# Does board diversity decrease corporate fraud? International evidence from family vs. non-family firms.

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**Abstract**

We take the perspective that specific traits that distinguish family from non-family firms are essential for the understanding of the impact of board diversity on the likelihood of corporate fraud. Grounded on the behavioural agency theory, we argue that family firms are more likely to commit fraud than non-family firms possibly because of the aim to preserve socioemotional wealth and the weakness of regulatory systems (i.e. in the Latin American region). We find that family firms can offset such frailties by diversifying the board of directors (i.e. gender, education and tenure of independent directors), and such opportunities for diversity increase with board size but decrease with experienced boards.

Keywords: corporate fraud, board diversity, family firms, socioemotional wealth.

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# Introduction

A frail market’s institutional system is one of the challenges when doing business because of the increased investors’ exposure to the impact of weak legality, such as fraud, bribery and corruption (La Porta et al., 2000; Klappler and Love, 2004). These aspects highlight the importance of strategically adapting institutional corporate governance practices to overcome the value-decreasing risks associated with low investors’ protection in the region (Poletti-Hughes, 2009).

Literature on internal corporate governance processes have focused attention on board diversity as a mechanism to increase effectiveness (Buse et al., 2016). Scholars have theorized that greater corporate board diversity will lead to a better strategic decision making, organizational behaviour, and financial performance (Ramirez, 2018), but whether board diversity impacts on the likelihood of corporate fraud is still an open question.

Inconclusive evidence on the effectiveness of board diversity on the probability of fraud calls for further empirical enquiry. In particular, because many results about the effects of board diversity, mainly in gender, derived from developed economies (Capezio and Mavisakalyan, 2016; Naumovska et al., 2020; Wahid, 2019) but have been limited in less developed markets (González et al., 2020), where the culture of the region influences corporate behaviour (Boateng et al., 2021) and warrant further investigation into the role of board diversity and the likelihood of fraud.

To address this research gap, this paper focuses in the Latin American region as a pertinent setting for study to explore what we know about family businesses around the world, and the generalizability of these ideas to other less developed markets (Müller et al., 2019). In this region, most companies are controlled by its founders (Jara et al., 2019), and the involvement of family members in key executive positions is very common (Bertrand and Schoar, 2006) increasing the prevalence of established networks that diminish opportunities to appoint a diverse board. Recent corporate scandals of family firms in the region have highlighted ethical concerns on whether family firms are more or less likely to commit corporate misconducts as a result of fragilities of the legal system that offer weak investors’ protection - i.e. exacerbating principal–principal agency conflicts between majority and minority shareholders (La Porta et al., 1999). The uncertain economic, social, political and legal environment that influence family firms in this region require governance structures that differ from other regions in the world (Monteferrante and Piñango, 2011), which range from leadership within the company to political connections that facilitate the success of the company as a going concern (Lansberg and Perrow, 1991), without neglecting the perpetuation of the company in the family as a point of reference when making managerial decisions (Gomez-Mejia et al., 2011).

This article addresses concerns that current perspectives on family business should capitalize on the distinctive context of the concept of socioemotional wealth (Berrone et al., 2012). Therefore, we extend current research on the impact of board diversity on corporate fraud by incorporating developments in the family business literature stressing the influence of a social configuration on the corporate conduct of family firms (Zellweger et al., 2019). Our empirical study that develops in the context of family firms, considers that financial malpractice from family controllers might occur as a means for survival when aiming to preserve the business for future generations (Krishnan and Peytcheva, 2019). Also, the findings of the study contribute to addressing the broader question of how the diversity of boards is more effective in decreasing fraud. We adopt a logit regression modelling approach to investigate whether board diversity (i.e. gender, education and tenure) influence the likelihood of corporate fraud with a sample of 1842 firm-year observations from 2008 to 2019. Results are robust to endogeneity concerns, methodological techniques and model specifications.

The findings of this study suggest that family firms have a positive and significant association with the likelihood of fraud, which aligns to potential traits that develop from director’s connectedness to the controlling family, suggesting that human capital leads social ties in family firms. These results shed some light on the impact of social ties for the development of independent boards, indicating that family firms favour shared networks of education to keep the control of family businesses. This is consistent with a “nepotism” view, which develops throughout the years of education of future board directors (Chua et al., 2009). Further, we find that board size is instrumental in minimizing the likelihood of fraud only for family firms, as it opens the possibility of diversity in the boardroom. Our findings suggest that family firms achieve a larger benefit from gender and education diversity in reducing the probability of fraud than non-family firms, possibly because more diversity constrains social connectedness and increases objectivity from board members. Additionally, we find that while long tenured independent directors increase the likelihood of fraud for all firms, family firms benefit from a board structure that comprises both longer-tenured and newly appointed independent directors (i.e. tenure diversity). Probably because the role of directors is valuable as both monitors and strategists (Hillman and Dalziel, 2003), which is enhanced by both their independence and experience (Vafeas, 2003; Patro et al., 2018). We conjecture that current board experience deters board diversity in family firms, because experienced directors are overconfident (Zhu et al., 2015), becoming entrenched and less likely to recognize the corporate benefits from diversity when appointing new members.

This study contributes to the literature in several ways. First, it furthers to efforts in understanding the association between board diversity (including and beyond gender) and corporate fraud. To the extent that board diversity reduces the prevalence of related party transactions (Mahenthiran et al., 2020) and social connectedness (Ahn et al., 2010), it is expected to reduce the probability of fraud.

Second, the particular characteristics of the region warrant to frame this study through the lens of the socioemotional wealth framework (SEW), that differentiates the significance and impact of fraud to the literature on corporate governance in family firms. We identify that behavioural agency costs also pertain to independent directors, since they develop ties with family firms (i.e. throughout their networks) which adversely affect the best interest of minority shareholders. This connectedness is particularly the case for longer tenured independent directors and those with education networks, who possess greater incentives to protect socioemotional wealth in family firms. Therefore, we incorporate aspects of socioemotional endowment framed by the behavioural agency theory, which is relevant for our analytical framework, stressing that the behaviour of family firms aligns to social relationships and social structures (Berrone et al., 2012), that motivate actions towards the interests of the family, expropriating resources from minority investors (Miller and Le Breton-Miller, 2006). Thus, the socioemotional wealth framework is pertinent to study the benefits of board diversity where complex board structures and management are represented by interests which not always align to an economic outcome (Kumeto, 2015).

Third, we assimilate into our analysis the notion that the benefits from board diversity are more effective mechanisms to offset the likelihood of fraud in family firms than in non-family firms. That is, boards that are diverse in gender, education and tenure of independent directors enhance the monitoring ability of the board in family firms. In line with Corbetta and Salvato (2004), we reason that board characteristics echo the dominance of family firms and the culture of the region, providing an insight to effective board compositions that strengthen corporate governance practices. In this quest, we distinguish that family firms with experienced boards have less diversity in gender, and directors are entrenched to their appointments (i.e. long tenures).

# Literature review and hypotheses development

Corporate fraud has been a topic of attention because of recent scandals of insidious actions from top management, such as Brazil’s Odebrecht and Petrobras (Zysman‐Quirós, 2019). The U.S. Association of Certified Fraud Examiners (ACFE) groups fraud into three main categories: fraudulent statements, asset misappropriation and corruption (Sabau, 2012). Recent academic literature studied fraud that ranges from inside the company (i.e. financial statements and reporting) (Shapiro, 2011) to against the company (i.e. misappropriation of assets) (Soltani, 2014). Another debate of corporate fraud in the accounting and auditing literature is based on the concept of the fraud triangle, where the probability of fraud increases based on its opportunity, pressure and rationalization (Cressey, 1953). Roden et al. (2016) found that these components were significant in increasing fraud measured as board composition, stock compensation and auditor changes, respectively.

The impact of fraud in corporations is large. On the one hand, fraudulent financial statements mislead investors and/or regulators regarding the financial health and prospects of the organization. Such misrepresentation of the use of internal funds leads to altered accounting systems (Reurink, 2018). On the other hand, assets misappropriation is damaging for corporations because it is difficult to recognize by internal and external auditors (Sabau, 2012).

Since, the influence of the institutional setting regarding corporate governance is relevant in determining cultural values and the legal environment (Sadique et al., 2019), the risk factors (i.e. fraud triangle) that impact on the probability of fraud might differ accordingly. Then, not only culture and traditions influence business practices (Hofstede, 1980), but also the legal environment (La Porta et al., 2000).

Although the incentives (e.g. reputation) to preserve integrity might differ among firms, weak external governance facilitates the incidence of corporate malpractice (Aguilera et al., 2019; González and García-Meca, 2014). Hence, weak enforcements, poor shareholder protection and political connections may motivate corporate malpractice in emerging economies.

From a corporate governance perspective, the role of the board in monitoring incidences of corporate fraud becomes relevant irrespective on whether the consequences of such actions are damaging for the company or any other stakeholders. Given that board diversity models firms’ performance through board’s monitoring intensity (Ararat et al., 2015), its relevance to decrease financial malpractice through the provision of a greater range of perspectives and different sources of previous experiences is clear (Magnanelli, 2021). Also, a diverse board signals the firms’ commitment towards the creation of social value, positively impacting on its reputation and improving its discernment of the external environment (Bear et al., 2010).

