values related to risk vary between males and females, where psychology and economic literature found that an average female is more risk averse than an average man (Croson, Gneezy and Rey-Biel, 2012; Croson and Gneezy, 2009 ; Eckel and Grossman, 2008; Levin et. Al, 1988; Fehr-Duda et. Al, 2006; Byrnes et.al 1999). Studies on corporate governance in general and board diversity specifically largely exclude financial institutions. The after math of the 2008 financial crisis though, brought up the need to overlook the corporate governance of financial institutions specifically. The collapse of Lehman Brothers created a wide belief among the industry leaders that greater female representation would have alleviated the risks and could have prevented the collapse. Christine Lagarde (2018) stated: "Higher share of women on the boards …is associated with greater stability…. if it had been Lehman Sisters rather than Lehman Brothers, the world might well look a lot different today". With a similar motive, Michel Barnier, Europe's internal markets commissioner in 2011, proposed one third of the boards of banks to be women. Also British Labour deputy leader Harriet Harman and Japanese Prime Minister Shinzo Abe have spoke of increased female importance in alleviating risk. Despite the findings in the general public of greater risk aversion of females and the belief among industry leaders, literature studying female

representation on the board of directors is inconclusive regarding riskiness of the company. Berger, Kick and Shaeck (2018) find that banks with greater female board representation have riskier portfolios. Also, Adams and Funk (2012) studying companies excluding financial institutions find that females on boards of directors are more risk loving than men. While Sila, Gonzalez and Hagendorff (2016) and Adams and Ragunathan (2015) do not find significant evidence that gender diversity affects firm performance volatility and various measures of bank risks, respectively. The inconclusive literature findings and the disagreements between the industry leaders and literature findings regarding the riskiness of financial institutions and women representation on boards keeps the question unanswered. Is women representation on boards related to the riskiness of the company? Thus we raise our main hypothesis regarding the first aspect of board diversity as follows:

H1: Higher proportion of females on the board of directors is significantly associated with the risk of the company.

In addition to the gender driven personal values, cultural background differences of leaders would be reflected into the differences of risk strategy adopted by these leaders. Hofstede (1985) finds that organization's founder and dominant Elite values appear to be reflected in the values of their organizations (Hofstede, 1985). Hambrick and Mason (1984) propose that socioeconomic background of "upper echelon" affects the variability of growth and profit of the firm. Literature studying the effect of cultural diversity of leaders on riskiness of companies is scarce and limited to few papers. Giannetti and Zhao (2018) find no evidence that firms with diverse boards take more risk, have higher leverage or invest more. But they find that these firms have higher return volatilities. While Nguyen, Hagendorff and Eshraghi (2018) studying the relation of CEO's ancestral origins and risk of companies find that those CEOs with ancestral origins of cultures with

values which emphasize uncertainty avoidance display lower risk. Both of these studies exclude financial institutions and only include public firms. The effect of ethnic diversity and the proposition of Hambrick and Mason (1984) as related to board members remains an underexplored empirical research question. Our second board diversity perspective as measures by ethnic diversity is thus tested by the below hypothesis:

H2: Ethnic diversity of board members is significantly associated with riskiness of the company.

The upper echelon theory extended on board of directors by Canella, Frankelstein and Hambrick (2008) proposes that the contextual environment in which the board of directors operate will affect their involvement and vigilance of strategic decisions. They propose that the more uncertain the environment the more involved boards are in strategic decisions. Multiple empirical studies investigating the effect of board diversity on performance or risk find that the effect does differ in different environments. Bernile, Bhagwat and Yonker (2018) who study a broad spectrum of diversity find that board diversity is less effective when uncertainty in the broader environment increases and a nimbler decision process may be needed. They also find that strength of the link between board diversity and firm risk depends on the circumstances that should affect the optimal composition of the board and the effectiveness of its monitoring role. Anderson, Reeb, Upadhyay, and Zhao (2011) find that firms with more complex operating environments have more diverse boards. For firms that operate in complex environments, board diversity improves performance, whereas the opposite is true for firms that operate in less complex environments. Anderson, Reeb, Upadhyayo, and Zhao (2011) constructing a diversity index which includes education, experience, age, gender, and ethnicity similar to Bernile, Bhagwat and Yonker (2018) find that in firms with complex operating environments, performance improves as boards become increasingly heterogeneous. However, they find that in firms with less complex operating environments, board

heterogeneity exhibits a negative relation to firm performance. Liu, Wei and Xi (2014) find that board gender diversity effect on firm performance is positive and significant in legal person-controlled firms but insignificant in state-controlled firms. Frijins, Dodd and Cimenova (2016) find that for firms which operate in more than three business segments, performance is not affected by cultural diversity, whereas for non-complex firms that operate in three or less business segments, performance is negatively affected. They also find that firms with a strong presence in foreign markets, as measured by the proportion of foreign sales or assets, the negative relation between performance and cultural diversity disappears. Gianetti and Zhao (2018) find that ancestral diversity between corporate decision makers has a hump-shaped effect on performance. The upper echelon theory and the empirical literature suggest that the effect of board diversity might depend on the structure of the organization, and type and complexity of operations. We thus test whether the complexity of business of an insurance company would affect the association of board diversity and risk of a company. Where the upper echelon theory suggests that more uncertain environment would allow the board to be more involved. Thus suggesting a firm operating in a more complex business environment would have a greater association of board diversity and risk. We test this empirically by measuring the business complexity with the concentration in commercial business lines (which are of greater complexity).

H5: Firms that have higher concentration of their business in commercial lines have a significant association between board diversity and risk.

