



## The dark side of marital leadership: Evidence from China

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### ABSTRACT

Using a unique dataset of Chinese private firms, we find that marital leadership is associated with higher propensity for financial fraud. We examine the potential economic mechanisms that lead to this result, finding that weak internal supervision and inefficient decision-making provide crucial linkages between marital leadership and financial fraud. However, well-functioning corporate governance mechanisms reduce the negative effects of marital leadership. Our findings provide important empirical evidence for the effect of family involvement in corporate governance and contribute to the literature on the determinants of financial fraud in listed firms.

### 1. Introduction

Information is one of the most crucial factors that affect investors' decision-making in capital markets (Bushman & Piotroski, 2006). While the quality of financial reports disclosed by listed firms are of great significance in reducing information asymmetry between investors and managers (Huynh, Wu, & Duong, 2020; Qu, Wongchoti, Wu, & Chen, 2018), equally important is the level of trust that investors place in these reports. However, it is unfortunately all too common for company insiders to engage in deceptive financial reporting in furtherance of private interests, thereby creating financial fraud.

Fraud undermines faith in financial disclosures, deprecating trust (Fukuyama, 1995). Consequently, as all market contracts are incomplete (e.g., Hart, 2017), deprecating trust increases the transaction costs of vetting asymmetric information (Williamson, 1979), leading to changes in the nature and costs of finance (Aggarwal & Goodell, 2009, 2011). In sum, acts of fraud increase the transaction costs of financial markets even for societies which have high-quality national governance and financial transparency. Further, for countries with less-than-optimal national governance and corporate transparency, acts of fraud will naturally have a magnifying impact on transaction costs, engendering instability in national financial systems.

Given the cost associated with financial fraud, previous literature has

explored the determinants of financial fraud from the viewpoints of equity structure (La Porta, Lopez-de-Silanes, & Shleifer, 1999), board of director/supervisor characteristics (Beasley, 1996; Ferris, Jagannathan, & Pritchard, 2003; Jia, Ding, Li, & Wu, 2009; Cumming, Hou, & Lee, 2016; Van Scotter & Roglio, 2020), local culture (Dong, Han, Ke, & Chan, 2018), and the effectiveness of public enforcement (Kedia & Rajgopal, 2011). Different from previous studies, our study focuses on the effect of marital leadership on financial fraud.

Recently, studies note that relational embeddedness factors such as marriage and family play a crucial role in corporate financial decision-making and governance (Nicolosi & Yore, 2015; Roussanov & Savor, 2014; Srinidhi & Liao, 2020). Generally, there is little cognitive disagreement about the concept of marriage. However, the definition of family boundaries has been, for most societies, a dynamic evolution across different historical stages. Specifically, in traditional societies, the family generally refers to the extended family, which is a kinship group based on consanguinity, with particular attention on relationships between generations and siblings. To date, 'family' has been regarded as a largely unified social system in the family embeddedness research (Aldrich & Cliff, 2003). However, as is discussed in Bird and Zellweger (2018), relational embeddedness varies depending on family types, particularly between a family of procreation such as members are linked by affinity (often marriage) and a family of orientation such as members

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are linked by consanguinity (often siblings). Specifically, they find that the trust, identification, and obligations among sibling teams are less salient compared to spousal teams.<sup>1</sup> In addition, the common interests obtained by married couples belong to the common family property of husband and wife, and will not be divided twice. However, the common interests obtained by sibling teams must be separated accordingly. Considering this, along with the stronger trust, identification, and obligations between husband and wife, married couples are more motivated than siblings to collaborate on company management, even to the point of conspiring to encroach on general shareholder interests. Consequently, in this paper, we focus primarily on whether firms controlled by married couples conduct more or less financial fraudulent behavior.

Barnett and Barnett (1988) creates the term “copreneurs” to describe couples in which both partners participate in the business and share operational and managerial responsibilities. Regarding the corporate governance effect of marital leadership, there are two opposite strands of research. On the one hand, some studies note that a spouse's participation in management can effectively reduce agency costs (Chrisman, Chua, & Litz, 2004; Belenzon, Pataconi, & Zarutskie, 2016) and improve firm performance (Amore, Miller, Le Breton-Miller, & Corbetta, 2017). For example, Kotlar and De Massis (2013) and Hsu, Wiklund, Anderson, and Coffey (2016) indicate that spouse support is a particularly important competitive advantage for enterprises in the entrepreneurial stage. Fu (2020) also indicates that family firms controlled by married couples tend to have more corporate innovation activities. On the other hand, some literature holds the opposite view, arguing that the closeness of the board can lead to adverse consequences. This view is consistent with regarding board diversity as improving firm performance and reputation (Bear, Rahman, & Post, 2010; Harjoto, Laksmana, & Yang, 2018). For example, Dyer, Dyer, and Gardner (2013) indicate that spousal entry produces nepotism, leading to poor corporate governance. Meanwhile, some studies find that family conflicts would increase firms' communication cost and operating pressure to some extent, which further weakens firm competition and negatively impacts on firm value (Danes & Olson, 2003).