### **2.1 Family firms and the impact of board size**

Family and non-family firms are distinctive in their organizational forms (i.e. goals, governance, and resources) (Chrisman et al. 2013). Managerial entrenchment in family firms creates an opportunity for family members to misappropriate minority shareholders’ wealth (Bardhan et al., 2015) and corporate opacity (Anderson et al., 2009). The concentration of family ownership eases the extraction of private benefits of control at the expense of minority shareholders through earnings manipulation and related party transactions (Chen et al., 2020), financial misreporting (Anderson et al., 2017), rent-seeking activities (Fan and Wong, 2002), among others.

A SEW perspective provides one interpretation to the behaviour of family firms, which suggests that family firms are loss averse (Keasey et al., 2015) and aim to pass a viable business to future generations, even when such financial actions both lead to suboptimal performance (Berrone et al. 2012) and ignore/eliminate controls that prevent financial malpractice (Kidwell and Kidwell, 2010).

Family firms tend to have more informal practices for ethical formulation (Vazquez, 2016) and such informal practices increase the possibility of having weaker controls (Krishnan and Peytcheva, 2019). To this end, the institutional framework is crucial to understand not only the actions of family firms but also their impact on firms’ outcomes (Husted and de Sousa-Filho, 2019). An effective system prevents companies from mismanagement that eventually affects the operation of the corporation (Kuan et al., 2017). However, family firms are still heterogeneous in their behaviour toward stakeholders and their strategic initiatives (Miller and Le Breton-Miller, 2021) and internal governance structures (e.g. boards of directors) (Corbetta and Salvato, 2004). Therefore, concentrated ownership (La Porta et al., 2009) together with a lack of internal controls in family firms (Krishnan and Peytcheva, 2019) are perceived as a major corporate governance issue because expropriation risks increase (Perkins, 2019) by not only limiting transparency but also impacting on the effectiveness of external governance structures.

Since family firms have a strong socioemotional endowment (Poletti-Hughes and Williams, 2019), the involvement of independent directors is limited (González and García-Meca, 2014), decreasing the effectiveness of internal controls. For instance, family firms may be more likely to utilise their connections to achieve a relaxed regulatory oversight (Kuvvet and Maskara, 2018), preferential treatment in competitions for government contracts and bailout funds (Faccio, 2006) and less supervision on firm’s activities (Duh et al., 2010). Also, senior management of family firms are often appointed based on connections/family ties as opposed to merit and talent, which could result in greater financial malpractice (Anderson et al., 2017). As the appointment of non-family directors frequently develops from family members’ closed networks, long tenures are common (Berrone et al., 2012), which limit the benefits of board independence. While family members are dominant in both the management and the board, outside directors act more as strategists than monitors exercising narrow control over executives (Lester and Cannella, 2006).

Overall, the institutional framework, sophisticated regulatory system, and connections (i.e. opportunity), as well as, weak internal controls (i.e. pressure) are conducive for opportunistic behaviour of family firms, which by choosing to preserve SEW (i.e. rationalization) pose risks in financial malpractice and specifically increase the risk of fraud, leading to the following hypothesis:

***H1a.*** *The likelihood of corporate fraud is greater in family than non-family firms.*

From the perspective of the SEW theory, family firms aim to preserve the company as a family going concern, therefore the involvement of independent directors is limited (Cuadrado-Ballesteros et al., 2015). In this regard, family firms have smaller boards and less independent directors (Lam and Lee, 2012), increasing group cohesiveness. Since family firms are less likely to give up family control to preserve family’s socioemotional wealth (Gomez-Mejia et al., [2007](https://link.springer.com/article/10.1007/s10551-015-2538-z#ref-CR41)), and considering that board capital depends on board size (Corbetta and Salvato, 2004), the involvement of more directors in family firms may potentially open an opportunity to increase board diversity, which together with the above discussion leads to the following hypothesis:

***H1b.*** *The probability of fraud in family firms is lower with larger boards.*

### **2.2 Gender diversity in family firms**

Current research posits that the influence of board characteristics on corporate fraud is relevant (Beasley, 1996; Chen et al., 2006; Virk, 2017). In particular, gender plays an important role in recent research and its association with financial fraud (Capezio and Mavisakalyan, 2016; Naumovska et al., 2020) and financial malpractice (Wahid, 2019). Gender diversity in the board facilitates effective monitoring and protects shareholders’ interests by widening board’s human capital such as expertise, experience and perspectives (Cumming et al., 2015).

From the view of ethical sensitivity, female directors show a positive approach towards codes of ethics and are more sensitive to moral issues that arise from business practices (Ibrahim et al., 2009). In terms of risk-taking, extant literature suggest that women are more risk-averse than men (Croson and Gneezy, 2009). However, there is a differential towards risk taking in family firms when culture associates with risk preferences from female directors (e.g. as in the Latin American region), which depends on the female directors’ affiliations to the firm (Müller et al., 2019). Female directors with ties to the family firm assume more performance hazard risk, such as the possibility of performing below target, to preserve socioemotional wealth (Poletti-Hughes and Briano-Turrent, 2019). That is, inside female directors align risk preferences towards the perpetuation of the family dynasty and protection of firm reputation as explained by the socioemotional wealth theory.

Since, the presence of a female on the board improves the quality of financial reporting and transparency of decision making when external governance is weak (González et al., 2020), the relevance of the firm’s regional setting becomes apparent in differentiating family firms attitudes towards board gender diversity. In a developing institutional environment, the internal governance system and transparency of the business complements corporate frailties and increases investors protection (Aguilera et al., 2019). Therefore, if diversity on the board solves the information asymmetric problem and improves transparency (Gul et al., 2011), then it could be hypothesized that the inclusion of female directors may act as a substitution mechanism to improve transparency in a weaker corporate governance environment, but will adjust in accordance to the objectives of a corporation, differentiating the outcome in family and non-family firms.

As the board configuration of family firms pursues a family status to maintain power and legitimacy towards stakeholders (Mitchell et al, 2011), the motivators of family firms towards gender diversity are not intrinsic. For instance, patriarchal practices make female kin less important and emphasize male kin to a position of power (Mulholland, 1996). Therefore, succession practices favour male relatives to leadership, who assume a role early in their career (González et al, 2012) gaining valuable experience that increases the prevalence of men leadership in family businesses (Lansberg and Perrow, 1991). Herein, in alignment with the SEW theory, the benefits from gender diversity might be more relevant for family firms. Overall, the presence of female directors may increase ethical sensitivity, and bring different perspectives towards risk taking and governing roles when external governance is weaker. Based on this discussion the following hypotheses are formulated:

***H2a.*** *The probability of corporate fraud decreases with the increase on the proportion of female directors.*

***H2b.*** *Independent female directors are more effective in decreasing the probability of corporate fraud.*

***H2c.*** *A gender diverse board is more effective in decreasing the probability of corporate fraud in family firms than non-family firms.*

### **2.3 Education diversity and alumni networks**

Based on the resource dependence view, educational background and knowledge have contributed to enhance board’s effectiveness (Payne et al., 2009). However, there are still examples where such characteristics did not enhance board’s effectiveness[[2]](#footnote-2), suggesting that education, qualifications or merit in isolation do not enrich the monitoring role, but the environment where those attributes are applied becomes relevant.

Education based diversity on boards enhances knowledge and team performance (Midavaine et al., 2016). Likewise, boards with members from different educational backgrounds are more likely to take corporate investment which is more favourable to enhance firm’s performance (Boadi et al., 2019) and thus might mitigate financial pressure. Diversity on educational background promotes debate in strategical decision that not only concentrates on profit, but also highlights issues of law enforcement and ethicality (Bertrand and Schoar, 2003; Chidambaran et al., 2011).

Since education diversity on boards facilitates the perception of different viewpoints, strategical decisions that favour the opportunity for profit, the reduction of financial pressures and ethical concerns can reconcile towards optimal resolutions, decreasing the probability of corporate fraud, and leading to the following hypothesis:

***H3a.*** *Board education diversity decreases the probability of corporate fraud.*

The strict definition of an independent director is ambiguous when adding the concept of social connectedness (Chidambaran et al., 2011; Kuang and Lee, 2017), which might be a favourable factor for the survival of a company (Xia et al., 2019). The social connections of independent directors with CEOs and executive directors restrict the monitoring function of boards (Chidambaran et al., 2011) and develop barriers for fraud detection. A root of developing social connectedness is through family ties and/or educational affiliations (Berger et al., 2013). These relationships might facilitate agreement on board decisions as directors hold similar attitudes, qualifications, experience and knowledge, but more importantly from a SEW perspective, a sense of loyalty towards the value of their network (Ng et al, 2019).

According to SEW theory, family firms behave differently from other business firms regarding the emotional and sociocultural relationships among the members such as spouses, children, siblings and other relatives (Poletti-Hughes and Williams, 2019). Most of the family business literature has discussed the existence of nepotism especially in emerging markets with a weak institutional environment (Liu et al., 2015). The social closeness becomes a key driver which expects loyalty and commitment towards the family business, generating a significant economic cost for minority shareholders (Perez-Gonzalez, 2006). If nepotism is a driver to motivate family members and friends’ involvement in firms, social connectedness might impede directors’ independence and limit the monitoring function.

Although, board members may have access to director roles because of their connections (Sonnenfeld, 2002), directors recruitment is also based on professional experiences and educational backgrounds (Cumming et al., 2015).