Lamm-Tennant and Starks (1993) find that stock insurers have more risk than mutual insurers, they also find that stock insurers write relatively more business than do mutuals in lines and states having higher risk. Ho, Lai and Lee (2013) find that mutual insurers, relative to stock insurers, with larger boards have higher underwriting risk and those with CEO duality have lower

leverage risk. These findings suggest that for insurance companies the organizational structure (stock vs. mutual) could act as a significant contextual environment which would affect how board diversity would affect risk. We thus test whether board diversity in stock insurance companies is significantly associated with risk as compared to the mutual insurers.

H8: Board diversity is significantly associated with risk when the insurance company is a stock insurers relative to mutual insurers.

Data and Methodology

Sample construction

We hand collect data on board of directors and officers from the company profiles of MSA research annual reports and A.M. Best Annual reports. MSA research reports cover the period from 2004 until 2018. Prior to 2003 A.M. Best covered the annual reports of Canadian insurance companies, so we collect 1999-2003 data from A.M. Best reports. The year of 2003 company profiles were not fully covered by A.M. Best, so we collected additionally the officers' data from General Insurance Registry and interpolate the board of directors' members. For the interpolation, we assume a director is member of the board in 2003 if this director was also a member both in 2002 and 2004.

We collect all the yearly financial data of the P&C insurance companies from MSA research reports from 1999 until 2017. There are 418 unique insurance companies covered by MSA research 200 of them report board members in their company profiles in at least one year. We exclude, from those 200, companies which do not have enough financial data for our risk measures and we are left with 191 unique companies. We further exclude 66 companies which do not have enough observations to calculate our risk measures, which need to have at least 5 years

of consecutive data. We end with 1344 insurer-year observations with 125 unique insurance companies.

As for the board of directors' characteristics, we use several approaches. First, we identify whether a board member is an insider if this board member is an officer at the same time. Second, using titles of the board members, we identify if the chair is also a CEO. Third, a board member is classified as male or female based on their first name[1]. Last, to identify the ethnicity of the board member, we use their last names. We use four sources to identify the origin of the family names. Using Forebears.com we identify the current prevalent country where the family name occurs. We use Dictionary of American Family Names to identify the origin of the family name. And we use Onomap, a project proceeding done by the department of geography at University College London, to identify the ethnic group of the last name. We compare the results of those three data bases, if they match we assign the last name to one of the seven ethnic groups. If they don't match, we use anscetry.com, which is a commercial data base which contains the census of Canada and U.S.A and the registers of ships arriving to U.S.A and Canada, these official sources can help us identify from which country did a certain family name arrived to U.S.A or Canada and resolve the discrepancy between the initial three data bases. If we find the family name origin using ancestry and it matches one of the previous data bases we assign an ethnic group to it accordingly. If using ancestry.com we could not identify the origin we assign the family name to the ethnic group based on the current prevalent country. For each board member, based on the origin of the family name identified, we assign a group as divided in the GLOBE project (House et. Al, 2014): Anglo, South Pacific, Germanic Europe, Latin Europe, Sub-Saharan Africa, Eastern Europe, Middle East,

[1] Some names have only initials and family names, or the first names can be either a male or female name. In this case, we refer to annual reports, photos and contacting the companies directly to identify the gender of the board members whose first names are not clearly stated in the company profile.

Confucian Asia, Southern Asia, Latin America, and Nordic Europe. Countries grouped into cultural clusters share characteristics such as geographic proximity, climate zone, mass migration, ethnic social capital, religious roots and linguistic roots (House et. Al, 2007). GLOBE project doesn't cover all the countries of origin of the directors in our sample (Belgium, Ukraine, Poland…), in that case we follow the shared characteristics with the corresponding groups and place the country into the closest group by characteristics. The countries of origin of the board of directors and their corresponding groups are summarized in table 1.

We use the epidemiological approach as described by Fernandez (2011) to study the effect of ethnic origin diversity of board members on company risk. This approach has been recently used in the economics literature to study the effect of ethnic origins. It is based on the idea that immigrants, possessing cultural beliefs and values, pass them to their descendants. Using last names of people studied to identify their ethnic origin has been used by several studies. Nguyen, Hagendorff and Eshraghi (2018) show that CEOs of second and third-generation immigrants significantly affect profitability of the firms. Liu (2016) identifies the ethnic origins of insiders to relate it to the corporate corruption. Bengston and Hsu (2015) study the effect of co-ethnicity between entrepreneurial founder and venture capitalist on investment likelihood and its further performance. Merkley, Michaely and Pacelli (2017) use the family names of analysts to study how cultural diversity affects the quality of the consensus forecasts analysts produce and Gianetti and Zhao (2017) identify board members' ethnicities to study the effect of cultural diversity on the predictability of decisions and firm volatility.

Methodology

Ho, Lai and Lee (2013), upon studying the effect of P&C insurance company structure and board characteristics on risk, find that different types of risks are affected differently and advise to

consider studying the different types when assessing the risk taking behaviour of an insurance company. We use several measures of risk as summarized in table 2. Leverage risk is calculated as 1 minus surplus divided by total assets, where surplus is a measure of total shareholders' equity. Underwriting risk is measured as the standard deviation of the loss ratio, where the loss ratio is the ratio of paid insurance claims, to premiums earned. Solvency risk is measured as the standard deviation of solvency ratio, which is measured as total assets minus total liabilities divided by total assets. Insurance risk is the proportion of net premiums written (NPW) of surplus, which represents the cushion in case the premiums generated by the insurance company are not enough to cover claims arising from the NPW and surplus has to be used in that case. A higher ratio of NPW/surplus would indicate that there is more NPW per surplus and hence the cushion of protection is lower which posses higher risk on the insurance company. Asset risk is measured following Che and Liebenberg (2017) as the ratio of commons shares plus junk bonds divided by total assets. The junk bonds are all bonds which are below investment grade rating, unrated or other. Insurance risk is measured as the proportion of net premiums written (NPW) to surplus, it is the cushion in case claims arising from the NPW cannot be covered by the premiums and need to be covered by surplus. We also use the total risk measure as the standard deviation of the return of assets (ROA). As summarized in table 3, our sample's risk measures are comparable to Che and Liebenberg (2017) asset risk, underwriting risk, standard deviation of ROA, leverage, and solvency risk used by Ho, Lai and Lee (2013).

