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## Article

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## Article

# Gender Diversity in the Boardroom and Corporate Cash Holdings: The Moderating Effect of Investor Protection

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**Abstract:** This paper investigates whether gender diversity in the boardroom is associated with corporate cash holdings and whether investor protection moderates the effect of corporate board gender diversity on corporate cash holdings. Using 20,750 firm-year observations from 33 countries, our analyses show that firms with high levels of corporate board gender diversity exhibit low corporate cash holdings. Furthermore, firms in countries with high levels of investor protection have low corporate cash holdings. Moreover, the negative association between board gender diversity and corporate cash holdings is weaker in high-level investor protection countries than in low-level investor protection countries. Our results are robust to various specification tests, such as the endogeneity issue, weighted least-squares regression, the global economic crisis effect, alternative measures for corporate cash holdings, and various country-level institutional features. Taken together, the findings reveal that board gender diversity and investor protection have significant influences on corporate cash holdings. These findings have significant implications for politicians, governments, and regulators in devising policies relating to the United Nations Sustainable Development Goal (SDG Number 5) on achieving gender equality and women empowerment.

**Keywords:** board gender diversity; corporate cash holdings; investor protection**JEL Classification:** G38; G18; M41; M43; M44

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## 1. Introduction

Corporate cash holdings are critical decisions for businesses. Companies keep cash reserves to capitalize on opportunities to invest in profitable projects and earn positive returns for shareholders. Current literature shows that companies have different motives to reserve cash, including transaction motives, precautionary motives, agency motives, tax motives, and predation motives (Tran 2020). Prior research has shown that cash holdings are associated with overinvestments in unprofitable projects and higher agency costs (Jensen 1986; Opler et al. 1999). Our research is motivated by the fact that, despite being a critical corporate policy in determining potential returns to investors (Chen et al. 2015; Harford et al. 2014; Pinkowitz et al. 2006), corporate cash-holding decisions can be influenced by behavioral biases and managerial characteristics (Huang and Kisgen 2013). The existing literature focuses on the importance of corporate boards in reducing the agency problem of corporate cash holding choices (Harford et al. 2008; Ozkan and Ozkan 2004; Tong 2010). In this study, we look at the link between board gender diversity and corporate cash holdings in this study (CCHs).

In 2019, a staggering 46% of new directors added to the S&P 500 companies' boards were women (Bloomberg 2019). As a result, women on corporate boards have received increased attention from the research community and academia, particularly on the effect

on companies' performances, particularly the return on investments, productivity, and share value (Chapple and Humphrey 2014; Joecks et al. 2013; Post and Byron 2015), as well as differences between men and women directors (Peterson and Philpot 2007; Singh et al. 2008). Previous studies concerning gender diversity conclude that female executives are less tolerant of managers' opportunistic behaviors (Peni and Vähämaa 2010). Further, they are less likely to pursue risky corporate policies (Faccio et al. 2016; Huang and Kisgen 2013) and are associated with lower agency costs (Jurkus et al. 2011). Xu et al. (2019) have examined the role of the CFO's gender on corporate cash holdings and its underlying mechanism. This is different from the studies conducted by Zeng and Wang (2015) and Adhikari (2018), which analyze the impact of the gender of CEOs and the proportion of female executives on cash holdings, respectively. In the empirical research, however, little is known about how board gender diversity affects managers' opportunistic behaviors in corporate cash holding decisions. This research gap is addressed in our study.

Studies have shown that companies in countries with weak investor protection measures tend to hold more cash reserves than those in countries with strong investor protection (Dittmar et al. 2003). Chang and Noorbakhsh (2006, 2009) concluded that firms tend to have a smaller proportion of cash and cash equivalents in total assets in countries with more substantial shareholder rights or in those countries that belong to the common law system. Additionally, Seifert and Gonenc (2018) found that stronger country-level governance decreases cash holdings. However, unlike these studies, Iskandar-Datta and Jia (2014) and Tran (2020) found a positive impact of shareholder protection on corporate cash reserves. In the context of the agency problem, Kuan et al. (2012) posited that investor protection and corporate governance aim to decrease cash levels. However, studies on the relationship between women's presence on the board of directors, investor protection, and corporate cash holdings remain scarce. Based on the above-mentioned previous studies, we postulate that investor protection measures moderate the relationship between board gender diversity and corporate cash holdings.

We examine the importance of investor protection and board gender diversity in influencing CCHs in international settings using a large sample of 20,750 firm-year observations from 33 countries during the 2009–2018 period. In this study, corporate cash holding is defined as the proportion of cash and equivalents to total assets. We measure board gender diversity based on the proportion of women on the board and the Blau (1977) index of heterogeneity. For investor protection, we use annual country-level data of the strength of the investor protection index provided by the World Economic Forum and the anti-self-dealing index reported in Djankov et al. (2008). From the regression estimates, we observe a low level of CCHs when the firms have high levels of women representation on boards and are domiciled in high-level investor protection countries. Additionally, we find that the negative effect of gender-diverse boards on CCHs is less pronounced in countries with relatively lower investor protection. Our results remain consistent under a battery of sensitivity tests, including two-stage least-squares regression to address potential endogeneity issues.

Our study contributes to the prevalent literature in three ways. First, to the best of our knowledge, this study is the first to examine the effect of gender-diverse boards on corporate cash holdings. Although prior studies have explored the role of gender diversity on various business decisions, the relationship between board gender diversity and corporate cash holdings is mainly unexplored. Our paper is closely related to, but distinguishable from, those of Xu et al. (2019) and Adhikari (2018) as it analyses the impact of gender-diverse boards on corporate cash holdings. Second, previous studies on the effects of investor protection are inconclusive. While some studies have found that strong corporate governance measures reduce cash holdings, others suggest that managers in companies with weak investor protection measures tend to use cash holdings for unprofitable projects. Our study finds evidence that countries with strong investor protections exhibit low cash holdings, giving significant practical implications for regulators in different countries regarding the need to monitor and enforce protectionist measures that prioritize investor

rights. Third, our international data sample offers a rich insight into the relationships among gender-diverse boards, corporate cash holdings, and investor protection measures across 33 different countries. Compared to board gender diversity literature that often focuses only on a single country, our research contributes to understanding institutional factors' roles in moderating the board's decision to decide on the cash level. Finally, our findings have important implications for legislators, governments, and regulators developing policies related to the UN Sustainable Development Goal (SDG) on gender equality and women's empowerment.

The remainder of the paper is structured as follows. In the following section, we review the related literature and develop our hypotheses. The next section describes the research design, including key variables, the regression model, and sample selection. The fourth section presents the main results and robustness tests. We conclude in the final section.