The family business environment usually tends to have less hierarchical structures and less formal modes of operations (Duh et al., 2010) that impact on enforcing ethicality (Vazquez 2016). As a consequence, the appointment of independent directors by family firms utilizes established networks (e.g. through educational affiliations) fostering the presence of cross-directorships (González and García-Meca 2014; Lefort and Urzúa, 2008). Therefore, mutual academic discipline and sharing the same alumni networks create direct friendship which may impede independent judgement (Hwang and Kim, 2009), leading to the following hypotheses:

***H3b.*** *Alumni networks developed between independent and executive directors increase the probability of corporate fraud.*

### **2.4 Tenure of independent directors**

Tenure of independent directors is an influential factor in board effectiveness (Khanna et al., 2015). Several studies have shown that a lengthy tenure influences a wide array of decisions and behaviour, including risk-taking (Serfling, 2014), effective decision-making (Ng and Feldman, 2008), ethicality (Shin, 2012), and firm strategy (Hambrick et al., 1996). Tenure increases director’s knowledge about the firm and its business environment (Livnat et al., 2021), but also interferes with the delivery of unbiased decisions as the relationship with the firm strengthens (Chidambaran et al., 2011).

The SEW dimension of binding social ties (Gomez-Mejia et al., 2011) extends beyond family members (i.e. to long-tenured directors), where independent board directors might be more likely to respond to the concerns of family members and relax monitoring activities. In this setting, longer tenured independent directors might develop a cosy relationship with the management or family members impairing objectivity and independence, which might decrease actions to prevent financial malpractice, leading to the following hypotheses:

***H4a.*** *Tenure of independent directors increases the likelihood of corporate fraud.*

Diversity on tenure among independent directors encourages different perspectives and experiences (Ali et al. 2014). Indeed, long-tenured independent directors have more experience and knowledge of the firm while shorter tenured directors have the energy and drive to perform the advisory and monitoring role (Kang et al., 2007). Therefore, the diversity of tenure of independent directors brings together different skills, expertise and social networks that drive board effectiveness. This aspect is particularly important for family firms because the appointment of new independent directors may not create incentives to protect SEW aims (Gomez-Mejia et al., 2011). Since long-tenured directors may hinder monitoring activities, the appointment of new independent directors which leads to tenure diversity on the board may enhance board effectiveness in family firms by trading off the limitations of binding social ties in the monitoring role. In this setting, tenure diversity among independent directors might reduce the incentives for collective benefits that arise from time-honoured independent directors and contribute to the independence on the board, which leads to the following hypotheses:

***H4b****. Diversity on independent director’s tenure decreases the likelihood of corporate fraud in family firms.*

# Data and regression model

## Sample Selection

We compile a unique data set of the main markets from the Latin American region as in Jara et al. (2019), which include Argentina, Brazil, Chile, Colombia, Mexico, and Peru (917 firms). The sample includes all non-financial listed firms available in DataStream (i.e. for financial variables) from 2000 through 2019. This sample is matched with data from BoardEx (i.e. for director and board characteristics), and only those observations with a match are kept in the sample that consists of an unbalanced panel of 1839 firm-years with 244 unique firms, representing approximately 25% of the population of listed active non-financial companies in the stock exchange in the selected countries. Data on fraud is obtained from news items in Bloomberg press releases for the fiscal years from 2008 to 2019. We define fraud based on the definition of the Association of Certified Fraud Examiners including fraudulent statements, asset misappropriation, and corruption (Sabau, 2012). We use the keywords fraud, corruption, embezzlement, CEO and fraud, misappropriation, bribes and materiality in order to classify fraud firms (Hayek and Atinc, 2018). We search the web (i.e. google) for few cases with missing information and/or the fraud commitment date. With these criteria, there are 86 cases of corporate fraud in our sample, with 707 fraud observations - ranging from the date when the alleged fraud occurred until the year when the alleged fraud ended, which is comparable to prior studies in emerging markets (Nasir et al., 2019). Table 1 presents the distribution of firms per country (Panel A) and year (Panel B). According to the news items collected for the sample, the highest number of fraud cases were recorded in 2010 (see Table 1, Panel B), following the period of the financial crisis. Also, a higher number of fraud observations were recorded from 2010 to 2018, which represent the fraud committing period – fraud duration. For instance, certain companies in the region paid bribes in several years to win contracts as a business practice before fraud was even detected. Fraud cases have been gradually decreased since 2012 possibly because the strengthening of corporate governance reforms in the Latin American region. However, there is also the possibility that fraud cases among our sample have not been detected (especially because of the weaknesses of the institutional system). Therefore, a limitation of this study is that there might be observations that have been misclassified within the non-fraud cohort.

----------Insert Table 1 here---------

1. **Empirical analysis**

The fraud indicator is modelled as a function of being a family firm, board diversity and control variables. Therefore, the following function is to be used to develop the panel data logistic regression model;

is the dependent binary variable where = 1 if a firm has committed corporate fraud at time t and 0 otherwise. The vector of measures the variables of gender diversity, the vector of measures the human capital variables (i.e. education and tenure) and measures family control. The vectors *Con* for and measure control variables for corporate governance and firm economic characteristics, respectively (see appendix 1 for full definitions). A one-year time lag of the explanatory variables with fraud is allowed for the predictor to precede the outcome (Ali et al., 2014), except for the family firm dummy. Using the above function, a binary logit model was estimated which assumes that the explanatory variables are strictly exogenous. In order to control heteroskedasticity, robust standard errors are clustered by firms.

The key variables on this study incorporate the concept of socioemotional wealth (Berrone et al., 2012), which include family control and influence, identification of family members with the firm, binding social ties and emotional attachment of family members. We identified family versus non-family firms based on the ownership structure. Therefore, a family firm is defined with a dummy variable which takes the value of one when both the share ownership by a family is at least 20 percent (La Porta et al., 1999) and there is at least one family member in the board, zero otherwise.

Gender Diversity (Gen) defines the ratio of female directors to board size, as well as the proportion of independent female directors in the board.

Human Capital (HC) defines the education and tenure of board members. The board education diversity was measured by two variables: board’s education on business administration and board education on non-business administration. Among them, board education diversity was calculated using the , where, is the percentage of board members qualified in each education category such as business education and non-business education. Drawing on the research of Campbell and Mínguez-Vera (2008), the purpose of the Blau index is to measure the balance/ evenness of board education. The minimum value of the index is 0 which represents an evenness/ homogeneity of board education and diversity is maximized when two categories of education present in equal proportions. Thus, the Blau index for education diversity lies between 0 and 0.5, with a value of 0.5 indicating that the board consists of an equal number of business and non-business education qualified members. As social ties created from the education network become a threat to conceal corporate fraud (Boivie et al., 2016), we identified a dummy variable that equals to 1 if executive and independent directors do not share the same education qualification, and 0 otherwise (Edushare).

Tenure is measured using the number of appointment years in the current board and diversity of tenure in the board was measured using the standard deviation of tenure.

Past studies have found that more external independent directors have less chance to incur into financial fraud due to the increase of the internal audit quality (Beasley, 1996). Therefore, our study controls for the proportion of outside independent directors in the board.

The size of the board determines the social ties among the members where smaller boards share stronger ties (Boivie et al., 2016). Board size is measured with the natural logarithm of the number of board directors. CEO/Chair duality represents unfettered power in the board. It is measured with a dummy variable that equals one when the CEO and Chair are the same individual.

Firm size is the natural logarithm of total assets. Firm age is the natural logarithm of age of the firm since establishment (Beasley, 1996). Financial leverage is the ratio of total debt to total assets. Sales growth is the five-year average annual sales growth rate. Return on assets represents financial performance and is measured with the ratio of earnings before interest and taxes to total assets. All financial continuous variables are winsorized at the top and bottom 1% to mitigate outlier bias.

To control for other possible differences in corporate financial fraud across different industries and countries in the region, we included industry, year and country dummies (Chen et al., 2006).

1. **Analysis and results**

Descriptive statistics reported in Table 2 are consistent with the prior Latin American literature (Jara et al., 2019). Panel A in Table 2 presents univariate comparisons between the fraud firms and non-fraud firms and Panel B in Table 2 presents univariate comparisons between the family firms and non-family firms. Firms in the fraud cohort have lower diversity in education and proportion of female directors in the board. With respect to financial performance, fraud firms have higher level of leverage, sales growth, firm size, but lower return on assets than non-fraud firms. Corporate governance of fraud firms tends to have a larger board (Chen et al., 2006), higher frequency of Chair-CEO duality (Sharma, 2004), greater firm age (Xu et al., 2018) and lack of board independence (Chidambaran et al., 2011). Family firms from the fraud cohort (Panel B – Table 2) present less independent female representation (1.2%) and higher tenure of independent directors.

----------Insert Table 2 here---------

## 4.1 Family and board size

Table 3 reports the results (marginal effects) of the bivariate logit regressions on the association between family firms and corporate fraud. Column 1 presents the regression for family firms showing a significant and positive effect on fraud in support of H1a. Similarly, we find that family ownership and the presence of family members on the board (defined in appendix 1) show a positive and significant impact on fraud (Columns 2 and 3). These findings suggest that family firms are more likely to commit fraud when family members have more power in the firm (Chen and Chung, 2019).

Firm size and financial leverage increase the likelihood of fraud whereas firm’s age decreases it. CEO/Chair duality shows a positive effect on the fraud commitment, albeit significance decreases in some models, suggesting managerial entrenchment in fraud commitment signals low monitoring efficacy of independent directors.