To create the measures of risks that are aligned with the right time windows as the decisions make by the board of directors, we create overlapping windows starting from 1999 until 2017. As such we create windows of 1999-2003; 2000-2004; 2001-2005; 2002-2006; 2003-2007… We calculate the average of all of the control variables, female proportion and diversity HHI over those

windows. We calculate the average of leverage risk, asset risk, and insurance risk and the standard deviation of loss ratio, solvency ration and ROA over each of those overlapping windows.

The two main variables of interest which represent the diversity of board members are ethnic diversity and gender diversity. Gender diversity is estimated as the proportion of female members on the board divided by the total number of board members. Female proportion of the total board size is 16.68%, and almost does not exceed the half in any company (table 3). Historically, shown in figure 1, female proportion has been increasing from an average of about 10% in the early 2000s to reach about 25% in the most recent period. Ethnic diversity ($DivHHI$) is measured by the Herfindahl Index as in model 1. To calculate the $DivHHI$ we use the number of the 12 ethnic groups divided by the total number of board members. The higher the $DivHHI$ the less ethnically diverse is the board of directors. As shown in table 3 the average $DivHHI$ is 0.6450 comparable to Adams and Ragunthan (2018) fractionalization measure of 0.725 and 0.561 using Oxford Dictionary used to measure the ancestral diversity of directors based on the country of last name origin.

$$DiversityHHI_{it} = \sum_{i=1}^{N} \left(\frac{total\ number\ of\ ethnic\ groups}{total\ number\ of\ board}\right)^2 \quad (1)$$

We estimate the model specified below (equation 2) using 2SLS regressions to study the effect of ethnic and gender diversity on various types of risk. Where $Risk_{it}$ is any type of risk described in table 1. We control for board characteristics, firm characteristics, firms fixed effects and year fixed effects.

$$Risk_{it} = \alpha_0 + \alpha_1 DiversityHHI_{it} + \alpha_2 Female\ proportion_{it} + \alpha_3 Insider\ proportion_{it} + \alpha_4 CEO\ duality_{it} + \alpha_5 Number\ of\ directors_{it} + \alpha_6 \ln(TA)_{it} + \alpha_7 Long\ tail_{it} + \alpha_8 Reinsurance_{it} + \alpha_9 geoHHI_{it} + \alpha_{10} LOBHHI_{it} + \alpha_{11} PC1_{it} + \alpha_{12} group_{it} + u_{it} \quad (2)$$

Ho, Lai and Lee (2013) find that higher percentage of insiders is associated with higher total risk, we control for insider proportion which is the total number of board members who are officers of the corresponding insurance company divided by the total number of board members. We also include total number of board members and CEO duality, which is a dummy variable that takes the value of 1 for the board chair who is also a CEO. Ho, Lai and Lee (2013) find that CEO-chairperson duality increases leverage risk and that firms with larger boards would have higher total risk and leverage risk but lower investment risk. Larger insurance firms might be able to absorb more risk due to greater expertise as suggested by Pottier (2007), we control for firm size by the natural logarithm of total assets. *Long tail* is measured as unpaid claims and adjustment expenses divided by total liabilities. We control for *reinsurance* proportion which is measured as the premiums written ceded divided by the sum of direct and assumed premiums written. *geoHHI* is the geographic Herfindahl Index, where the geographic diversification considered is among the provinces of Canada. Each province has its own insurance regulations which makes the geographic diversity comparable to international geographic diversity. *LOBHHI* is the line of business Herfindahl Index, five lines of business are defined: 1) auto, 2) personal property, 3) commercial property, marine, boiler and machinery and hail, 4) liability and 5) surety and other. We introduce a dummy variable which is equal to 1 if a firm is part of a group and zero otherwise. Che and Liebenberg (2017) show that the group indicator positively and significantly affects asset risk. We also control for the firm being domestic or a foreign branch. Where the dummy variable PC1 equals one if the firm is federally or provincially licensed domestic company and zero if the company is a federally licensed foreign branch.

We use proportion of females on boards of peer companies as an instrumental variable for the female proportion. Where having more females with expertise in the insurance companies on

the boards of other companies can act as a pool of potential females on the boards of other companies. These female proportions on other boards though, would not affect the risk strategies on the company of interest. This kind of instrument is similar to the one used by Liu, Wei and Xie (2014) percent of women directors in the firm's 2-digit SIC coded industry. Due to the nature of insurance industry, there is a possibility that female candidates to serve on boards are scarce if only limiting the choice to the insurance industry. In order to account for this caveat, in addition to the proportion of females in the peer companies as an instrument, we use the distance to a major airport. The proximity to a major airport would encourage more directors living in other location to serve on the boards of companies, this will broaden the potential directors' pool and allow the company to have greater board diversity. For instrumenting the board diversity, we use distance of head office to a major airport and ethnic diversity of peers, following the same logic as with the female proportion. This instrument reasoning is in line with Masulis, Wang and Xie (2012) who use a dummy variable for whether a firm is headquartered within 100 km from a large US airport. It is also in line with Bernile, Bhagwat and Yonker (2018) who use diversity of the supply of nonlocal potential directors residing one non-stop flight away from the firm headquarters as the instrumental variable.