## 2. Literature Review and Hypotheses Development

While there is existing literature on women directors, most research pertains to the number of women on corporate boards and how the representation of females has developed over the years (Brancatto and Patterson 1999; Burke and Mattis 2000; Conyon and Mallin 1997; Daily et al. 1999). There have also been exploratory studies on the behavioral differences between male and female executives (Shaukat et al. 2016; Cabeza-García et al. 2018; Fernandez et al. 2019; Faccio et al. 2016; Martín-Ugedo et al. 2018).

Further, there have been numerous studies, such as those of Carter et al. (2003), Campbell and Minguez-Vera (2008), and Nguyen et al. (2015), which have found positive relationships between gender diversity and firm performance. Terjesen et al. (2009) concluded that gender diversity on corporate boards leads to efficient corporate governance. This is also suggested by the studies conducted by Adams and Ferreira (2009), Gul et al. (2011) and Nguyen et al. (2015), which conclude that gender diversity could act as an additional governance mechanism. On the other hand, Carter et al. (2010), Dale-Olsen et al. (2013), and Rose (2007) find insignificant relationships between gender diversity and firm performance.

### 2.1. Board Gender Diversity and Corporate Cash Holdings

Board gender diversity continues to attract considerable research attention. In the recent past, many countries worldwide have enacted the gender quota legislation to have a mandatory appointment of female directors to strengthen the corporate governance in the boardroom. The extant literature shows that greater board gender diversity is associated with a range of benefits, including higher meeting attendance and better monitoring, high-quality decision-making through diverse experience, and diverse and innovative perspectives to resolve complex issues (Adams and Ferreira 2009; Gul et al. 2011). Extant literature that unfolds the benefits of board gender diversity suggests that companies with more female members on their boards have higher profitability and better stock-price performances (Credit Suisse 2012; Catalyst 2014). More importantly, board diversity also emphasizes female directors' roles in the firms as being less conformist and more vocal than their male counterparts (Carter et al. 2003).

Further, female directors enhance the legitimacy of firm practices (e.g., Hillman et al. 2007), and they can contribute diverse perspectives and experiences to the board, which helps firms in resolving complex issues by providing impartial advice through high-quality deliberations (Huang and Kisgen 2013; Miller and del Carmen Triana 2009). Furthermore, board gender diversity encourages more competitive discussion, improves board effectiveness with unique working styles, avoids groupthink, and would be a substitute for corporate governance (Gul et al. 2011; Chen et al. 2016). The main drive for all these studies is to establish the importance of board gender diversity to improve the board's effectiveness and decision-making, strengthen corporate governance, and safeguard all stakeholders' interests.

In the context of corporate cash holding, holding excess corporate cash reserves has potential benefits and adverse effects. On one side, there are various reasons and motives for managers to hold cash reserves (Chen et al. 2015). The majority of the previous studies argue that precautionary motives (Opler et al. 1999), lower transaction costs, and safeguarding against firms' future funding requirements and underinvestment risks are the main reasons for holding cash reserves (Han and Qiu 2007; Bates et al. 2009; Du and Beuselinck 2017). Hence, female directors may prefer holding appropriate cash reserves to safeguard financial flexibility in the company and avoid external financing transaction costs. Likewise, Adhikari (2018) concludes that companies having more female executives hold more cash as they are more risk-averse as compared to their men counterparts. The study argues that companies led by more risk-averse managers hold more cash due to precautionary motives, whereas female directors give more importance to having higher cash reserves to help the company be sustainable in case of difficult and unforeseen circumstances. Additionally, the strategy helps in avoiding problems in financing capital investment projects in case of financial troubles (Bates et al. 2009; Han and Qiu 2007). Empirical studies on board gender diversity concur the role of female executives in holding corporate cash reserves (Adhikari 2018; Zeng and Wang 2015) in terms of the importance of having internal cash resources at the time of crisis (Chang et al. 2017; Nason and Patel 2016) and the necessity of efficacious corporate governance to help to manage cash resources (Schauten et al. 2013).

However, on the other hand, excess corporate cash can reduce firm value because agency issues may arise as excess cash can be easily misappropriated by managers (Bates et al. 2009; Boubaker et al. 2015). These studies suggest trade-offs associated with corporate cash holdings, which are mostly influenced by the managers' risk aversion behaviors; hence, it is critical to examine the implications of gender differences on the corporate cash-holding policy since numerous studies have explored behavioral differences between male and female executives. Previous studies suggest that female directors are more cautious, as compared to their male counterparts, in making corporate decisions; for example, they are more focused on environmental disclosure and corporate social responsibility (Shaukat et al. 2016; Cabeza-García et al. 2018; Fernandez et al. 2019), make less risky financing and investment choices (Faccio et al. 2016; Martín-Ugedo et al. 2018), make higher dividend payouts (Chen et al. 2017), have higher stock price informativeness (Gul et al. 2011), have better firm performance (Terjesen et al. 2016), and perform monitoring functions more diligently (Adams and Ferreira 2009). Even in public companies, similar observations have been noticed by many other authors, where female executives usually follow relatively less risky corporate policies compared to men (Borghans et al. 2009; Croson and Gneezy 2009; Faccio et al. 2016; Huang and Kisgen 2013; Zeng and Wang 2015). In another study using the data of US corporations, it was found that male executives undertake far more acquisitions and issue debt more often than female executives (Huang and Kisgen 2013).

Considering all the studies mentioned above, it seems relevant to investigate the relationship between board gender diversity and corporate cash holdings, especially when definite gender differences in economic behavior (Croson and Gneezy 2009) have already been established in the previous studies, particularly the female choice of having more strict monitoring in governance (Adams and Ferreira 2009) and being more risk-aversion (Bernile et al. 2018; Faccio et al. 2016). Moreover, while the extant literature focuses on increased gender diversity that improves the effectiveness and decision-making of the board (Yermack 1996; Adams and Ferreira 2009) and highlights the traits and behavior of female directors, being more risk-averse and independent (Kang et al. 2007), the question remains, is there any relationship between board diversity and the corporate cash holding decision?