Boards in family firms might maintain a group cohesiveness which would build connectedness with family owners. For which, H1b tests whether board size might offset the increase on the probability of fraud in family firms by opening the opportunity to increase diversity in a setting where binding social ties is a cultural norm. To test H1b, we subsample by family and non-family firms and test the impact of board size on the likelihood of fraud in columns 4 and 5, respectively. The marginal effect for board size is negative and significant on the likelihood of corporate fraud for family firms, which implies that larger boards in family firms reduce the likelihood of corporate fraud in support of H1b. In contrast, larger boards in non-family firms increase the likelihood of corporate fraud, because very large boards can be inefficient for decision-making, as a result of problems of coordination and communication (Gonzalez and Garcia-Meca, 2014).

----------Insert Table 3 here---------

## 4.2 Female directors

Table 4 presents the results for female presence on the board. Columns 1 and 2 present the female proportion on the board and the ratio of female to male directors, respectively, showing significantly negative coefficients (in support of H2a). From column 1, we find that the marginal effect on the female proportion is -0.213 (p<0.01), implying that if the female proportion increases by one standard deviation (9.9%), the likelihood of being in the fraud sample decreases by 2.11% (9.9 x -0.213). In column 3, we distinguish between independent female and independent male directors and find that only the proportion of independent female directors decreases the likelihood of fraud by 0.240% (6.0 x -0.040). Column 4 presents results distinguishing the impact of independent female and inside female (executive female directors) separately and find that the impact of the former is greater and more significant in decreasing the likelihood of fraud (in support of H2b). Columns 5 and 6 model the impact of the female ratio for subsamples of family and non-family firms. In support of H2c, we find that a board with female directors have a greater impact in decreasing the likelihood of fraud in family firms than in non-family firms [0.77% (-0.073 \* 10.6%) vs 0.31% (-0.034 \* 9.1%), respectively]. Columns 7 and 8 present the impact of the independent-female ratio for subsamples of family and non-family firms, where a significant estimator is only found for the sample of non-family firms. This finding might be explained by the lower participation of independent female directors in family firms (see panel B in table 2 for comparative statistics), which consequently decreases the power of their actions to influence decision making.

----------Insert Table 4 here---------

## 4.3 Education Diversity and alumni networks

We regress corporate fraud with different estimations of board education diversity and alumni networks that developed between independent and non-independent directors (Table 5). Column 1 uses the Blau Education Index showing a significant and negative impact on corporate fraud. Column (2) & (3) include the sub-sample analyses by family and non-family of the Blau index. In support of H3a, we find that family firms that have directors with diverse education are 6.81% (-0.463 \* 14.7%) less likely to be in the fraud sample, whereas in non-family firms this likelihood is of 1.72% (-0.107 \* 16.1%). Column 4 & 5 model the impact of alumni networks for family firms and non-family firms by measuring whether independent and executive directors share the same education qualification and university (Edushare), which has a greater impact in increasing the probability of fraud in family than non-family firms [17.50% (0.370\*47.3%) vs 8.07% (0.181\*44.6%), respectively].

----------Insert Table 5 here---------

## Tenure of Independent Directors

Table 6 examines the association between tenure of the independent directors and fraud. Columns 1 to 3 present results for the tenure of independent directors, which coefficients are positive and significant in support of H4a. Independent directors increase the access to a wide range of information and resources when they stay longer on the board, but the effectiveness of their monitoring decreases.

To examine this relationship further, we regress the plausible effect of the standard deviation of tenure of independent directors in columns 4 & 5. In support of H4b, we find that diversity in tenure decreases the probability of fraud in family firms by 0.02% (-0.017\*1.25), but increases it for non-family firms by 0.04% (0.038\*1.12). This implies that diversity in tenure of independent directors provides incentives for better corporate governance practices in family firms. That is, long tenured independent directors that become internally well-connected over time in family firms are disciplined by newly appointed independent directors, improving the effectiveness of the board.

----------Insert Table 6 here---------

## 5. Endogeneity and further analysis

### **Two-stage least squares (2SLS)**

Endogeneity arises in our study because variables of human capital, gender diversity and fraud are not random which might cause bias and inconsistent estimates (Johnson et al., 2013). Therefore, we conduct several tests to address the potential endogeneity issue and confirm the robustness of our findings.

In order to remove unobservable factors, which result in selection bias, we adopt an instrumental variable two-stage least square approach (Kuang and Lee, 2017). The relevancy and exclusion criteria of the instruments were assessed using partial R2 which measures the strength of instrumental variables in the first stage after removing the contribution of the control variables (Larcker and Rusticus, 2010). We treat the family firm variable as endogenous because family firms in Latin America achieve financial outcomes based on non-financial decisions, following socioemotional wealth objectives (Poletti-Hughes and Briano-Turrent, 2019). Therefore, family firms are not independent from their corporate governance choices in the fraud model (i.e. appointment of female directors, board size, etc.). We instrument family firms with operating expenses to represent firm efficiency (Opex) and dividends pay-out ratio (Dividend) as family firms incur in lower agency costs (from the principal/agent relationship) in comparison to non-family firms. That is, dividend policies and firm’s efficiency reflect choices made by family firms but are exogenous from other explanatory variables in the fraud model (Gomez–Mejia et al., 2014). Board size is instrumented with the percentage of free float (float) because shares distributed in the public are not likely to involve board characteristics or family choices on corporate governance practices (Nakano and Nguyen, 2012). The partial R2 of 42% claims the strength of the instrument for board size. To instrument gender diversity we follow Low et al. (2015) and consider that the lack of female appointments to boards can be explained by female economic participation in the country. Therefore, we employ the ratio of female to male labour force participation of the respective countries (female\_part) as the instrumental variable for gender diversity. Although the adjusted R2 for the entire first stage model is 24.5%, the partial R2 for determining the strength of the instrument for female proportion is 19.6% which claims that the strength of the instrument is high excluding the explanatory power of the control variables (Larcker and Rusticus, 2010).

To instrument education diversity, we employ the number of directors’ foreign educational affiliations (foreign\_edu) to represent directors’ cultural diversity in human capital (Johnson et al., 2013). The strength of the instrument for education diversity is 21.6% (partial R2), which proves the relevancy of the instrument in this model.

Further, to address the possibility of reverse causality between fraud and tenure, we use the age of the longest tenured director at the time of appointment or the average of this variable if there is more than one director in this category (Bonini et al., 2017). This is a plausibly exogenous (not simultaneous) instrumental variable, with a partial R2 of 52.3%.

Following Kuang and Lee (2017), we estimate the first-stage regression for the fraud model. In particular, we used the same sets of control variables as in the main model and the instruments described above in the regressions (Table 7 panel A). We then use the predicted value from each stage one regression to instrument the endogenous variables in the second stage regressions. Panels B and C in Table 7 present the results of the instrumented regressions for family and non-family firms, respectively, and indicate that the results remain consistent.

----------Insert Table 7 here---------

## Board experience as a determinant of diversity

According to the upper echelon theory, experienced board members might be overconfident with regards to their judgements and contribution to board effectiveness, impeding actions to change membership, including those that would increase diversity in gender and human capital (Zhu et al., 2015). As experienced boards gain legitimacy and good reputation, restructuring a board to reflect more diversity might be a counterintuitive action from the perspective of a family firm. Johnson et al. (1993) found that board involvement in restructuring board membership takes place only when managerial strategy implementation appears to be deficient. Board restructuring is less likely in family firms as members of the family are board members themselves and family influence impacts on the organizational effectiveness of the family firm because of SEW aims (Barros et al., 2017). Also, it is not uncommon the prevalence of related party transactions in Latin American companies (Mahenthiran et al., 2020), which might increase the likelihood of fraud and the decrease of board membership renewal.

We address that average board experience might have a positive impact on fraud, because of the lack of independence (i.e. limited diversity) that arises from interlocking directorates in firms that have related party transactions (Kuang and Lee, 2017) and because of the weaker quality of oversight that arises as a consequence of external social connectedness (Ahn et al., 2010). Therefore, the reduced monitoring quality from experienced boards suggests that the board may overlook instances of managerial opportunistic behaviour which could precede financial malpractice (i.e. increased likelihood of fraud). We test whether more experienced boards impair diversity on gender, education and tenure, which might be an explanation for board quality (Ali et al., 2014).

We measure board experience with the board average number of directorships in quoted companies hold to date. Table 8 presents the results and indicate that board experience significantly increases the probability of fraud in family firms (column 1) while decrease the probability of fraud in non-family firms (column 2). This finding indicates that experienced family boards may embrace decisions on diversity in order to preserve the SEW (Gomez-Mejia et al. 2007).

Overall, board experience adversely impacts on probability of fraud and board re-structuring in family firms. The family business environment usually tends to have less hierarchical structures and less formal modes of operations (Duh et al., 2010). It is indicated that experienced boards in family firms have less gender diversity (columns 3 and 4) and less diversity in education (albeit no significant, column 5). Column (6) shows that experience increases the tenure of independent directors. These findings provide an explanation to illustrate a mechanism in which family firms have less board diversity.

----------Insert Table 8 here---------

# Discussion & Conclusions

The motivation of this study is the distinguishable characteristics of family and non-family firms, which have been framed by the socioemotional wealth framework (Gomez-Mejia et al., 2011) by highlighting that family firms take financial actions with a non-financial aim (e.g. perpetuate the ownership and control of the family firm), which may intensify resource expropriation from minority investors. Therefore, corporate outcomes are influenced by the familial culture (Poletti-Hughes and Briano-Turrent, 2019), which is predominant in the Latin American region (Gonzalez and Garcia-Meca, 2014), as is the weakness of the institutional system (La Porta et al., 1999), making this region a pertinent setting to study the association of board diversity and fraud.