Empirical Results

Does Board Diversity Affect Risk?

We measure board diversity from two perspectives, first is the gender diversity as measured by the proportion of females on board and the second is the ethnic diversity which is measured as the ethnic diversity Herfindahl Index. Our results shows that only gender diversity is significantly associated with risk. As suggested by Ho, Lai, and Lee (2013) not all types of risk are affected by board characteristics and they are affected differently. Our results in table 6,

suggest that higher female proportion is negatively associated with asset risk and positively, but positively associated with total risk (measured as the standard deviation of the ROA) and insurance risk. This indicates that as more females are present on the boards of insurance companies, the volatility of ROAs increases as well as the cushion of surplus to NPW decreases posing larger risk on the insurance company in terms of the ability to meet their claims and stability in the returns on assets. On the other hand, female representatives seem to be more cautious with the company investment portfolio, where the asset risk decreases as more females are on board.

Adams and Ragunathan (2018) find that return volatility and cash/assets are significantly associated with board ethnic diversity. In contrast, we do not find significant evidence that ethnic board diversity significantly affects any riskiness of insurance firms using the measures we employ. A common measure used by Adams and Ragunathan (2018) and us is leverage and they also do not find that leverage is significantly associated with ethnic diversity.

Is the Board Diversity Effect on Risk Dependant on the Contextual Environment of the Firm?

Canella, Finkelstein and Hambrick (2008) explain that the involvement and hence the reflection of board member values might depend on the contextual environment on the firm. Those personal values can be shaped by gender or ethnicity of the board members and affect the riskiness of the company (Hambrick and Mason, 1984). Bernile, Bhagwat and Yonker (2018), Frijins, Dodd and Cimenova (2016) and Anderson, Reeb, Upadhyay, and Zhao (2011) find that the complexity of the operating environment could moderate the way board of director diversity affects the performance of the company. Liu, Wei and Xi (2014) find that board gender diversity effect on firm performance is positive and significant in legal person-controlled firms but insignificant in

state-controlled firms. Gianetti and Zhao (2018) find that ancestral diversity between corporate decision makers has a hump-shaped effect on performance. The upper echelon theory and the empirical literature suggest that the effect of board diversity might depend on the structure of the organization, and type and complexity of operations. We thus test whether the complexity of business of an insurance company would affect the association of board diversity and risk of a company. Where the upper echelon theory suggests that more uncertain environment would allow the board to be more involved. Thus suggesting a firm operating in a more complex business environment would have a greater association of board diversity and risk. We test this empirically by measuring the business complexity with the concentration in commercial business lines (which are of greater complexity). Our results in table 7 shows that female directors significantly increase the insurance and total risk for insurance firms with more complex operations (predominantly writing commercial lines) while they can significantly decrease the asset risk for firms with less complex operations. Thus the results observed in table 5 for the total sample stem from the division of the firms into having complex and non-complex operations and the way female directors are able to manage the risks in those firms differ.

Furthermore, Lamm-Tennant and Starks (1993) find that stock insurers have more risk than mutual insurers, they also find that stock insurers write relatively more business than do mutuals in lines and states having higher risk. Ho, Lai and Lee (2013) find that mutual insurers, relative to stock insurers, with larger boards have higher underwriting risk and those with CEO duality have lower leverage risk. These findings suggest that for insurance companies the organizational structure (stock vs. mutual) could act as a significant contextual environment which would affect how board diversity would affect risk. We thus test whether board diversity in stock insurance companies is significantly associated with risk as compared to the mutual insurers. Our results in

table 6, ascertain the proposition of the upper echelon in the context of the organizational structure in addition to the complexity of operations. Where larger proportion of female directors increases the total risk of mutual firms but have a negative effect on the asset risk of stock firms. And the insurance and solvency risk increases significantly as more females serve on the boards for stock companies only.

Testing the effect of female board members on the riskiness of the firms as moderated by the different contextual environments of the insurance firms, allows us to explain how female board members affect the riskiness of the companies. Where it is possible that the narrow insurance industry are inviting female board members from other industries to serve on their boards, hence they lack the expertise of running insurance specific types of risk such as the insurance risk and thus adversely affect this type of risk. The less complex operational environment allows the female board members to manage the asset risk and thus decrease this type of risk.

Event Study

Robustness Tests

Conclusion

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Table 1.Division of Countries of Board Member Origins by Groups

This table lists the countries of origin of the board members in our sample and the division of those countries by groups as divided in the GLOBE project (2014). Some countries are not covered by the GLOBE project, we followed a close analogue procedure and assigned those countries into corresponding groups based on similar characteristics such as language, geographic location, and history.

Anglo	**Eastern Europe**	**Germanic Europe**	**Latin Europe**	**Middle East**	**Southern Asia**
Australia	Armenia	Austria	France	Algeria	Bangladesh
Canada	Bulgaria	Belgium	Italy	Egypt	India
England	Croatia	Germany	Portugal	Morocco	Pakistan
Iceland	Czech republic	Netherlands	Spain	Turkey	Philippines
Ireland	Greece	Switzerland			Sri Lanka
Scotland	Hungary	**Confucian Asia**	**Latin America**	**Nordic Europe**	**Africa**
South Africa	Latvia	China	Brazil	Denmark	Cameroon
United States	Poland	Japan	Dominican Republic	Norway	Ghana
	Russia	Taiwan	Mexico	Sweden	Mozambique
	Serbia	Vietnam	Puerto Rico		
	Slovenia				
	Ukraine				

Table 2. Measures of Risk

This table represents a summary of the measures of risk used in our study and how it relates to the interpretation of the riskiness of the P/C insurance company.