Therefore, we propose to test the following hypothesis:

**Hypothesis 1 (H1).** *There is a relationship between board gender diversity and corporate cash holdings.*



## 2.2. Investor Protection, Board Gender Diversity and Corporate Cash Holdings

The impact of investor protection on board diversity and corporate cash holdings is an open empirical issue. In today's real world, which is full of uncertainties, corporate cash holdings take on a strategic role. Additionally, ample empirical evidence shows that investor rights further influence corporate cash holdings (Dittmar et al. 2003; Kalcheva and Lins 2007; Pinkowitz et al. 2006; Iskandar-Datta and Jia 2014; Yung and Nafar 2014). Previous literature assumes agency costs exist due to the absence of country-level factors ensuring investor protection (Dittmar et al. 2003; Yung and Nafar 2014). The extant literature shows that investors' legal protection is an effective channel to alleviate agency problems in a corporate dividend policy (Brockman and Unlu 2009; La Porta et al. 2000; Shao et al. 2013). Despite managers' preferences for higher levels of corporate cash holdings, the extant literature shows that when investors are protected, they can use their rights to pressure managers to use the excess cash (La Porta et al. 1998; La Porta et al. 2000).

Harford (1999, p. 1996) concludes that cash reserves "remove an important monitoring component from the investment process", which often impairs shareholder value. Yun (2008) posits that firms prefer non-monitored cash instead of bank credit when they have weaker corporate governance. Previous research studies have found ways to monitor firms so that the misappropriation of corporate cash holdings can be avoided. Low monitoring of excessive cash holdings results in personal benefits for managers (Jensen 1986). Managers generally prefer full control of excess corporate cash holdings instead of paying dividends (Opler et al. 1999). Non-payment of dividends to investors or opting for costly external financing increases corporate cash holdings, which reduces the firms' value, destroys investors' wealth, and leads to agency cost and conflict (Harford 1999). Therefore, to remove the agency conflict, investors may enforce strong monitoring mechanisms to control the managers' discretionary powers related to corporate cash holdings.

A few studies (Dittmar et al. 2003; Ferreira and Vilela 2004) suggest an adverse effect of investor protection on corporate cash holdings. Seifert and Gonenc (2018) concluded that strong country-level and firm-level governance reduces cash holdings. However, there are a few researchers who have contradicted the results, as mentioned earlier. For example, Harford et al. (2008) found that US companies with better investor protection hold more cash, and they also concluded that large amounts of corporate cash holdings are too visible to trigger shareholder action to pay more dividends. Therefore, managers of companies with low levels of investor protection may prefer overinvestment in unprofitable projects. Excess cash is not visible to investors as the projects' investment decision cannot be questioned immediately by the investors. It means that investor protection prevents overinvestment, inducing firms to keep high corporate cash holdings. Similarly, Iskandar-Datta and Jia (2014) found a positive relationship between investor protection and corporate cash holdings, suggesting that firms in countries with low levels of investor protection tend to overinvest, which leads to lower corporate cash holdings.

While extant literature highlights the role of investor protection in affecting corporate cash holding decisions (Dittmar et al. 2003; Pinkowitz et al. 2006; Harford et al. 2008; Chen et al. 2015; Iskandar-Datta and Jia 2014), to the best of our knowledge, no studies to date have investigated how investor protection can moderate the effect of board gender diversity on corporate cash holding decisions. We develop our hypotheses based on the literature discussed in the previous subsections. Based on prior studies of Dittmar et al. (2003), Elyasiani and Zhang (2015), Jiang and Lie (2016), and Ozkan and Ozkan (2004), we expect that if excess cash holdings are the result of low levels of investor protection (at the firm or country level), then mechanisms that increase investor protection should lead to lower cash holdings. Thus, following Kalcheva and Lins (2007), we expect the managerial behavior of holding excess cash to be prevalent when investor protection is low, and when investor protection is high, investors can enforce strong monitoring mechanisms to control the managers' discretionary powers related to corporate cash holdings (La Porta et al. 2000). Thus, in these environments, managers may find it difficult to pursue their

personal preferences of having more corporate cash holdings. This leads to the following hypothesis:

**Hypothesis 2 (H2).** *Investor protection moderates the relationship between board gender diversity and cash holdings.*

### 3. Research Design

#### 3.1. Measurement for Variables

Our dependent variable is corporate cash holdings, measured by the proportion of cash and equivalents to total assets (*CCH1*), which is extensively used in the finance literature (e.g., Acharya et al. 2013; Han and Qiu 2007; Palazzo 2012). For the robustness analysis, we use *CCH2*, which is equal to the total cash and equivalents divided by the total assets minus cash and equivalents (Phan et al. 2019).

Following prior studies (e.g., Alves et al. 2015; Kamarudin et al. 2021; Smith et al. 2006), we measure board gender diversity based on the proportion of women on the board of directors by dividing the number of female board members by the total number of directors (*DIVBOD*). Second, for the robustness analysis, we follow Campbell and Mínguez-Vera (2008) and Miller and del Carmen Triana (2009) by calculating *BLAU*, which is based on the Blau (1977) index of heterogeneity. *BLAU* is defined as  $1 - \sum_{i=1}^k p_i^2$ , where  $p_i^2$  corresponds to the proportion of group females and males in *i*th category and *k* denotes the number of categories for an attribute of interest. Hence, if *BLAU* equals its minimum value (i.e., zero), all members of the group are classified in the same category, and there is no variety. In contrast, the higher the *BLAU* is, the more dispersed the group members are over the categories.

Our primary measure for investor protection is based on annual country-level data of the strength of the investor protection index (*INVPRO*) provided by the World Economic Forum. Following Kamarudin et al. (2020a), we create a dummy variable for a high-level investor protection country (*DINVPRO*), in which we assign the value 1 if the *INVPRO* value is higher than the median, and 0 otherwise. For the alternative measure, we create a dummy variable *DASDI* that takes the value of 1 if the anti-self-dealing index reported in Djankov et al. (2008) is higher than the median, and 0 otherwise.