In addition, compared to other firms, a prominent feature of marital leadership firms is the centralized control of ownership and management. Some related studies indicate advantages, under this mode, in which ownership and control are centrally controlled, such as lower agency costs (Jensen & Meckling, 1976), better reputation maintenance mechanisms (Chen, Chen, & Cheng, 2008), higher decision-making efficiency (Fama & Jensen, 1983), and strong altruism tendencies (Schulze, Lubatkin, & Dino, 2003). At the same time, however, centralized control of ownership, along with the fact that couples' interests, as distinct from siblings, don't need dividing twice may bring about increased opportunities for shareholder expropriation (Burkart, Panunzi, & Shleifer, 2003; La Porta et al., 1999); as well as weaker internal supervision (Jaggi, Leung, & Gul, 2009), higher risk of decision-making errors, and more opportunistic behavior (Lubatkin, Ling, & Schulze, 2007).

Both the positive and negative views of centralized control of ownership and management are founded on consideration of the motives and conditions for firms' internal or actual controllers to implement financial fraud. Therefore, it is of great interest to examine whether marital leadership, which can also be regarded as a centrally controlled mode of ownership and control, restrains or exacerbates firms' financial fraudulent behavior. However, no prior study has examined this issue. Using a unique hand collected dataset on Chinese listed firms, this paper helps fill this gap and investigates the role of marital leadership in firm-

<sup>1</sup> Bird and Zellweger (2018) point out that there are three obvious facets of the family embeddedness, including trust, identification, and mutual obligations. Meanwhile, the above three aspects in spousal teams are stronger than in sibling teams.

specific information disclosure and identifies its' impact on financial fraud.

The Chinese environment is arguably ideal for our investigation. First, there are many firms managed by marital leadership in the Chinese market. At the end of 2017, among listed private firms whose controllers are Chinese nationals, 383 of the 1790 were jointly operated and managed by married couples. This accounts for nearly 21.4% of listed private firms.<sup>2</sup> Clearly, marital leadership is an important part of China's family enterprises, and the Chinese market provides us with a natural good sample to test the governance effect of marital leadership. Additionally, China's unique family and marriage culture makes the study on marital leadership particularly representative. On the one hand, marriage in China does not fully emphasize the supremacy of love, but rather the obligation to family. As core status in the community relates to both the family and the firm, mutual supervision between the spouses can weaken motivation of one party to engage in opportunistic behavior (Belenzon et al., 2016), thus suppressing financial fraud. On the other hand, influenced by the traditional notion that ‘men play the key roles in society, while women are confined to the family,’ many Chinese women still observe deference to their husbands, even in cases of relatively economic independence. Such deference is not conducive to mutual supervision in the process of business management. Overall, the Chinese stock market is an ideal choice to study the dual nature of marital leadership in corporate governance.

Furthermore, given China's relatively weak formal institutional structure and many capital impediments, the nation provides a good platform for the study of financial fraud. As an emerging market, there are a series of institutional problems in China, such as imperfect market mechanisms and less effective legal systems, creating conditions for the occurrence of financial fraud (Allen, Qian, & Qian, 2005; Cui, Yao, Fang, & Wang, 2020; Feng, Yao, Wang, Liao, & Cheng, 2021; Yao, Wang, Sun, Liao, & Cheng, 2020). In addition, considering the mechanism of financial fraud, the economic environment has become an important source of pressure for the financial fraud of listed firms in China. Since the 2008 global financial crisis, slowing economic growth, increasing macro-economic uncertainty, and continuing deleveraging have all caused firms in China to face strong external economic pressure. This pressure causes enterprises to suffer financial difficulties and face greater operating pressure, thus engendering motivation for financial fraud of listed firms (Crutchley, Jensen, & Marshall, 2007). Further, the difficulty and high cost of financing have been obstacles in the development of China's private firms. Downward economic pressure, poor performance, and strong demands for external financing prompt listed firms to commit financial fraud (Dechow, Sloan, & Sweeney, 1996).