Measures of Risk		Relation to riskiness of the firm
Leverage Risk	$1-\frac{surplus}{TA}$	positive
Underwriting Risk	SD (Loss Ratio)	Positive
Solvency Risk	SD(solvency ratio), where solvency ratio=(TA-TL)/TA	Positive
Asset Risk	$\frac{CS+junk\ bonds}{TA}$	Positive
Insurance Risk	$\frac{NPW}{Surplus}$	Positive
Total Risk	SD(ROA)	Positive

Table 3: Summary Statistics

This table represents the summary statistics of the variables, all the variables are the averages or standard deviation on 5 year overlapping windows starting 1999 until 2017.The risk measures as described in table 1. DivHHI is the Herfindahl Index of board members' ethnic diversity, female ratio is measured as the ratio of females to the total number of board members. Total directors is the total number of directors on board. Insider ratio is the ratio of directors who are also officers in the company to the total number of board members. Chair Duality is a dummy variable which takes the value of one if the board chair is also the CEO of the company. Mutual is a dummy variable which takes the value of one if the company is mutual and zero if it is a stock company. GeoHHI is a Herfindahl index of the geographic diversity of the company lines of business. LOBHHI is a Herfindahl index of the lines' of business diversity of insurance written. Long tail is measured as unpaid claims and adjustment expenses divided by total liabilities. Ln(TA) is the natural logarithm of total assets. PC1 is a dummy variable which takes the value of one if the company is a domestic company and zero if it is a foreign branch. Group is a dummy variable which takes the value of one if the company is part of a group and zero otherwise.

Variable	Obs	Mean	Std. Dev.	Min	Max
Risk Measures:					
Leverage Risk	1344	0.7056	0.1507	0.0768	0.9454
Insurance Risk	1344	1.4095	0.9236	0.0138	12.2201
Solvency Risk	1344	0.1490	0.4393	0.0024	5.0840
Underwriting Risk	1344	0.0981	0.1014	0.0077	0.8561
Asset Risk	1344	0.1091	0.1225	0.0000	1.8555
Total Risk	1344	0.0290	0.0325	0.0000	0.4378
Board Measures:					
Female Proportion	1344	0.1668	0.1107	0.0000	0.5623
DivHHI	1344	0.6450	0.1598	0.2804	1.0000
Total Directors	1344	9.3671	2.6228	4.0000	22.600
Insider Ratio	1344	0.1307	0.1143	0.0000	0.8200
Chairduality	1344	0.0359	0.1490	0.0000	1.0000
Company Measures:					
Group	1344	0.6655	0.4672	0.0000	1.0000
Mutual	1344	0.2180	0.4087	0.0000	1.0000
GeoHHI	1344	0.5657	0.2791	0.1698	1.0117
LobHHI	1344	0.5360	0.2114	0.2361	1.0004
Reinsurance	1344	0.2308	0.1837	-0.021	0.8274
Longtail	1344	0.5942	0.1802	0.0274	0.9885
Ln(TA)	1344	12.7617	1.5093	7.8334	15.7942
ROA	1344	0.0366	0.035	-0.2691	0.3252
PC1	1344	0.9308	0.2539	0.0000	1.0000

Table 4. Diversity and Risk taking OLS regressions

This table presents the OLS regressions of risk on board gender (ethnic) diversity for the total sample without controlling for firm fixed effects. The risk measures are as defined in table 1. Over 5 year overlapping windows starting with 1999 until 2017, we calculate the average of insurance risk, asset risk and leverage risk and standard deviation of underwriting risk, solvency risk and total risk. In order to have the independent variables measures commensurate with the time frame of the risk measures, we also calculate the independent variables as averages over the 5 year overlapping windows. P-values (in parentheses) are corrected for clustering at the insurer level and heteroskedasticity. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

	Solvency Risk	Insurance Risk	Total Risk	Asset Risk	Underwriting Risk	Leverage Risk
Female Proportion	0.28	0.47	0.03	-0.16**	0.01	0.02
	(0.19)	(0.23)	(0.10)	(0.03)	(0.91)	(0.53)
DivHHI	0.04	-0.12	-0.00	0.01	0.03	0.02
	(0.69)	(0.69)	(0.75)	(0.89)	(0.41)	(0.56)
Total Directors	-0.00	-0.02	0.00	0.01*	-0.00	0.00
	(0.61)	(0.51)	(0.98)	(0.07)	(0.79)	(0.95)
Insider Ratio	-0.39	0.08	-0.03*	-0.04	0.02	0.03
	(0.29)	(0.81)	(0.09)	(0.65)	(0.69)	(0.53)
Chairduality	0.30	-0.03	-0.02	0.06*	0.02	-0.02
	(0.30)	(0.88)	(0.25)	(0.06)	(0.39)	(0.55)
GeoHHI	-0.14	-0.12	0.03*	0.01	-0.00	-0.02
	(0.36)	(0.61)	(0.10)	(0.84)	(0.97)	(0.67)
LobHHI	0.11	0.65*	0.01	-0.03	0.07	0.02
	(0.32)	(0.06)	(0.50)	(0.44)	(0.20)	(0.76)
Longtail	-0.94*	-1.00***	-0.03	-0.03	0.21***	0.08
	(0.08)	(0.00)	(0.14)	(0.48)	(0.00)	(0.19)
Ln(TA)	-0.09***	0.19***	-0.01***	0.01**	-0.03**	0.05***
	(0.01)	(0.00)	(0.00)	(0.05)	(0.03)	(0.00)
Reinsurance	-0.17	-1.11***	-0.02**	-0.03	0.09**	0.15***
	(0.18)	(0.00)	(0.03)	(0.35)	(0.04)	(0.00)
PC1	-0.54***	0.81***	-0.02*	0.12***	-0.14***	0.14***
	(0.01)	(0.00)	(0.07)	(0.00)	(0.01)	(0.00)
Group	0.02	0.19	0.02**	-0.05**	0.02	0.05**
	(0.87)	(0.24)	(0.03)	(0.01)	(0.32)	(0.03)
Mutual	-0.02	-0.06	-0.00	0.01	0.03*	0.03
	(0.74)	(0.65)	(0.57)	(0.54)	(0.05)	(0.22)
ROA	-0.06	-4.02*	-0.34**	0.06	-0.32*	-0.27
	(0.95)	(0.07)	(0.04)	(0.67)	(0.07)	(0.16)
Constant	2.40***	-0.67	0.15***	-0.10	0.42***	-0.12
	(0.00)	(0.34)	(0.00)	(0.30)	(0.00)	(0.36)
Observations	1,344	1,344	1,344	1,344	1,344	1,344
R-squared	0.279	0.303	0.200	0.122	0.273	0.525
Number of firms	125	125	125	125	125	125
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	No	No	No	No	No	No