#### 3.2. Regression Model

We regress Equation (1) to investigate the effect of board gender diversity on the CCH and the moderating effect of investor protection on board gender diversity and the CCH relationship.

$$\begin{aligned} CCH_{it} = & \beta_0 + \beta_1 DIVERSITY_{it} + \beta_2 PROTECTION + \beta_3 PROTECTION * DIVERSITY_{it} \\ & + \beta_4 SIZE_{it} + \beta_5 LEV_{it} + \beta_6 GROWTH_{it} + \beta_7 LOSS_{it} + \beta_8 MTB_{it} + \beta_9 QUICK_{it} \\ & + \beta_{10} RETEQ_{it} + \beta_{11} LIT_{it} + \beta_{12} AGE_{it} + \beta_{13} FEMLAB_{it} \\ & + \theta_{1-n} Fixed\_Effects_t + \varepsilon_{it} \end{aligned} \quad (1)$$

where *i* and *t* denote firm *i* at the end of year *t*, *CCH* is a variable for corporate cash holdings, either *CCH1* or *CCH2*; *CCH1* is the proportion of cash and equivalents to total assets; *CCH2* is the total cash and equivalents divided by the total assets minus cash and equivalents; *DIVERSITY* is a variable for board gender diversity, either *DIVBOD* or *BLAU* or *FEMALE*; *DIVBOD* is the proportion of female directors over the total number of directors; *BLAU* is the measurement corresponding to the proportion of group females and males using the formula adopted from the Blau (1977) index of heterogeneity, *FEMALE* is a dummy variable that takes the value 1 if the board has at least one female director, otherwise 0; *PROTECTION* is a variable for investor protection, either *DINVPRO* or *DASDI*; *DINVPRO* is a dummy variable for investor protection; *DASDI* is a dummy variable that takes the value 1 if the anti-self-dealing index (*ASDI*) by Djankov et al. (2008) is greater than the median, otherwise 0; *SIZE* is the natural logarithm of firm's total assets; *LEV* is the total liabilities over the total assets; *GROWTH* is firm-specific growth, measured as the changes

in sales compared to the previous year; *LOSS* is a dummy variable equal to 1 if the EPS is negative, and 0 otherwise; *MTB* is the ratio of the market-to-book value; *QUICK* is the ratio of the current assets minus the inventory divided by the total current liabilities; *RETEQ* is the ratio of the retained earnings to total equity; *LIT* is a dummy variable of high-litigation industries, classified as 1 if the SIC codes are between 2833–2836, 3570–3577, 3600–3674, 5200–5961, and 7370–7370, otherwise 0 (Ashbaugh and LaFond 2003); *AGE* is the natural log of the number of years since incorporation; *FEMLAB* is the ratio of women in the labor force to men; and *Fixed\_Effects* are the vectors for industry and year fixed effects.

We have included a range of control variables commonly used in the literature (e.g., Bates et al. 2009; Dittmar et al. 2003; Phan et al. 2019; Opler et al. 1999) to explain corporate cash holdings, including firm size, financial leverage, growth opportunities, loss firms, accumulated retained earnings, litigation risk, and firm age. We have also included a country-level variable, *FEMLAB*, to control the country variable effect on board gender diversity and the CCH relationship. The model further includes fixed effects to control for unobserved time and industry-wide common factors (Wan Ismail et al. 2021).

### 3.3. Sample Selection

Our sample includes non-financial firms around the world covering the period of 2009–2018. The data are obtained from various sources. Firm-level data are extracted from Thomson Reuters Fundamentals, while the country-level data are extracted from the World Economic Forum (WEF) annual reports. We exclude (i) financial institutions (SIC code between 6000 and 6999), similar to the approach used by prior research (e.g., Francis and Wang 2008; Arif and Kamarudin 2019), and (ii) utility companies (SIC code between 4900 and 4999) because they are highly regulated (Wan Ismail et al. 2015). To mitigate the influence of outliers, we winsorize the observations that fall in the top and bottom one percent of all continuous variables. Our final sample consists of 20,750 firm-year observations from 33 countries. The definition and description for each variable are reported in the Appendix A.

## 4. Discussion of Results

### 4.1. Descriptive Statistics

Panel A of Table 1 presents the descriptive statistics for the firm-level variables, while Panel B summarizes the descriptive statistics for the country-level variables. Panel A shows that the averages of *CCH1* and *CCH2* are 0.102 and 0.136, respectively. The mean value for *DIVBOD* is 0.127, indicating the low presence of women directors on boards, specifically around 12.7 percent. For *BLAU*, the mean value is 0.193, with values ranging from 0.000 to 0.494, indicating the corporate board's low diversity. On average, 66.4 percent of the firms have at least one female director and 11.3 percent of female executive directors on their boards.

For the control variables, the mean for *SIZE* is 22.114, with a range between 18.024 and 26.913. The variables *LEV*, *GROWTH*, *MTB*, *QUICK*, and *RETEQ* have mean values of 0.246, 0.090, 3.114, 1.740, and 0.403, respectively. The average values for the dummy variables *LOSS* and *LIT* are 0.142 and 0.202, respectively, indicating that loss-firms constitute 14.2 percent of the sample while 20.2 percent of the sample is from highly litigious industries. Other variables, *AGE*, *ROA*, and *CURR*, have mean values of 38.597, 0.063, and 2.151, respectively. The *BODSIZE* has a mean value of 9.783, with values ranging from 4 to 21 directors. The results exhibit that the corporate boards are comprised of 57.4 percent independent directors and 69.9 percent non-executive directors.

Panel B of Table 1 presents the descriptive statistics for the country-level variables. The statistics show that the US is the most heavily represented in the sample ( $n = 7715$ ), followed by firms in Japan ( $n = 3383$ ). Meanwhile, Austria ( $n = 34$ ) and Finland ( $n = 32$ ) have the lowest number of observations. For investor protection (*INVPRO*), Canada, Malaysia, and Hong Kong rank among the countries with the highest scores. Switzerland and the Philippines are among the countries with the lowest score of investor protection (*INVPRO*).



The statistics for other country-level variables, namely, *FEMLABOR* and *GOVDEBT*, report mean values of 0.811 and 1.004, respectively.