Grounded on the behavioural agency theory, our argument is that family firms preserve their SEW and consequently take actions that increase the probability of fraud, damaging firms’ reputation (Naumovska et al., 2020) and the prospects of future investment (Gomez-Mejia et al., 2014). Therefore, this research centres on corporate governance mechanisms that offset the probability of corporate fraud in family firms, taking the perspective that the concept of socioemotional wealth (SEW) in family firms is essential in disentangling such relationship. Our first hypothesis (H1a) supports that corporate fraud is greater in family firms. This finding is in line with the argument that the frailty of the institutional system contributes to opportunistic behaviour of family firms (Solís et al., 2017). Therefore, highlighting the relevance of good corporate governance practices as a substitute of a weak legal system to protect minority investors (Poletti-Hughes, 2009).

Our theoretical framework incorporates the notion that the opportunities to preserve emotional endowment over economic value maximization are rooted in the culture and traditions where the family firms are established (Poletti-Hughes and Briano-Turrent, 2019). In such context, we contend that the propensity of fraud in family firms is mainly driven by boards that are homogenous in gender and human capital (i.e. education and tenure). Therefore, a focal point of this study is that board diversity is more relevant for family firms in decreasing the likelihood of fraud, because board diversity decreases entrenchment in family controllers (Bardhan et al., 2015) and consequently reduces the likelihood of fraud. In this process, the stand towards diversity is of utmost importance, because board diversity is the main component to align socioemotional goals to minority shareholders’ goals.

By modelling the relationship between family firms and fraud, we incorporate the notion that board diversity increases in line to board size (Carter et al. 2003), and hypothesize that family firms benefit from having larger boards to decrease the probability of fraud (H1b). In support of H1b we conclude that smaller boards align to the family interests because of the social ties among members, but dissipate when boards are larger because the inclusion of more members provides a potential source for diversity.

In our analytical framework, we assume that because of SEW objectives, the choices towards diversity from family firms differ from those of non-family firms and are driven by independent directors who develop ties with the family board members. In coherence with our theoretical predictions, we find that gender and board education diversity significantly decrease fraud. The results of gender diversity are also consistent with the literature positing that female directors make a firm less propense to commit fraud (H2a). For instance, Chidambaran et al. (2011) finds that SEC violations are more likely in boards with less female directors and less independent directors (i.e. longer tenure, executives and CEO/Chair duality). More importantly and relevant to the main contribution of this research is that gender diversity in family firms is more impactful (H2c). Greater gender diversity suggests an improvement of financial reporting quality and transparency in decision making in a weaker corporate governance environment (González et al., 2020). We highlight a difference between non-independent and independent female directors in family and non-family businesses, respectively (H2b). We find that independent female directors are more effective in decreasing the probability of fraud. However, in family firms the monitoring role of non-independent female directors is impaired (i.e. showing a non-significant relationship with the likelihood of fraud). A possible explanation for this effect is that the proportion of independent female directors in Latin American family companies is lower than that of inside female directors (i.e. 1.8% vs 5.3%, respectively). The low participation of independent female directors might represent tokenism in response to strong institutional pressures as opposed to aiming to achieve the benefits from gender diversity (Konrad et al., 2008). Notably, the benefits from gender diversity on boards are palpable when more than one female director are present within a board (Torchia et al., 2011).

Also, we find that corporate fraud decreases in line with education diversity (i.e. business vs non-business in independent directors), but increases when independent directors have previously developed alumni networks with executive directors). Such an impact is significant for family and non-family firms (H3a), but more impactful for the later (H3b), because of the emotional bonds that arise between independent directors and inside directors that share same educational backgrounds could harm the monitoring role of directors. That is, future firm directors that belong to a family firm might establish their network throughout their education years (González and García-Meca 2014; Lefort and Urzúa, 2008), which fosters the use of such connectedness to appoint future directors. These outside directors do not classify to the strict definition of independence, as are close to family owners through friendships and tend to hold cross-directorships, impairing their independence in line to the quality and quantity of their relationships (Avina-Vazquez and Uddin, 2016). Similarly, Hsu et al., (2014) find that in the UK not only the monitoring function of independent directors is relevant, but also and consistent with our findings, their affiliations with the firm and its management might impact on corporate failure.

Following this view, we further explore how fraud relates to family firms through the process in which external independent directors develop ties with the family firm, as human capital led social ties might create more connected directors (Chidambaran et al, 2011). We show that independent directors’ ties weaken their input as represented by longer board tenures, increasing the likelihood of fraud (H4a). In addition, we find that family firms benefit from diversity in tenures contributing to a decrease in fraud (H4b). Based on these findings, we assert that independent directors that can provide both experience in the company and unbiased input respond to the needs of family firms more efficiently, resulting in a decrease of fraud.

Our findings contribute to research on board structure of family firms in important ways. First, we use the theoretical framework of socioemotional wealth (SEW) as a possible interpretation to explain the entrenchment effect of family controllers which is common in the Latin American regional setting to explain the probability of fraud. Second, we contribute by explaining the social ties between family and outside directors, which decrease their independence and increasing the likelihood of corporate fraud. This study shows the benefits that arise from gender and human capital diversity, which are more impactful in family firms and do not contradict SEWs aims, yielding important implications for regulators in the Latin American region for improving corporate governance mechanisms in family firms.

In our research we have provided socioemotional wealth as a possible interpretation for the association of family firms and fraud. Future research could aim to directly measure SEW as the mechanism in which family firms affect fraud.

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**Table 1. Fraud cases and observations per country and year.**

**Panel A. Fraud by country**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Country | No. of firms | Fraud cases | Non-Fraud | No. Observations | Fraud | Non-Fraud |
| Argentina | 18 | 9 | 9 | 150 | 61 | 89 |
| Brazil | 113 | 40 | 73 | 868 | 349 | 519 |
| Chile | 25 | 4 | 21 | 169 | 37 | 132 |
| Colombia | 13 | 5 | 8 | 86 | 34 | 52 |
| Mexico | 66 | 24 | 42 | 503 | 198 | 305 |
| Peru | 9 | 4 | 5 | 63 | 28 | 35 |
| **Total** | **244** | **86** | **158** | **1839** | **707** | **1132** |

**Panel B. Fraud by year**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Year | Fraud Cases | Fraud Observations | Year | Fraud Cases | Fraud Observations |
| 2000 | 0 | 0 | 2011 | 8 | 56 |
| 2001 | 1 | 1 | 2012 | 10 | 66 |
| 2002 | 1 | 1 | 2013 | 9 | 72 |
| 2003 | 1 | 1 | 2014 | 8 | 71 |
| 2004 | 1 | 1 | 2015 | 6 | 76 |
| 2005 | 2 | 8 | 2016 | 4 | 77 |
| 2006 | 2 | 9 | 2017 | 5 | 75 |
| 2007 | 3 | 16 | 2018 | 4 | 74 |
| 2008 | 4 | 26 | 2019 | 1 | 1 |
| 2009 | 5 | 27 | **Total** | **86** | **707** |
| 2010 | 11 | 49 |  |  |  |

Fraud cases are based on the fraud date of commission reported from the source. Fraud observations indicates fraud duration, which ranges from the date of commission of the alleged fraud until the year when the alleged fraud ended.

**Table 2. Descriptive statistics**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Panel A: Univariate comparisons between fraud and non-fraud firms** | | | | | | | | | | | | |
|  | Overall  (1) | | Fraud = 0  (2) | | | | | Fraud = 1  (3) | | | | Mean  Difference |
| Variable | Mean | Std. Dev. | Mean | Std. Dev. | Min | Max |  | Mean | Std. Dev. | Min | Max | (2)-(3) |
| **Gender diversity** |  |  |  |  |  |  |  |  |  |  |  |  |
| Fem | 0.07 | 0.09 | 0.08 | 0.10 | 0.00 | 0.60 |  | 0.06 | 0.09 | 0.00 | 0.40 | 0.02\*\* |
| InD Fem | 0.02 | 0.06 | 0.03 | 0.07 | 0.00 | 0.50 |  | 0.02 | 0.04 | 0.00 | 0.38 | 0.01\*\* |
| InD Male | 0.83 | 0.17 | 0.85 | 0.19 | 0.00 | 0.92 |  | 0.82 | 0.13 | 0.00 | 0.95 | 0.03\*\* |
| **Tenure and Experience** |  |  |  |  |  |  |  |  |  |  |  |  |
| Tenure InD | 6.06 | 4.34 | 5.95 | 4.26 | 0.10 | 24.50 |  | 6.28 | 4.46 | 0.10 | 24.10 | -0.33\* |
| Blau Edu Index | 0.33 | 0.15 | 0.34 | 0.15 | 0.00 | 0.50 |  | 0.31 | 0.16 | 0.00 | 0.50 | 0.03\*\* |
| SD Tenure InD | 3.79 | 3.17 | 3.85 | 3.38 | 0.20 | 15.30 |  | 3.74 | 2.81 | 0.10 | 17.60 | 0.11\*\* |
| Edu share | 0.18 | 0.39 | 0.22 | 0.37 | 0.00 | 1.00 |  | 0.16 | 0.41 | 0.00 | 1.00 | 0.06\*\* |
| **Firm Financial and Governance Characteristics** |  |  |  |  |  |  |  |  |  |  |  |  |
| ROA | 0.04 | 0.09 | 0.05 | 0.09 | -0.40 | 0.31 |  | 0.03 | 0.08 | -0.40 | 0.30 | 0.02 |
| Size | 8.37 | 1.58 | 7.92 | 1.37 | 4.41 | 11.13 |  | 9.09 | 1.64 | 4.42 | 12.80 | -1.17\*\* |
| Leverage | 0.57 | 0.22 | 0.55 | 0.21 | 0.13 | 0.95 |  | 0.61 | 0.24 | 0.14 | 0.98 | -0.06\*\* |
| Sales growth | 0.05 | 0.19 | 0.05 | 0.17 | 0.04 | 0.10 |  | 0.06 | 0.203 | 0.04 | 0.11 | -0.01\* |
| Chair CEO | 0.29 | 0.45 | 0.24 | 0.24 | 0.00 | 1.00 |  | 0.38 | 0.48 | 0.00 | 1.00 | -0.14\*\* |
| Independence | 0.38 | 0.20 | 0.39 | 0.20 | 0.00 | 0.91 |  | 0.37 | 0.20 | 0.00 | 0.95 | 0.02\* |
| Board size | 9.31 | 3.21 | 8.84 | 2.97 | 3 | 22 |  | 10.06 | 3.37 | 2 | 22 | -1.22\*\* |
| Firm age | 41.12 | 31.17 | 41.11 | 32.58 | 1 | 181 |  | 41.13 | 30.33 | 1 | 171 | -0.02 |