Table 4. Diversity and Risk taking OLS regressions with Firm Fixed Effects

This table presents the OLS regressions of risk on board gender (ethnic) diversity for the total sample controlling for firm fixed effects. The risk measures are as defined in table 1. Over 5 year overlapping windows starting with 1999 until 2017, we calculate the average of insurance risk, asset risk and leverage risk and standard deviation of underwriting risk, solvency risk and total risk. In order to have the independent variables measures commensurate with the time frame of the risk measures, we also calculate the independent variables as averages over the 5 year overlapping windows. P-values (in parentheses) are corrected for clustering at the insurer level and heteroskedasticity. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

	Solvency Risk	Insurance Risk	Total Risk	Asset Risk	Underwriting Risk	Leverage Risk
Female Proportion	0.29	0.74	0.04*	-0.21**	-0.00	0.03
	(0.23)	(0.10)	(0.07)	(0.02)	(0.98)	(0.41)
DivHHI	0.03	-0.29	-0.01	0.04	0.04	0.01
	(0.75)	(0.39)	(0.65)	(0.53)	(0.34)	(0.65)
Total Directors	-0.01	-0.02	-0.00	0.01	-0.00	0.00
	(0.25)	(0.68)	(0.54)	(0.12)	(0.14)	(0.72)
Insider Ratio	-0.49	0.18	-0.04*	-0.05	0.03	0.05
	(0.21)	(0.66)	(0.09)	(0.61)	(0.50)	(0.39)
Chairduality	0.30	0.03	-0.02	0.07*	0.02	-0.02
	(0.27)	(0.86)	(0.26)	(0.07)	(0.56)	(0.68)
GeoHHI	-0.17	-0.42	0.04	-0.01	0.00	-0.01
	(0.38)	(0.26)	(0.11)	(0.91)	(1.00)	(0.87)
LobHHI	-0.05	0.70	0.00	-0.01	0.02	0.04
	(0.70)	(0.19)	(0.85)	(0.94)	(0.79)	(0.63)
Longtail	-1.05	-1.02**	-0.04	-0.01	0.21**	0.07
	(0.15)	(0.03)	(0.11)	(0.90)	(0.01)	(0.35)
Ln(TA)	-0.11*	0.24*	-0.01	0.01	-0.04	0.05**
	(0.07)	(0.06)	(0.13)	(0.60)	(0.26)	(0.01)
Reinsurance	-0.24*	-1.10***	-0.01	-0.03	0.09*	0.16***
	(0.08)	(0.00)	(0.26)	(0.53)	(0.10)	(0.00)
Group	0.04	0.14	0.03	-0.03	0.00	0.03
	(0.77)	(0.67)	(0.34)	(0.72)	(0.96)	(0.36)
Mutual	-0.08	0.25	0.00	-0.04***	0.04*	0.06**
	(0.28)	(0.16)	(0.87)	(0.01)	(0.08)	(0.02)
ROA	0.04	-4.69*	-0.30*	0.11	-0.31	-0.27
	(0.97)	(0.09)	(0.08)	(0.52)	(0.10)	(0.20)
Constant	2.30**	-0.21	0.18*	-0.00	0.38	0.01
	(0.02)	(0.90)	(0.07)	(1.00)	(0.28)	(0.98)
Observations	1,344	1,344	1,344	1,344	1,344	1,344
R-squared	0.10	0.182	0.25	0.005	0.11	0.387
Number of firms	125	125	125	125	125	125
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 5. 2SLS Regression Total Sample

This table presents the 2SLS regressions of risk on board gender (ethnic) diversity for the total sample with firm and year fixed effects. Proportion of females on boards of peer companies and the distance form the firm's headquarters to the major airport are used as an IV for female proportion. And we use the diversity Herfindahl Index in peer firms and the distance form the firm's headquarters to the major airport as IV for ethnic diversity. P-values (in parentheses) are corrected for clustering at the insurer level and heteroskedasticity. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