**Table 1.** Descriptive statistics.

Panel A: Firm Level ( <i>n</i> = 20,750)							
Variable/Stat	Mean	Std. Dev.	p25	Median	p75	Max	Min
<i>CCH1</i>	0.102	0.116	0.026	0.066	0.137	0.999	−0.024
<i>CCH2</i>	0.136	0.203	0.026	0.071	0.159	1.370	0.000
<i>DIVBOD</i>	0.127	0.119	0.000	0.111	0.200	0.750	0.000
<i>BLAU</i>	0.193	0.160	0.000	0.198	0.32	0.494	0.000
<i>FEMALE</i>	0.664	0.472	0.000	1.000	1.000	1.000	0.000
<i>DIVEXEC</i>	0.113	0.129	0.000	0.091	0.200	1.000	0.000
<i>SIZE</i>	22.114	1.597	21.127	22.15	23.143	26.913	18.024
<i>LEV</i>	0.246	0.185	0.100	0.230	0.359	0.825	0.000
<i>GROWTH</i>	0.090	0.332	−0.048	0.046	0.154	2.168	−0.660
<i>LOSS</i>	0.142	0.349	0.000	0.000	0.000	1.000	0.000
<i>MTB</i>	3.114	4.150	1.111	1.952	3.626	25.381	−6.249
<i>QUICK</i>	1.740	1.998	0.800	1.181	1.862	14.936	0.141
<i>RETEQ</i>	0.403	1.434	0.246	0.618	0.876	4.502	−8.312
<i>LIT</i>	0.202	0.401	0.000	0.000	0.000	1.000	0.000
<i>AGE</i>	38.597	30.219	15.000	28.000	59.000	124.000	1.000
<i>ROA</i>	0.063	0.115	0.025	0.062	0.112	0.383	−0.480
<i>CURR</i>	2.151	2.075	1.101	1.577	2.406	15.298	0.189
<i>BDSIZE</i>	9.783	3.064	8.000	9.000	12.000	21.000	4.000
<i>INDEP</i>	0.574	0.270	0.364	0.625	0.818	0.941	0.000
<i>OUTDIR</i>	0.699	0.245	0.615	0.778	0.875	1.000	0.000
Panel B: Country Level							
Country	Obs	<i>INVPRO</i>	<i>DINVPRO</i>	<i>DASDI</i>	<i>FEMLAB</i>	<i>GOVDEBT</i>	
Australia	2149	5.725	0.000	1.000	0.852	0.311	
Austria	34	5.071	0.000	0.000	0.864	0.763	
Belgium	72	6.628	0.653	0.000	0.846	1.009	
Canada	774	8.110	1.000	0.000	0.910	0.855	
China	594	4.717	0.000	1.000	0.856	0.335	
Denmark	104	6.605	0.433	0.000	0.925	0.445	
Finland	32	5.687	0.000	0.000	0.954	0.548	
France	368	5.795	0.117	0.000	0.882	0.883	
Germany	42	5.440	0.000	0.000	0.870	0.741	
Greece	69	4.712	0.000	0.000	0.743	1.565	
Hong Kong	651	8.639	1.000	1.000	0.776	0.168	
India	535	6.686	0.499	0.000	0.366	0.683	
Israel	81	7.930	1.000	1.000	0.888	0.711	
Italy	78	6.018	0.103	0.000	0.715	1.243	
Japan	3383	6.674	0.608	0.000	0.754	2.322	
South Korea	61	6.008	0.295	0.000	0.722	0.344	
Malaysia	334	8.290	1.000	1.000	0.606	0.553	
Netherlands	83	5.073	0.000	0.000	0.871	0.675	
Norway	40	6.920	1.000	0.000	0.941	0.396	
Philippines	149	4.105	0.000	0.000	0.640	0.410	
Poland	156	6.090	0.000	0.000	0.817	0.536	
Portugal	52	5.915	0.000	0.000	0.892	1.105	
Russia	241	5.088	0.000	0.000	0.882	0.125	
Saudi Arabia	53	6.294	0.472	n/a	0.255	0.090	
Singapore	330	8.919	1.000	1.000	0.767	1.040	
South Africa	737	7.518	1.000	1.000	0.778	0.443	
Sweden	85	6.431	0.271	0.000	0.943	0.424	
Switzerland	202	3.851	0.000	0.000	0.876	0.473	
Thailand	184	7.150	0.842	1.000	0.822	0.441	
Turkey	165	6.233	0.382	0.000	0.403	0.366	
United Arab Emirates	38	5.729	0.211	n/a	0.477	0.199	
United Kingdom	1159	7.910	1.000	1.000	0.858	0.828	
United States of America	7715	7.312	0.571	1.000	0.856	1.007	
Total	20,750	6.925	0.543	0.674	0.811	1.004	

Note: See Appendix A for definitions of variables.

We perform pairwise correlation analysis among the dependent and independent variables. For brevity purposes, the untabulated results reveal that *DIVBOD* is positively correlated with *SIZE*, *LEV*, *MTB*, *RETEQ*, *LIT*, *FEMLAB*, *ROA*, *BDSIZE*, *INDEP*, and *OUTDIR*. We find that *DIVBOD* is negatively associated with *DASDI*, *DINVPRO*, *GROWTH*, *LOSS*, *QUICK*, *AGE*, *GOVDEBT*, and *CURR*. Although the results show several significant correlations between the independent variables, none represent any concern for multicollinearity.<sup>1</sup>

#### 4.2. Main Results

Table 2 presents the regression estimates for the effect of board gender diversity and investor protection on CCHs. The result for the samples with low and high levels of investor protection, reported in column (1) and column (2), shows that *DIVBOD* has a significant negative coefficient, supporting the prediction of the first hypothesis that a high level of board gender diversity is associated with a low level of CCH. In column (3), which reports the estimation for the pooled sample, we included a dummy variable for investor protection (*DINVPRO*), where we find the coefficients for *DINVPRO* and *DIVBOD* are significantly negative, suggesting that both high levels of investor protection and board gender diversity are associated with low levels of CCHs. We later tested the joint effect of investor protection and board gender diversity, where the results in column (4) show that the coefficient for *DIVBOD*\**DINVPRO* is positively significant. This result suggests that investor protection moderates the relationship between *DIVBOD* and CCHs, implying that lower levels of CCHs are exhibited in firms with a more diverse board in low-level investor protection countries than high-level investor protection countries. For the control variables, the results in Table 2 report that *GROWTH*, *LOSS*, *MTB*, *QUICK*, and *LIT* have a positive relationship with CCH. At the same time, *SIZE*, *LEV*, and *RETEQ* are found to be negatively associated with the CCH, showing the significant influence of these variables on CCHs.

**Table 2.** Regression estimates of the effect of investor protection and board diversity on corporate cash holdings.

Sample Variable/Stats	LOW (1)	HIGH (2)	POOLED (3)	POOLED (4)
Intercept	0.086 *** (3.841)	0.257 *** (14.809)	0.147 *** (10.756)	0.149 *** (10.853)
<i>DIVBOD</i>	−0.072 *** (−7.152)	−0.016 ** (−2.100)	−0.055 *** (−8.754)	−0.074 *** (−8.635)
<i>DDINVPRO</i>			−0.003 * (−1.752)	−0.008 *** (−3.503)
<i>DINVPRO</i> * <i>DIVBOD</i>				0.038 *** (3.273)
<i>SIZE</i>	−0.002 ** (−2.573)	−0.010 *** (−14.487)	−0.006 *** (−10.609)	−0.006 *** (−10.546)
<i>LEV</i>	−0.090 *** (−12.660)	−0.073 *** (−14.209)	−0.079 *** (−18.508)	−0.079 *** (−18.449)
<i>GROWTH</i>	0.008 ** (2.504)	0.008 *** (2.863)	0.008 *** (3.612)	0.008 *** (3.529)
<i>LOSS</i>	0.007 * (1.939)	0.009 *** (3.476)	0.009 *** (4.182)	0.009 *** (4.170)
<i>MTB</i>	0.003 *** (9.014)	0.002 *** (8.346)	0.002 *** (13.089)	0.002 *** (13.000)
<i>QUICK</i>	0.022 *** (34.960)	0.015 *** (27.001)	0.019 *** (46.455)	0.019 *** (46.510)
<i>RETEQ</i>	−0.004 *** (−5.564)	−0.000 (−0.708)	−0.003 *** (−5.481)	−0.003 *** (−5.581)

Table 2. Cont.