Accordingly, our findings and contributions are as follows. First of all, we find that firms controlled by spouses have higher propensity to

<sup>2</sup> Although the Chinese government has not yet issued specific regulatory policies for the marital leadership model, in recent years they have been aware of the disadvantages of marital leadership and have strengthened supervision, and elevated punishments for corresponding illegal behaviors, especially for the firms applying for listing. For example: (1) From December 2014 to May 2015, the actual controllers of “Yangpu Medical” (marital leadership) made a profit of nearly 10 million RMB by using inside information for insider trading. In 2017, the firm was found to be involved in internal trading. Its illegal gains were confiscated and it was fined 30 million RMB; (2) On April 13, 2018, the board meeting of “Good Wife”, a marital leadership leading firm, deliberated and approved the proposal to invest 215 million RMB to purchase real estate. The transaction amount of this transaction accounted for 19.8% of the firm's 2017 annual audited net assets, which reached the disclosure standard of the temporary announcement. However, “Good Wife” was identified by regulators as not disclosing the relevant information in a timely manner, and was publicly punished in December 2019; (3) In March 2021, “Wei Te Ou”, a company applying for listing, was punished by the CSRC because the controllers (marital leadership) were involved in related transactions. CSRC assigned a procurator team to the firm for on-site inspection.

engage in financial fraudulent behavior. This result still holds after conducting a series of robustness tests and controlling for endogeneity. To the best of our knowledge, this paper is the first to examine the role of marital leadership on the propensity for financial fraud of listed firms. Results indicate that in a market where corporate governance systems are suboptimal, marital leadership may lead to serious agency conflicts between controlling family shareholders and external minority shareholders. Our results, suggesting negative effects of marital leadership on corporate governance; thereby contribute significantly to ongoing debates on the impact of family involvement in corporate governance (Danes & Olson, 2003; Dyer et al., 2013; Kotlar & De Massis, 2013; Belenzon et al., 2016; Hsu et al., 2016; Amore et al., 2017).

Further, we examine the economic linkages between marital leadership and financial fraud. Our evidence shows that weaker internal supervision and more decision-making errors are positively associated with marital leadership, thereby establishing motives and opportunities for financial fraud. These results contribute to understanding the economic consequences of marital leadership. In addition, our findings contribute to the literature on financial fraud by showing that the information disclosure quality is associated with the relational embeddedness of a firm (Bird & Zellweger, 2018).

We also conduct conditional analyses to show that the marital leadership effect is more pronounced for smaller-cap and younger firms, while well-regulated external monitoring mechanisms (such as the use of Big 4 auditors, higher institutional ownership and analyst coverage) can reduce the above marital leadership effect. These findings not only confirm the positive effect of external supervision but also provide important references for the prevention of financial fraud and the positioning of internal or external supervision.

In addition, this paper also contributes to the literature on the role of female presence and gender diversity in corporate governance. Previous studies evidence that firms with female leadership and higher gender diversity tend to have better performance, less earnings management, and positive abnormal returns (Francoeur, Labelle, & Sinclair-Desgagné, 2008; Peni & Vähämaa, 2010; Strøm, D'Espallier, & Mersland, 2014). However, our findings indicate that although the wife promotes the gender diversity of the respective firm management, due to the disadvantages of marital leadership, this gender effect is likely unfavorably conditioned. These results offer support for laws, present in some countries, barring both spouses from working jointly at the same firm. More importantly, our findings also suggest that the impact of gender diversity on corporate governance should also be considered in terms of the impact of other potential relationships, such as the presence of a marital relationship. Overall, our results provide important help for us to understand the corporate governance effect of gender diversity more comprehensively.

The remainder of this paper is organized as follows. Section 2 reviews related literature and proposes our main research hypothesis. Section 3 introduces data and methodology. Section 4 analyzes the impact of marital leadership on firm-specific financial fraud with performing robustness checks and addressing potential endogeneity concerns. Section 5 examines the economic linkages. Section 6 performs conditional analyses from the perspective of firm characteristics and external monitoring mechanisms. Section 7 concludes the paper.

## 2. Literature review and hypothesis development

Financial fraud is often associated with suboptimal corporate governance (Dong et al., 2018; Farber, 2005). Based on the essential traits of family involvement in the centralized control of ownership and management, our analysis is motivated by two opposite strands of literature concerning the impact of marital leadership.

### 2.1. Marital leadership and financial fraud suppression

Principal-agent theory notes that agency costs are generated from the

separation of ownership and management rights. Specific to those firms with marital leadership, the simultaneous involvement of couples in both ownership and management leads to the concordant goals and interests between the owners and operators, thereby reducing information asymmetry and relieving the agency problem (Jensen & Meckling, 1976). Couples have mutual trust as well as symbiotic thoughts and feelings, forming an advantage in supervision, management, and decision-making (Fama & Jensen, 1983), thereby improving governance and providing a favorable environment for restricting managers' opportunistic behaviors.