	Female Proportion	DivHHI	Solvency Risk	Insurance Risk	Total Risk	Asset Risk	Underwriting Risk	Leverage Risk
Female Proportion			0.27	0.69*	0.04*	-0.20**	0.00	0.03
			(0.25)	(0.10)	(0.06)	(0.02)	(0.99)	(0.40)
DivHHI			0.04	-0.30	-0.01	0.05	0.04	0.02
			(0.71)	(0.37)	(0.63)	(0.49)	(0.34)	(0.59)
Total Directors	0.00	0.00	-0.01	-0.02	-0.00	0.01	-0.00	0.00
	(0.59)	(0.49)	(0.25)	(0.68)	(0.53)	(0.11)	(0.13)	(0.71)
Insider Ratio	0.00	-0.00	-0.49	0.18	-0.04*	-0.05	0.03	0.05
	(0.26)	(0.29)	(0.20)	(0.66)	(0.08)	(0.61)	(0.49)	(0.38)
Chairduality	0.00	0.00	0.30	0.03	-0.02	0.07*	0.02	-0.02
	(0.14)	(0.20)	(0.26)	(0.88)	(0.25)	(0.06)	(0.55)	(0.67)
GeoHHI	-0.00	0.00	-0.17	-0.41	0.04	-0.01	-0.00	-0.01
	(0.89)	(0.31)	(0.38)	(0.26)	(0.10)	(0.90)	(1.00)	(0.87)
LobHHI	-0.00	0.00	-0.05	0.70	0.00	-0.00	0.02	0.04
	(0.59)	(0.99)	(0.69)	(0.18)	(0.86)	(0.95)	(0.79)	(0.62)
Longtail	0.01*	0.00	-1.04	-1.01**	-0.04*	-0.01	0.21**	0.07
	(0.07)	(0.27)	(0.14)	(0.03)	(0.10)	(0.88)	(0.01)	(0.34)
Ln(TA)	-0.00	-0.00*	-0.11*	0.24*	-0.01	0.01	-0.04	0.05***
	(0.30)	(0.08)	(0.06)	(0.05)	(0.12)	(0.59)	(0.25)	(0.01)
Reinsurance	0.00	-0.01**	-0.24*	-1.10***	-0.01	-0.03	0.09*	0.16***
	(0.70)	(0.02)	(0.08)	(0.00)	(0.25)	(0.53)	(0.09)	(0.00)
Group	-0.00	-0.00	0.05	0.14	0.03	-0.03	0.00	0.03
	(0.42)	(0.30)	(0.76)	(0.66)	(0.33)	(0.71)	(0.97)	(0.34)
Mutual	0.00	0.00**	-0.08	0.25	0.00	-0.04***	0.04*	0.06**
	(0.76)	(0.04)	(0.27)	(0.15)	(0.86)	(0.00)	(0.07)	(0.02)
ROA	0.00	0.00	0.04	-4.69*	-0.30*	0.11	-0.31*	-0.27
	(0.79)	(0.93)	(0.97)	(0.08)	(0.08)	(0.51)	(0.10)	(0.19)
Proportion of females in peer firms	-113.45***	-0.42						
	(0.00)	(0.37)						
Distance to airport	0.00***	-0.00**						
	(0.00)	(0.04)						
DivHHI in peer firms	0.09	-113.17***						
	(0.70)	(0.00)						
Observations	1,339	1,339	1,339	1,339	1,339	1,339	1,339	1,339
Number of firms	120	120	120	120	120	120	120	120
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 6. Effect of Board Diversity on Risk for Mutual and Stock Firms

This table presents the 2SLS regressions of risk on board gender (ethnic) diversity for mutual firms and stock firms. Proportion of females on boards of peer companies and the distance form the firm's headquarters to the major airport are used as an IV for female proportion. And we use the diversity Herfindahl Index in peer firms and the distance form the firm's headquarters to the major airport as IV for ethnic diversity. P-values (in parentheses) are corrected for clustering at the insurer level and heteroskedasticity. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: 2nd Stage IV estimates for sample of mutual firms						
	Solvency Risk	Insurance Risk	Total Risk	Asset Risk	Underwriting Risk	Leverage Risk
Female Proportion	-0.17	-0.15	0.07**	0.10	0.18*	0.11
	(0.60)	(0.70)	(0.04)	(0.40)	(0.09)	(0.35)
DivHHI	-0.23	0.41	0.05**	-0.10	0.04	0.20**
	(0.50)	(0.22)	(0.03)	(0.38)	(0.50)	(0.05)
Observations	277	277	277	277	277	277
Number of firms	27	27	27	27	27	27
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: 2nd stage IV estimates for sample of stock firms						
	Solvency Risk	Insurance Risk	Total Risk	Asset Risk	Underwriting Risk	Leverage Risk
Female Proportion	0.50*	0.93**	0.03	-0.28***	-0.04	0.04
	(0.06)	(0.05)	(0.14)	(0.00)	(0.52)	(0.30)
DivHHI	0.04	-0.20	-0.00	0.06	0.05	-0.01
	(0.76)	(0.58)	(0.72)	(0.40)	(0.30)	(0.87)
Observations	1,035	1,035	1,035	1,035	1,035	1,035
Number of firms	96	96	96	96	96	96
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 7. Effect of Board Diversity on Risk by Complexity of Firms' Operations

This table presents the 2SLS regressions of risk on board gender (ethnic) diversity for firms with predominantly commercial lines written (more operationally complex firms) and firms with predominantly personal lines written (less operationally complex firms). Proportion of females on boards of peer companies and the distance form the firm's headquarters to the major airport are used as an IV for female proportion. And we use the diversity Herfindahl Index in peer firms and the distance form the firm's headquarters to the major airport as IV for ethnic diversity. P-values (in parentheses) are corrected for clustering at the insurer level and heteroskedasticity. *, **, and *** denote statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: 2nd stage IV estimates for firms with predominantly commercial lines written						
	Solvency Risk	Insurance Risk	Total Risk	Asset Risk	Underwriting Risk	Leverage Risk
Female Proportion	0.56	1.34***	0.06**	-0.42	0.08	0.15
	(0.33)	(0.01)	(0.03)	(0.12)	(0.55)	(0.13)
DivHHI	0.03	0.03	0.02	0.07	0.01	0.00
	(0.91)	(0.94)	(0.35)	(0.40)	(0.89)	(0.97)
Observations	343	343	343	343	343	343
Number of firms	35	35	35	35	35	35
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Panel B: 2nd stage IV estimates for firms with predominantly personal lines written						
	Solvency Risk	Insurance Risk	Total Risk	Asset Risk	Underwriting Risk	Leverage Risk
Female Proportion	0.01	1.45**	-0.02	-0.25**	-0.01	0.01
	(0.88)	(0.01)	(0.40)	(0.05)	(0.96)	(0.83)
DivHHI	-0.15	-0.74	-0.00	0.14	0.06	0.06
	(0.19)	(0.27)	(0.86)	(0.12)	(0.36)	(0.11)
Observations	602	602	602	602	602	602
Number of firms	62	62	62	62	62	62
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