Sample Variable/Stats	LOW (1)	HIGH (2)	POOLED (3)	POOLED (4)
LIT	0.029 *** (5.843)	0.016 *** (4.900)	0.022 *** (7.533)	0.022 *** (7.501)
AGE	−0.000 ** (−2.334)	−0.000 (−1.020)	−0.000 (−0.736)	−0.000 (−0.595)
FEMLAB	0.011 (0.946)	0.019 ** (2.228)	0.031 *** (4.421)	0.031 *** (4.425)
Fixed Effects	Included	Included	Included	Included
Adj.R <sup>2</sup>	0.33	0.31	0.31	0.31
N	9482	11268	20750	20750
F-stat	57.118	60.415	108.731	107.681

Note: The reported *t*-statistics are in parentheses. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels, respectively. See Appendix A for definitions of variables.

Overall, these results support the notion that investor protection affects the relationship between board gender diversity and CCHs. The results show that in poor investor protection countries, board gender diversity has a stronger negative effect on CCHs than in high-level investor protection countries. In other words, in high-level investor protection countries, the negative impact of diversity on CCHs is weaker, suggesting evidence of a substitution effect of board gender diversity and investor protection.

#### 4.3. Endogeneity Issue

In our main analysis, we assume that board gender diversity is an exogenous variable. If *DIVBOD* and *CCH* are simultaneously determined, our results suffer from endogeneity bias. To control for endogeneity, we employed the following procedures:

First, we estimate Equation (2) to calculate *PREDDIVBOD*, augmented from various determinants identified from prior studies, which is then included in the second stage regression.

$$DIVBOD_{it} = \alpha_0 + \beta_1 SIZE_{it} + \beta_2 ROA_{it} + \beta_3 GROWTH_{it} + \beta_4 LEV_{it} + \beta_5 CURR_{it} + \beta_6 LIT_{it} + \beta_7 BDSIZE_{it} + \beta_8 INDEP_{it} + \beta_9 OUTDIR_{it} + Fixed\_Effects + e_{it} \quad (2)$$

where *DIVBOD* is the proportion of female directors over the total number of directors; *SIZE* is the natural logarithm of firm's total assets; *ROA* is the net income over the total assets; *GROWTH* is the change of net sales over last year's sales; *LEV* is the ratio of total debt per total assets; *CURR* is the ratio of total current assets over total current liabilities; *LIT* is a dummy variable for industries with high litigation risks, classified as 1 if the SIC codes are between 2833–2836, 3570–3577, 3600–3674, 5200–5961, and 7370–7370, otherwise 0 (Ashbaugh and LaFond 2003; *BDSIZE*) is the number of directors on the board; *INDEP* is the proportion of independent directors over the total number of directors; *OUTDIR* is the proportion of non-executive directors over the total number of directors; and *Fixed\_Effects* are vectors for industry and year fixed effects.

The results for the first and second stage estimations are presented in Table 3. The number of observations dropped to 20,526 firm-year observations because of the additional data requirements. The results for the first stage estimation, as reported in column (1), indicate that *DIVBOD* is positively associated with *SIZE*, *ROA*, *BDSIZE*, *INDEP*, and *OUTDIR*. We find significant negative coefficients for *GROWTH*, *CURR*, and *LIT*. The F-stat reported in column (1) is statistically significant, suggesting that the estimation is unlikely to be subject to weak instrument problems (see Larcker and Rusticus 2010).

**Table 3.** Two-stage regression (2SLS) estimates of the effect of investor protection and board diversity on corporate cash holdings.

FIRST STAGE		SECOND STAGE	
Dependent Variable = DIVBOD		Dependent Variable = CCH1	
Variable/Stats	(1)	Variable/Stats	(2)
Intercept	−0.211 *** (−16.316)	Intercept	0.111 *** (7.984)
SIZE	0.005 *** (8.703)	PREDDIVBOD	−0.382 *** (−17.426)
ROA	0.040 *** (6.147)	DINVPRO	−0.016 *** (−4.687)
GROWTH	−0.015 *** (−6.939)	DINVPRO*PREDDIVBOD	0.097 *** (4.077)
LEV	−0.002 (−0.480)	SIZE	−0.004 *** (−6.883)
CURR	−0.003 *** (−7.584)	LEV	−0.076 *** (−17.683)
LIT	−0.006 ** (−1.996)	GROWTH	0.002 (1.045)
BDSIZE	0.002 *** (8.717)	LOSS	0.007 *** (3.152)
INDEP	0.074 *** (18.739)	MTB	0.003 *** (15.403)
OUTDIR	0.136 *** (31.021)	QUICK	0.018 *** (42.313)
		RETEQ	−0.002 *** (−4.163)
		LIT	0.024 *** (8.087)
		AGE	−0.000 *** (−4.551)
		FEMLAB	0.059 *** (8.369)
Fixed Effects	Included	Fixed Effects	Included
Adj.R <sup>2</sup>	0.28	Adj.R <sup>2</sup>	0.33
N	20526	N	20526
F-stat	92.839	F-stat	112.083

Note: The reported *t*-statistics are in parentheses. Asterisks denote statistical significance at the 1% (\*\*\*), or 5% (\*\*) levels, respectively. See Appendix A for definitions of variables.

In the second stage, as reported in column (2), the results show that the coefficients for *PREDDIVBOD* and *DINVPRO* are negatively significant while the coefficient for *DINVPRO\*PREDDIVBOD* is positively significant, which is consistent with the main results. We observe similar findings when estimating using alternative measures for the dependent and moderating variables, eliminating concern or endogeneity and further supporting H1 and H2.