\*\*, \* represent significance at the 0.05, and 0.1 levels (two-tailed).

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Panel B: Comparison of Fraud and non-Fraud Samples in Family and no- Family Firms** | | | | | | | | | |
|  | Family = 0 | | |  | Family = 1 | | | Difference in means | |
|  | Overall | Fraud = 0 | Fraud = 1 |  | Overall | Fraud = 0 | Fraud = 1 | Fraud =1 | Fraud = 0 |
| (n=919) | (n = 567) | (n = 352) | (n=920) | (n = 565) | (n = 355) |
|  | (1) | (2) | (3) |  | (4) | (5) | (6) | (3) -(6) | (2)-(5) |
| **Gender Diversity** |  |  |  |  |  |  |  |  |
| Fem | 0.06(0.09) | 0.04(0.06) | 0.07(0.09) |  | 0.07(0.10) | 0.07(0.10) | 0.05(0.098) | 0.02\* | -0.03\*\* |
| InD Fem | 0.03(0.67) | 0.03(0.07) | 0.02(0.05) |  | 0.02(0.05) | 0.02(0.03) | 0.01(0.03) | 0.01\*\* | 0.01\*\* |
| InD Male | 0.92(0.16) | 0.72(0.17) | 0.74(0.14) |  | 0.95(0.16) | 0.73(0.19) | 0.76(0.11) | -0.02\* | -0.01\*\* |
| **Tenure and Experience** |  |  |  |  |  |  |  |  |  |
| Tenure InD | 4.65(1.12) | 5.64(1.22) | 4.78(2.82) |  | 7.47(1.25) | 6.02(1.30) | 6.54(1.63) | -1.76\*\* | -0.38 |
| Blau Edu Index | 0.32(0.16) | 0.39(0.06) | 0.32(0.01) |  | 0.33(0.14) | 0.35(0.05) | 0.31(0.01) | 0.01\* | 0.04\* |
| SD Tenure InD | 2.91(1.12) | 2.97(3.04) | 2.79(2.15) |  | 2.91(1.25) | 3.93(3.51) | 4.05(2.86) | -1.26\*\* | -0.96 |
| Edu share | 0.17(0.44) | 0.21(0.41) | 0.31(0.46) |  | 0.19(0.47) | 0.15(0.36) | 0.20(0.39) | 0.11\*\* | 0.06\* |
| **Firm Financial and Governance Characteristics** |  |  |  |  |  |  |  |  |  |
| ROA | 4.89(9.35) | 3.77(7.03) | 6.61(10.17) |  | 3.49(8.42) | 4.55(10.79) | 3.70(1.22) | 2.91 | -0.78 |
| Size | 8.53(1.77) | 7.57(1.57) | 8.56(1.47) |  | 8.21(1.36) | 7.98(1.36) | 9.23(2.14) | -0.67\*\* | -0.41\*\* |
| Leverage | 0.54(0.22) | 0.53(0.20) | 0.54(0.24) |  | 0.59(0.21) | 0.55(0.21) | 0.73(1.73) | -0.19 | -0.02 |
| Sales growth | 0.05(0.02) | 0.06 (0.02) | 0.04 (0.01) |  | 0.05(0.01) | 0.05 (0.01) | 0.06 (0.02) | -0.02 | 0.01 |
| Independence | 0.37(0.22) | 0.32(0.21) | 0.39(0.19) |  | 0.39(0.19) | 0.38(0.21) | 0.32(0.21) | -0.07\*\* | -0.06\*\* |
| Board size | 9.00(2.85) | 8.50(2.92) | 10.24(3.23) |  | 9.60(3.49) | 8.84(2.97) | 10.09(3.42) | 0.15\*\* | -0.34 |
| Chair CEO | 0.28(0.45) | 0.28(0.45) | 0.48(0.50) |  | 0.31(0.46) | 0.24(0.43) | 0.35(0.48) | 0.13\*\* | 0.04 |
| Firm age | 40.25(34.85) | 40.08(36.98) | 40.52(31.18) |  | 41.99(28.25) | 42.14(27.47) | 41.74(29.48) | -1.22\*\* | -2.06\*\* |

\*\*, \* represent significance at the 0.05, and 0.1 levels (two-tailed). Standard deviation of variables is in the parentheses.

**Table 3. Fraud and Family Firm (marginal effects)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4)  Fam | (5)  Non-Fam |
| Fam | 0.064\*\* |  |  |  |  |
|  | (2.10) |  |  |  |  |
| Fam in Board |  | 0.068\*\* |  |  |  |
|  |  | (2.24) |  |  |  |
| Fam Own |  |  | 0.083\* |  |  |
|  |  |  | (1.84) |  |  |
| Board size | -0.073 | -0.052 | -0.032 | -0.918\*\*\* | 1.696\*\*\* |
|  | (-1.39) | (-0.84) | (-0.66) | (-3.77) | (3.24) |
| ROA | 0.002 | 0.001 | 0.002 | 0.006 | 0.003 |
|  | (0.92) | (0.79) | (0.74) | (0.45) | (1.07) |
| Size | 0.096\*\*\* | 0.089\*\*\* | 0.085\*\*\* | 0.865\*\*\* | 0.137\*\*\* |
|  | (5.93) | (3.97) | (4.83) | (3.91) | (5.01) |
| Leverage | 0.199\*\* | 0.150\* | 0.156\* | 0.234\*\* | 0.151 |
|  | (2.60) | (1.64) | (1.67) | (2.47) | (1.60) |
| Firm age | -0.018\*\*\* | -0.001\*\* | -0.005 | -0.001 | -0.001 |
|  | (-2.94) | (-2.18) | (-0.71) | (-1.18) | (-1.38) |
| Sales growth | -0.005 | -0.004 | -0.006 | -0.018 | -0.022 |
|  | (-0.62) | (-0.47) | (-0.65) | (-1.28) | (-1.30) |
| Independence | 0.003 | 0.004 | 0.015 | -0.127 | -0.210\* |
|  | (0.46) | (0.54) | (0.21) | (-0.90) | (-1.65) |
| Chair CEO | 0.040 | 0.027 | 0.021 | 0.257\*\*\* | 0.086 |
|  | (1.35) | (0.81) | (0.67) | (5.37) | (1.53) |
| Observations | 1839 | 1839 | 1839 | 920 | 919 |
| Log pseudo likelihood | -94.649 | -95.900 | -95.291 | -191.62 | -96.534 |
| Wald chi2 | 192.39 | 244.12 | 206.76 | 170.13 | 170.99 |
| Wald chi2(P- Value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

This table presents the marginal effects from a panel data logistic regression. Fraud is a dummy variable which equal one when a firm committed fraud and zero otherwise. Country, year and industry dummies are included in all models. Robust standard errors clustered by firm in parentheses \*\*\* p<0.01, \*\* p<0.05, \* p<0.10. Definitions of variables in appendix 1.