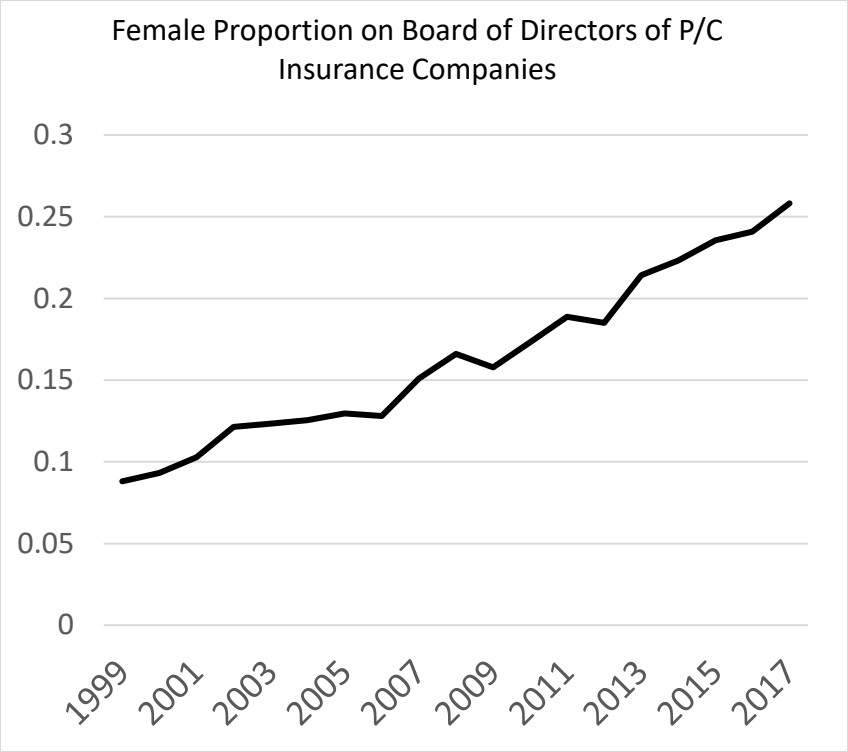

Figure 1. Variation of the proportion of females on the board of directors of P/C Insurance Companies in Canada from 1999 until 2017

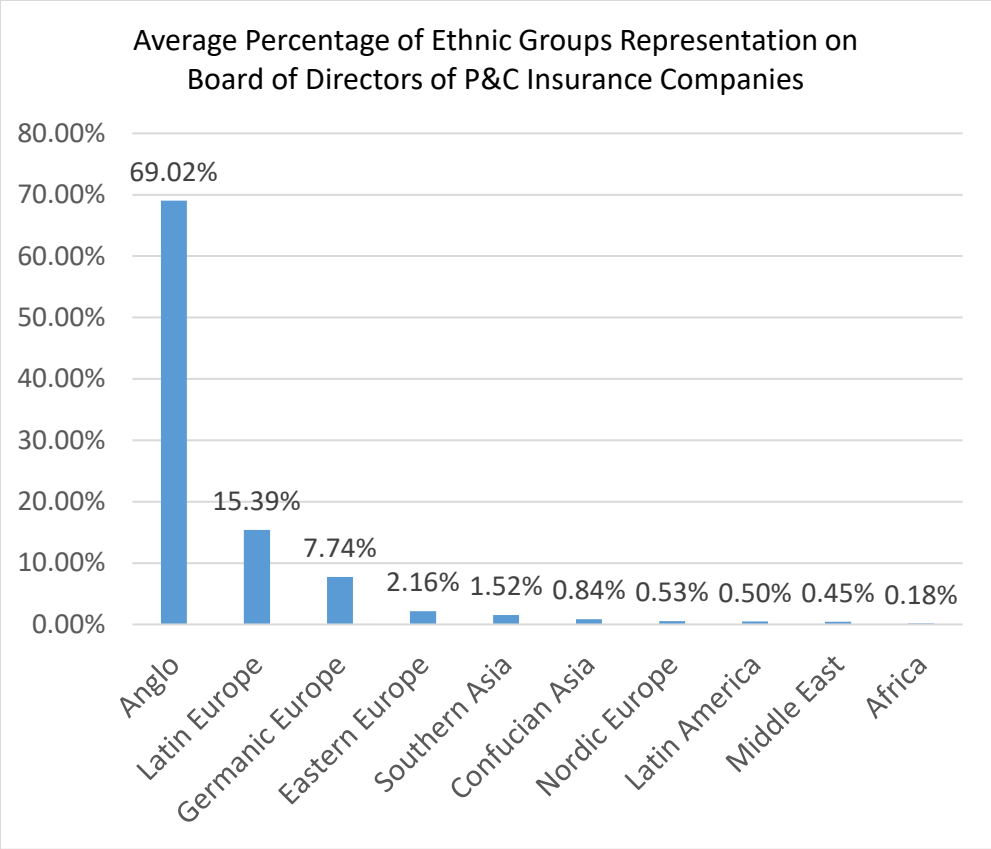

Figure 2. Variation of ethnic group representations on the board of directors of Canadian P/C insurance companies.