#### 4.4. Robustness Tests

We perform several robustness tests in this paper. The results are reported in Table 4. First, as our number of observations varied substantially across countries, there was a concern that the results were biased by countries that were heavily represented. We employed weighted least squares (WLS) regression to address this issue, consistent with earlier studies (e.g., Jaggi and Low 2011; Kamarudin et al. 2020a). In WLS, we use the inverse of the number of observations in each country as a weight so that each country receives equal weight in the estimation.<sup>2</sup> From the result in column (1), we further observe that the analysis yields similar results of the substitutive role of board gender diversity and investor protection in enhancing the CCH.

**Table 4.** Robustness tests: regression estimates of the effect of investor protection and board diversity on corporate cash holdings.

Tests Variable/Stats	WLS (1)	CRISIS (2)	NON CRISIS (3)	ASDI (4)	CCH2 (5)	BLAU (6)
Intercept	0.190 *** (14.325)	0.252 *** (7.124)	0.136 *** (9.226)	0.162 *** (11.748)	0.257 *** (10.707)	0.147 *** (10.703)
<i>DIVBOD</i>	−0.072 *** (−8.703)	0.059 (1.576)	−0.083 *** (−9.319)	−0.122 *** (−11.334)	−0.105 *** (−7.034)	
<i>DINVPRO</i>	−0.008 *** (−4.025)	0.013 ** (2.522)	−0.010 *** (−4.207)		−0.015 *** (−4.026)	−0.007 *** (−3.239)
<i>DINVPRO*DIVBOD</i>	0.043 *** (3.834)	−0.034 (−0.806)	0.042 *** (3.395)		0.070 *** (3.468)	
<i>BLAU</i>						−0.056 *** (−8.836)
<i>DINVPRO*BLAU</i>						0.025 *** (2.930)
<i>DASDI</i>				−0.027 *** (−11.578)		
<i>DASDI*DIVBOD</i>				0.114 *** (8.730)		
<i>SIZE</i>	−0.006 *** (−10.680)	−0.008 *** (−5.536)	−0.005 *** (−9.426)	−0.007 *** (−12.336)	−0.011 *** (−11.625)	−0.006 *** (−10.395)
<i>LEV</i>	−0.078 *** (−18.368)	−0.083 *** (−7.367)	−0.079 *** (−16.913)	−0.077 *** (−17.949)	−0.119 *** (−15.814)	−0.079 *** (−18.399)
<i>GROWTH</i>	0.008 *** (3.582)	0.010 * (1.805)	0.007 *** (3.094)	0.009 *** (4.177)	0.015 *** (4.048)	0.008 *** (3.489)
<i>LOSS</i>	0.008 *** (3.980)	−0.002 (−0.312)	0.010 *** (4.162)	0.009 *** (4.304)	0.018 *** (4.769)	0.009 *** (4.197)
<i>MTB</i>	0.002 *** (12.818)	0.002 *** (3.551)	0.002 *** (12.485)	0.002 *** (13.667)	0.004 *** (12.820)	0.002 *** (13.152)
<i>QUICK</i>	0.019 *** (46.676)	0.014 *** (12.030)	0.020 *** (44.456)	0.019 *** (46.369)	0.034 *** (46.342)	0.019 *** (46.468)
<i>RETEQ</i>	−0.003 *** (−5.555)	−0.002 (−1.078)	−0.003 *** (−5.080)	−0.003 *** (−5.111)	−0.006 *** (−6.560)	−0.003 *** (−5.504)
<i>LIT</i>	0.022 *** (7.598)	0.019 *** (2.632)	0.022 *** (7.015)	0.024 *** (8.239)	0.029 *** (5.764)	0.022 *** (7.608)
<i>AGE</i>	−0.000 (−0.466)	−0.000 ** (−1.976)	−0.000 (−0.175)	−0.000 *** (−3.423)	−0.000 (−1.319)	−0.000 (−0.736)
<i>FEMLAB</i>	0.028 *** (4.258)	−0.036 ** (−2.020)	0.038 *** (4.946)	0.059 *** (7.683)	0.024 * (1.943)	0.032 *** (4.610)
<i>GOVDEBT</i>	0.190 *** (14.325)	0.252 *** (7.124)	0.136 *** (9.226)	0.162 *** (11.748)	0.257 *** (10.707)	0.147 *** (10.703)
<i>Fixed Effects</i>	Included	Included	Included	Included	Included	Included
Adj.R <sup>2</sup>	0.31	0.26	0.32	0.32	0.29	0.31
N	20750	3118	17632	20659	20750	20750
F-stat	233.803	15.261	97.559	109.413	95.119	107.828

Note: The reported *t*-statistics are in parentheses. Asterisks denote statistical significance at the 1% (\*\*\*), 5% (\*\*), or 10% (\*) levels, respectively. See Appendix A for definitions of variables.

Second, our study controls for the impact of the 2009–2010 global financial crisis. We posit that the crisis would cause exogenous shock to the CCH since it increases uncertainty and restricts firms' access to external financing (Tran 2020). In assessing whether our results hold to these possibilities, we partitioned the sample into the global financial crisis period and the non-crisis period. The results are reported in columns (2) and (3). However, we find that the coefficients for *DINVPRO* and *DINVPRO\*DIVBOD* are only significant in the non-crisis period. This result shows that the global financial crisis has an impact on our results.



Third, we employed the anti-self-dealing index (ASDI) by [Djankov et al. \(2008\)](#) as an alternative measure for investor protection, which captures the strength of minority shareholder protections against self-dealing by the controlling shareholder. ASDI focuses on private enforcement mechanisms, such as disclosure, approval, and litigation, that govern a specific self-dealing transaction calculated based on the average of ex-ante and ex-post private control of self-dealing. Following [Kamarudin et al. \(2020b\)](#), we established a dummy variable for *DASDI*, where we assigned the value of 1 if the value is higher than the median, otherwise 0. The re-estimated results in column (4) indicate robust evidence that board gender diversity has a stronger negative link with the CCH in low-level investor protection countries than in high-level investor protection countries.

Fourth, following [Phan et al. \(2019\)](#), we used *CCH2* as a dependent variable. We calculate *CCH2* as the total cash and equivalents divided by the total assets minus cash and equivalents. The results of column (5) in Table 4 show that the coefficient for *DIVBOD* and *DINVPRO* are negative, while the coefficient for *DINVPRO\*DIVBOD* is positively significant, showing consistent evidence. This implies that investor protection weakens the negative relationship between board gender diversity and CCHs, thereby supporting the substitutive explanation of *BODDIV* and *DINVPRO*. Finally, we used *BLAU* as an alternative measure for board gender diversity ([Campbell and Mínguez-Vera 2008](#); [Miller and del Carmen Triana 2009](#)). The results in column (6) of Table 4 reveal a negatively significant coefficient for *BLAU*, an inference similar to the main findings. This implies that firms with diverse gender boards exhibit low levels of CCHs. We find that the coefficient for *DINVPRO\*BLAU* is positively significant, further validating our main results.