**Table 4:** **Fraud and Female Director (marginal effects)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5)  Fam | (6)  Non-Fam | (7)  Fam | (8)  Non-Fam |
| Fem | -0.213\*\* |  |  |  | -0.073\*\* | -0.034\* |  |  |
|  | (-2.05) |  |  |  | (-1.97) | (-1.78) |  |  |
| Fem/male ratio |  | -0.438\*\* |  |  |  |  |  |  |
|  |  | (-2.00) |  |  |  |  |  |  |
| InD Male |  |  | 0.005 |  |  |  |  |  |
|  |  |  | (0.63) |  |  |  |  |  |
| InD Fem |  |  | -0.040\* | -0.093\*\*\* |  |  | -0.094 | -0.103\* |
|  |  |  | (-1.92) | (-2.78) |  |  | (-1.44) | (-1.74) |
| Ins fem |  |  |  | -0.021\* |  |  |  |  |
|  |  |  |  | (-1.81) |  |  |  |  |
| Fam | 0.064\*\* | 0.017\*\* | 0.054\* | 0.023\* |  |  |  |  |
|  | (2.21) | (2.30) | (1.89) | (1.78) |  |  |  |  |
| ROA | 0.001 | 0.001 | 0.003 | 0.095\* | 0.003 | 0.003 | 0.061 | 0.007 |
|  | (0.70) | (0.71) | (0.21) | (1.79) | (0.55) | (0.60) | (1.21) | (0.81) |
| Size | 0.094\*\*\* | 0.134\*\*\* | 0.104\*\*\* | 0.119\*\*\* | 0.031\*\*\* | 0.124\*\* | 0.116\*\*\* | 0.125\*\*\* |
|  | (4.67) | (7.25) | (4.86) | (5.05) | (5.11) | (2.19) | (5.01) | (3.59) |
| Leverage | 0.188\*\*\* | 0.442\*\*\* | 0.224\*\*\* | 0.369\*\*\* | 0.137\*\*\* | 0.157 | 0.398\*\*\* | 0.290\* |
|  | (2.90) | (4.78) | (4.05) | (3.68) | (3.83) | (1.00) | (3.51) | (1.68) |
| Firm age | -0.005 | -0.013\*\* | -0.001\*\* | -0.001 | -0.001 | -0.001 | -0.001 | -0.001 |
|  | (-1.00) | (-2.10) | (-2.19) | (-1.28) | (-1.42) | (-0.94) | (-1.38) | (-1.38) |
| Sales growth | -0.004 | -0.003 | -0.005 | -0.002 | -0.006 | -0.020 | -0.001 | -0.005 |
|  | (-0.62) | (-0.72) | (-0.66) | (-1.17) | (-0.33) | (-0.78) | (-0.66) | (-0.35) |
| Board size | -0.011 | 0.045 | 0.011 | 0.047 | -0.058 | 0.073 | -0.336 | 0.092 |
|  | (-0.81) | (0.63) | (0.24) | (0.66) | (-0.92) | (0.64) | (-1.34) | (0.78) |
| Independence | -0.015 | -0.001 |  |  | -0.044\*\* | -0.012\* |  | -0.021 |
|  | (-1.01) | (-0.11) |  |  | (-2.67) | (-1.71) |  | (-1.61) |
| Chair CEO | 0.022 | 0.093\*\*\* | 0.040\* | 0.113\*\*\* | 0.136\* | 0.023\* | 0.122\*\* | 0.0155\*\* |
|  | (1.44) | (2.59) | (1.95) | (3.22) | (1.66) | (1.75) | (2.08) | (2.41) |
| Observations | 1839 | 1839 | 1839 | 1839 | 920 | 919 | 920 | 919 |
| Log pseudo likelihood | -93.785 | -84.659 | -87.401 | -93.918 | -47.085 | -43.314 | -47.043 | -55.780 |
| Wald chi2 | 269.34 | 176.64 | 187.52 | 222.92 | 86.43 | 84.89 | 86.42 | 89.32 |
| Wald chi2(P- Value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.009 | 0.000 | 0.000 |

This table presents the marginal effects from the panel data logistic regression. *t* statistics in parentheses All models used robust standards errors, clustered by firm. \*\*\*, \*\*, \* represent significance at the 0.01, 0.05, and 0.1 levels (two-tailed), respectively. All regressions include dummies for industrial sectors, year and countries. Definitions of variables in appendix 1.

**Table 5. Board Education and Corporate Fraud (marginal effects)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) |
|  | Blau index | Blau index  Fam | Blau index  Non-Fam | Edu share  Fam | Edu share  Non-Fam |
| Blau Edu Index (1) | -0.164\* | -0.463\*\*\* | -0.107\* |  |  |
|  | (-1.79) | (-3.43) | (-1.70) |  |  |
| Edu share (2) |  |  |  | 0.370\*\*\* | 0.181\*\*\* |
|  |  |  |  | (7.11) | (3.58) |
| Fam | 0.039\* |  |  |  |  |
|  | (1.94) |  |  |  |  |
| ROA | 0.001 | 0.003 | 0.001 | 0.002 | 0.004 |
|  | (0.60) | (1.00) | (0.70) | (0.79) | (1.03) |
| Size | 0.113\*\*\* | 0.072\*\*\* | 0.108\*\*\* | 0.111\*\*\* | 0.102\*\*\* |
|  | (5.04) | (2.93) | (5.08) | (7.06) | (4.37) |
| Leverage | 0.351\*\*\* | 0.040 | 0.337\* | 0.299\*\*\* | 0.116 |
|  | (3.85) | (0.29) | (1.72) | (3.50) | (0.85) |
| Firm age | -0.001\* | -0.001 | -0.008 | -0.001\* | -0.001\* |
|  | (-1.86) | (-1.40) | (-1.37) | (-1.73) | (-1.75) |
| Sales growth | 0.001 | 0.018 | 0.001 | 0.006 | 0.024\* |
|  | (0.08) | (1.17) | (0.69) | (0.49) | (1.66) |
| Board size | 0.037 | -0.035 | 0.049 | -0.030 | 0.162\* |
|  | (0.47) | (-0.41) | (0.62) | (-0.44) | (1.93) |
| Independence | -0.002 | 0.001 | -0.003 | -0.007 | 0.013 |
|  | (-0.44) | (1.18) | (-0.76) | (1.00) | (1.15) |
| Chair CEO | 0.112\*\*\* | 0.200\*\*\* | 0.110\*\*\* | 0.106\*\*\* | 0.171\*\*\* |
|  | (3.07) | (3.94) | (3.04) | (3.34) | (4.03) |
| Observations | 1839 | 920 | 919 | 920 | 919 |
| Log pseudo likelihood | -125.913 | -194.394 | -91.755 | -162.170 | 130.755 |
| Wald chi2 | 103.92 | 162.64 | 120.59 | 196.28 | 157.04 |
| Wald chi2(P- Value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

This table presents the marginal effects from the panel data logistic regression. All models include country, year and industry dummy variables. T-statistics in parentheses with robust standards errors, clustered by firm. \*\*\*, \*\*, \* represent significance at the 0.01, 0.05, and 0.1 levels (two-tailed), respectively. Definitions of variables in appendix 1.

**Table 6. Fraud and tenure of independent directors in family firms (marginal effects)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) |
|  | Tenure InD | Tenure InD  Fam | Tenure InD  Non-Fam | SD Tenure InD  Fam | SD Tenure InD  Non-Fam |
| Tenure InD | 0.009\*\* | 0.048\*\*\* | 0.024\*\*\* |  |  |
|  | (2.23) | (3.70) | (4.14) |  |  |
| SD Tenure InD |  |  |  | -0.017\*\* | 0.038\*\*\* |
|  |  |  |  | (-2.53) | (3.33) |
| Fam | 0.007 |  |  |  |  |
|  | (1.41) |  |  |  |  |
| ROA | 0.002\* | 0.001 | 0.006\*\*\* | 0.001 | 0.001 |
|  | (1.75) | (1.43) | (4.11) | (0.98) | (0.07) |
| Firm size | 0.109\*\*\* | 0.114\*\*\* | 0.123\*\*\* | 0.122\*\*\* | 0.121\*\*\* |
|  | (4.87) | (5.08) | (5.57) | (4.96) | (5.42) |
| Leverage | 0.360\*\*\* | 0.330\*\*\* | 0.167\* | 0.304\*\*\* | 0.130 |
|  | (3.37) | (3.49) | (1.94) | (2.92) | (1.47) |
| Firm age | -0.001\*\* | -0.001\*\* | -0.001\*\* | -0.001 | -0.001\*\* |
|  | (-2.17) | (-2.13) | (-2.14) | (-1.68) | (-2.04) |
| Sales growth | 0.002 | 0.001 | -0.012 | 0.002 | -0.011 |
|  | (0.23) | (0.72) | (-0.92) | (1.13) | (-0.81) |
| Independence | -0.002 | -0.003 | 0.019 | -0.003 | 0.158 |
|  | (-0.33) | (-0.36) | (1.58) | (-0.41) | (1.27) |
| Board size | 0.059 | 0.066 | 0.115 | 0.055 | 0.718 |
|  | (0.89) | (0.95) | (1.30) | (0.91) | (1.08) |
| Chair CEO | 0.121\*\*\* | 0.123\*\*\* | 0.027\* | 0.122\*\*\* | 0.030 |
|  | (3.76) | (3.73) | (1.70) | (3.71) | (1.61) |
| Observations | 1839 | 920 | 919 | 920 | 919 |
| Log pseudo likelihood | -95.732 | -93.768 | -93.956 | -97.59 | -94.287 |
| Wald chi2 | 193.83 | 178.26 | 200.12 | 196.57 | 174.66 |
| Wald chi2(P- Value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

This table presents the marginal effects from the panel data logistic regression. All models include country, year and industry dummy variables. All the models used robust standards errors, clustered by firm. \*\*\*, \*\*, \* represent significance at the 0.01, 0.05, and 0.1 levels (two-tailed), respectively. Definitions of variables in appendix 1.