Overall, we found robust results for firms with diverse gender boards; they exhibit low levels of CCHs and investor protection, which weakens the negative relationship between board gender and CCHs. However, we have to be cautious when making inferences during the global crisis period since it has influenced the CCHs.

#### 4.5. Discussion of the Results

This study corroborates evidence from previous studies that a high level of board gender diversity is linked to a low CCH. Our findings contradict the notion that high CCHs would benefit firms ([Chen et al. 2015](#)), especially as precautionary motives ([Opler et al. 1999](#)) and safeguarding against firms' future funding requirements and underinvestment risks ([Han and Qiu 2007](#); [Bates et al. 2009](#); [Du and Beuselinck 2017](#)). Consistent with the attitudes and conduct of female directors of being risk-averse ([Kang et al. 2007](#)), our findings show that female directors prefer a low CCH. This is probably due to the high agency cost since managers easily siphon cash, hence lowering the firm value ([Bates et al. 2009](#); [Boubaker et al. 2015](#)).

Further, we find that cash holdings are reduced due to good governance. Consistent with [Dittmar et al. \(2003\)](#) and [Ferreira and Vilela \(2004\)](#), we find that countries with investor protection exhibit low CCHs compared to firms from low investor protection countries. We found that managers tend to increase surplus cash when investor protection is low. When the investor protection is high, investors can impose strong monitoring systems to constrain managers' discretionary powers connected to company cash holdings, hence reducing the level of cash ([Kalcheva and Lins \(2007\)](#)). The joint effect between board gender diversity and investor protection shows a substitutive effect where both variables act as governance mechanisms for firms.

## 5. Conclusions

In this paper, which uses data of 20,750 firm-year observations from 33 countries, we have examined the link between board gender diversity and CCH and the joint effect of investor protection and board gender diversity on CCHs. Prior studies have provided mixed findings on the relationship between board gender diversity and CCHs, where holding excess corporate cash reserves has potential benefits and adverse effects. On one hand, precautionary motives ([Opler et al. 1999](#)), the benefits of lower transaction costs, and

avoiding underinvestment risks are the main reasons for holding cash reserves (Han and Qiu 2007; Bates et al. 2009; Du and Beuselinck 2017). However, on the other hand, excess corporate cash can reduce firm value because agency issues may arise as excess cash can be easily misappropriated by managers (Bates et al. 2009; Boubaker et al. 2015). Taking these perspectives together, we examined whether female directors would prefer holding excess cash reserves to safeguard financial flexibility in the firm and avoid external financing transaction costs or choose to minimize the level of cash to reduce the agency costs. We further investigated how a country-level governance variable, i.e., investor protection, affects the relationship between board gender diversity and CCHs.

In support of the motive to reduce agency costs, our study has documented that board gender diversity has a negative effect on CCHs in both high and low investor-protection countries. We also found evidence on the joint effect of board gender diversity and investor protection on the CCH. Further evidence suggests that countries with high levels of investor protection are associated with low levels of CCHs. Additionally, the low levels of CCHs exhibited in firms with more diverse boards are more observable in low-level investor protection countries compared to high-level investor protection countries, suggesting the substitutive effect of investor protection on board gender diversity and the CCH relationship.

Our results should be interpreted with several caveats. Although we employed a large dataset of firm-year observations from 33 countries, the dataset was still restricted by the availability of board gender diversity data. Additionally, we mainly focused on the CCH, where future studies can explore the effect on other corporate consequences. Despite these limitations, our study addresses an essential issue of investor protection in ensuring board gender diversity's effective function. Investors could benefit by integrating board gender diversity and investor protection in their investment decisions. Our research can help investors and governments formulate policies that promote gender equality and women's empowerment in line with the United Nations Sustainable Development Goals (SDGs). Going forward, we encourage more research on the impact of board gender diversity at the regional economic level and the incorporation of other institutional variables, such as politics and culture.

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**Data Availability Statement:** The data that support the findings of this study are available from Refinitiv. Restrictions apply to the availability of these data, which were used under license for this study. Data are available from the authors with the permission of Refinitiv.

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**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

**Table A1.** Variable description.

Variables	Definition
(1) CCH1	The proportion of cash and equivalents to total assets
(2) CCH2	The total cash and equivalents divided by the total assets minus cash and equivalents
(3) DIVBOD	The proportion of female directors over the total number of directors
(4) BLAU	A measurement corresponds to the proportion of group female and male using the formula from the <a href="#">Blau (1977)</a> index of heterogeneity
(5) FEMALE	A dummy variable that takes the value of 1 if the board has at least one female director, otherwise 0.
(6) DINVPRO	A dummy variable that takes the value of 1 if the investor protection index by World Economic Forum is greater than the median, otherwise 0.
(7) DASDI	A dummy variable that takes the value of 1 if the anti-self-dealing index (ASDI) by <a href="#">Djankov et al. (2008)</a> is greater than the median, otherwise 0.
(8) SIZE	The natural logarithm of total assets
(9) LEV	The ratio of total debt per total assets
(10) GROWTH	The change of net sales over last year's sales
(11) LOSS	A dummy variable that takes the value of 1 if net income is negative, otherwise 0.
(12) MTB	The ratio of market-to-book value
(13) QUICK	The ratio of current assets minus the inventory divided by the total current liabilities
(14) RETEQ	The ratio of retained earnings to total equity
(15) LIT	A dummy variable for industries with high litigation risk, classified as 1 if the SIC codes were between 2833–2836, 3570–3577, 3600–3674, 5200–5961, and 7370–7370, otherwise 0 ( <a href="#">Ashbaugh and LaFond 2003</a> )
(16) AGE	The number of years since IPO
(17) FEMLAB	The women in labor force ratio to men
(18) GOVDEBT	The ratio of government debts over gross domestic product
(19) ROA	The net income over the total assets
(20) CURR	The ratio of total current assets over total current liabilities
(21) BDSIZE	The number of directors on the board
(22) INDEP	The proportion of independent directors over the total number of directors
(23) OUTDIR	The proportion of non-executive directors over the total number of directors

## Notes

- <sup>1</sup> The correlations are not tabulated in the paper in the interest of brevity. They are available on request from the authors.
- <sup>2</sup> This methodology has been used in earlier studies (e.g., [Jaggi and Low 2011](#); [Hope et al. 2009](#)).

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