**Table 7. Instrumental variables regressions**

We adopt an Instrumental Variable Logit regression approach (Burgess, 2013) to mitigate the endogeneity issue in the models. The Instrumental Variable Logit regression used the following model,

First Stage:

qit= αit+ βnInstrumental Variables+ ∑βk(CGkit)+∑βc(FEcit)+ εi,t

Second Stage:

Fraudit= αit+ βiqitˆ+ ∑βk(CGkit)+∑βc(FEcit)+ εi,t

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Panel A: First Stage (Instrumental Regression)** | | | | | |
|  | (1) | (2) | (3) | (4) | (5) |
| Dependent variable: | Fam | Board Size | Fem | Blau Edu Index | Tenure |
| Opex | -0.005\*\*\* |  |  |  |  |
|  | (-4.14) |  |  |  |  |
| Dividend | 0.934\*\*\* |  |  |  |  |
|  | 2.37 |  |  |  |  |
| Float |  | 0.008\* |  |  |  |
|  |  | (1.82) |  |  |  |
| Female\_part |  |  | 0.004\*\* |  |  |
|  |  |  | (1.96) |  |  |
| Foreign\_edu |  |  |  | 0.033\*\*\* |  |
|  |  |  |  | (8.88) |  |
| Max age |  |  |  |  | -0.583\*\*\* |
|  |  |  |  |  | (-9.01) |
| Observations | 1839 | 1839 | 1839 | 1839 | 1839 |
| Adj. R2 | 0.210 | 0.491 | 0.245 | 0.295 | 0.608 |
| F –statistics | 20.62 | 72.12 | 22.41 | 26.92 | 105.95 |
| Partial R2 | 0.183 | 0.427 | 0.196 | 0.216 | 0.523 |
| **Panel B: Second Stage (dependent variable – Fraud) – Family Firms** | | | | | |
| Famhat | 0.675 \*\*\* |  |  |  |  |
|  | (2.38) |  |  |  |  |
| Bsizehat |  | -0.444\*\* |  |  |  |
|  |  | (-3.09) |  |  |  |
| Femhat |  |  | -1.951\*\* |  |  |
|  |  |  | (-2.26) |  |  |
| Eduhat |  |  |  | -1.935\*\*\* |  |
|  |  |  |  | (-3.82) |  |
| Tenhat |  |  |  |  | 0.025\*\* |
|  |  |  |  |  | (2.06) |
| R2 | 0.210 | 0.489 | 0.414 | 0.375 | 0.355 |
| chi2 | 258.08 | 247.23 | 242.26 | 262.88 | 284.83 |
| p-value | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Panel C: Second Stage (dependent variable – Fraud)  - Non-Family Firms** | | | | | |
| Bsizehat |  | 0.937 |  |  |  |
|  |  | (0.25) |  |  |  |
| Femhat |  |  | -0.156\*\*\* |  |  |
|  |  |  | (-3.17) |  |  |
| Eduhat |  |  |  | -1.279\*\*\* |  |
|  |  |  |  | (-3.21) |  |
| Tenhat |  |  |  |  | 0.018\*\* |
|  |  |  |  |  | (2.10) |
| R2 |  | 0.531 | 0.486 | 0.359 | 0.341 |
| chi2 |  | 127.46 | 183.27 | 189.85 | 147.30 |
| p-value |  | 0.041 | 0.000 | 0.000 | 0.000 |

Panel A reports instrumental variable 2SLS regression results from the first stage for the bivariate logit model. Panels B and C report marginal effect of second stage regressions in sub-sample of family firms and non-family firms, respectively. Control variables included in the model but unreported. All regressions include dummies for industrial sectors, year and countries. *t* statistics in parentheses. \* p<0.10, \*\* p<0.05, \*\*\* p<0.01

**Table 8: Board experience, fraud and diversity (marginal effects)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
|  | Family | Non-Family | Female Proportion | InD Fem | Blau Index | Tenure\_ID |
| Experience\* Fam |  |  | -0.078\*\* | -0.009\*\* | -0.008 | 0.590\*\* |
|  |  |  | (-2.33) | (-2.01) | (0.11) | (2.14) |
| Experience | 0.068\*\* | -0.092\*\*\* | 0.024 | 0.014\* | 0.041 | 0.120\*\*\* |
|  | (2.43) | (-3.72) | (0.98) | (1.78) | (0.46) | (3.41) |
| Fam |  |  | 0.221\*\* | 0.042 | -0.007 | 0.014 |
|  |  |  | (2.26) | (1.51) | (-0.52) | (1.65) |
| ROA | 0.002 | 0.003 | -0.008 | -0.002 | -0.004\*\* | 0.014\*\* |
|  | (1.28) | (1.06) | (-1.14) | (-1.18) | (-2.10) | (2.34) |
| Firm size | 0.110\*\*\* | 0.135\*\*\* | -0.003 | 0.059\*\*\* | -0.042\*\*\* | 0.661\*\*\* |
|  | (4.90) | (5.18) | (0.43) | (3.73) | (-2.76) | (3.35) |
| Leverage | 0.400\*\*\* | 0.317\*\* | -0.087 | -0.016 | -0.073 | 1.273\*\* |
|  | (3.10) | (2.12) | (-0.28) | (-0.04) | (-1.41) | (2.13) |
| Firm age | -0.001 | -0.001\* | 0.002 | 0.001 | 0.003 | 0.042\*\*\* |
|  | (-0.74) | (-1.93) | (0.74) | (1.14) | (1.04) | (2.64) |
| Sales growth | 0.001 | -0.021 | 0.018 | -0.014\* | -0.002 | -0.034 |
|  | (-0.80) | (-1.39) | (0.62) | (-1.68) | (-0.69) | (-0.76) |
| Independence | -0.006 | 0.018 | 0.003 |  | 0.005 | -0.287\*\*\* |
|  | (-1.05) | (1.44) | (0.69) |  | (1.43) | (-3.37) |
| Board size | 0.033 | 0.141 | 0.291\*\*\* | 0.033 | 0.050 | -0.514 |
|  | (-0.01) | (1.44) | (3.89) | (0.58) | (-0.14) | (-1.31) |
| Chair CEO | 0.121\*\*\* | -0.158\*\*\* | -0.102\*\* | -0.010 | -0.108\*\*\* | -0.406 |
|  | (3.72) | (-2.58) | (-2.50) | (-0.59) | (-3.05) | (-0.53) |
| Observations | 920 | 919 | 1839 | 1839 | 1839 | 1839 |
| chi2 | 30.88 | 35.94 | 39.01 | 84.40 | 63.47 | 125.60 |
| p-value | 0.099 | 0.000 | 0.019 | 0.000 | 0.000 | 0.000 |

This table reports the alternative estimations of board experience on board diversity characteristics for family and non-family firms. Standards errors are robust. All regressions include dummies for industrial sectors, year and countries. \*\*\*, \*\*, \* refer to significance at the 0.01, 0.05, and 0.1 levels (two-tailed), respectively. t statistics in parentheses.

**Appendix 1**

|  |  |
| --- | --- |
| **Definitions of Variables** | |
| **Variable** | **Definition** |
| Fem | Ratio of the number of female directors to board size |
| InD Fem | Ratio of the number of independent female directors to board size |
| InD Male | Ratio of the number of independent male directors to board size |
| Fem male | Ratio of independent female to independent male directors. |
| InD fem Dum | Indicator variable with the value of 1 if there is at least one independent female director on the board, 0 otherwise |
| Ins\_fem | Ratio of female non-independent to board size |
| Female part | Ratio of female to male labour force participation |
| Femhat | Predicted values for Fem from the first-stage regression (Table 7) |
| Tenure InD | Years of experience in the board by non-executive independent directors |
| Blau Edu Index | An index to measure board education diversity, calculated using the , where, is the percentage of board members qualified in business education. The value fluctuates between 0 and 0.5. |
| Edushare | Dummy variable equal to 1 if the independent directors do not share the same education qualification and same university with executive directors and otherwise. |
| SD Tenure InD | Standard deviation measured within independent director’s tenure in the board |
| Foreign edu | The number of foreign educational affiliations |
| Eduhat | Predicted values for Blau Education Diversity Index from the first-stage regression (Table 7) |
| Max Age | The average age that the longest-tenured independent directors were hired |
| Max Tenhat | Predicted values for tenure of independent directors from the first-stage regression (Table 7). |
| InD Age | Natural logarithm of average age of independent directors in the board |
| Size | Natural log of total assets |
| Sales growth | The five-year average annual sales growth rate. |
| Leverage | Ratio of Debt divided by equity |
| ROA | Ratio of operating profit to total assets |
| Firm age | Natural logarithm of the number of years since firm’s year of incorporation |
| Opex | Natural logarithm of Earnings before interest and tax |
| Dividend | Ratio of dividend per share divided to Earnings per share |
| Float | Float in the market as percentage of total shares outstanding |
| Independence | Ratio of Independent directors’ seat to board size |
| Board size | Logarithm of the total number of members on the boards |
| Chair CEO | If the chair and CEO are the same individual, set to 1; otherwise, set to 0; dummy variable |
| Fam | Dummy variable equal to 1 if the family is the family hold more than 20% of share ownership and at least one family member in the board, and 0 otherwise |
| Fam Own | Proportion of shares hold by family members |
| Fam in Board | If at least one family member in the board, set to 1; otherwise, set to 0; dummy variable |
| Famhat | Predicted values for family firm from the first-stage regression (Table 7) |
| boardhat | Predicted values for board size from the first-stage regression (Table 7) |
| Board experience | Board average number of quoted directorships hold to date. |

1. Corresponding author email: [jpoletti@liverpool.ac.uk](mailto:jpoletti@liverpool.ac.uk) [↑](#footnote-ref-1)
2. Enron’s board was integrated by appropriate financial competencies and experience (i.e. multiple MBAs and legal experts), and yet members have claimed that they have been confused by the financial transactions (O'Connor, 2002). [↑](#footnote-ref-2)