Previous studies also prove that the altruistic behavior among family members in family business is an important part of family 'social emotional wealth' or the non-pecuniary benefits families receive from business operations. Altruism between spouses will encourage them to be loyal to each other, and to regard jointly owned enterprises as an extension of the family. This behavior makes a commitment to firm's long-term goals (Amore et al., 2017), thus suppressing the self-interested opportunism. Meanwhile, in contrast to the leaders of other firms, couples who own a firm are integrated into both the family and the enterprise. They have a deep sense of identity and emotional dependence on the firms they have personally established. Particularly, when the family's objective of preserving the firm as a legacy for future generations, the involvement of the wife will generate less risk-taking behavior (Gómez-Mejía, Haynes, Núñez-Nickel, Jacobson, & Moyano-Fuentes, 2007). Therefore, such couples pay more attention to the maintenance of social emotional wealth and the external reputation of the firm (Berrone, Cruz, & Gomez-Mejia, 2012; Hu & Zhang, 2018), as well as have a greater sensitivity to negative news or events (Chen et al., 2008), thereby dissuading consideration of financial fraud.

In all, marital leadership firms may focus strongly on long-term success. Compared to non-marital-leadership firms, marital-leadership firms' marginal pressure to carry out financial fraud is relatively low. Therefore, marital leadership may reduce propensity for financial fraud. Following the above arguments, we propose the following hypothesis:

**Hypothesis 1a.** Marital leadership decreases the propensity for financial fraud, *ceteris paribus*.

### 2.2. Marital leadership and financial fraud propagation

Completely contradictory to the first argument, the second stand argues that agent conflicts and opportunistic behaviors are more severe in a family business with more centralized control. Specifically, agency conflicts between family major shareholders and non-family minority shareholders in family-owned firms are more serious, with ownership concentration having a significantly negative impact on accounting information quality (Villalonga & Amit, 2006). Under such circumstances, there is stronger motivation by large shareholders to encroach on the interests of external stakeholders, such as minority shareholders and creditors. Further, emotional and psychological predilections of family business owners can expose firms to serious agency hazards (Lubatkin et al., 2007; Schulze et al., 2003; Schulze, Lubatkin, Dino, & Buchholtz, 2001). Therefore, given their centralized control of corporate resources, couples also have high moral hazard and opportunistic motivation to manipulate their financial reporting. In particular, in contrast to siblings, the benefits obtained by the married couples do not need to be divided twice, therefore the motivation of couples to collude against the interests of other shareholders will likely be strong.

Furthermore, under particularly intense couple control, the board of directors and supervisors often lack independence (Jaggi et al., 2009). Under such circumstances, firms' internal governance mechanism cannot play an effective supervisory role, leading to malfunctioning financial and audit supervision, and deprecated corporate governance (Villalonga & Amit, 2006).

Additionally, bounded rationality (Conlisk, 1996) of decision makers has an important role in creating decision-making errors. Therefore,

constraints decision makers play a vital role in corporate governance (Forbes & Milliken, 1999). However, in firms where the marital leaders have greater residual control rights (Hart, 2017), lack of constraints on managers may induce more decision-making errors and potential operational risks (e.g., inefficient investment) (Raheja, 2005).

Further, the closeness and loyalty of couples may impair mutual supervision, exacerbating collusion tendencies that ultimately lead to financial fraud. On the other hand, heterogeneities and conflicts between couples may increase communication costs, and operating pressures, thereby impeding decision-making effectiveness and firm performance (Danes & Olson, 2003). When marital leaders face greater pressure, they have a greater incentive to engage in financial fraud. Accordingly, we propose the Hypothesis 1b:

**Hypothesis 1b.** Marital leadership increases financial fraud, ceteris paribus.

### 3. Data and methodology

#### 3.1. Sample selection and data sources

The sample comprises all private firms<sup>3</sup> of A-share stocks (excluding ST stocks) listed in the Shenzhen Stock Exchange and the Shanghai Stock Exchange, covering 2008 to 2017. In 2007, China implemented the new accounting standards for listed firms, which aimed at the convergence with the international financial reporting standards. To exclude the impact of different accounting standards on our empirical results, we choose 2008 as the starting year of our research period. Considering the different accounting and reporting standards of financial firms, we exclude financial firms referring to Yuan, Sun, and Cao (2016). We also exclude time-discontinuous samples. Finally, we obtain 11,119 firm-year observations. The data is obtained from the China's Stock Market and Accounting Research (CSMAR) database, and the Baidu search engine. When determining the marital relationship of the actual controller and the working status of both couples, we collect the data from "the actual controller and kinship of listed private firms" and "the kinship of senior directors" disclosed by CSMAR to conduct manual queries and collation. For undisclosed data, we conduct manual sorting through the given firm's annual reports and confirm them with the Baidu search engine. All continuous variables are winsorized at 1% at both tails.

Following Beasley (1996), Miller, Le Breton-Miller, Lester, and Cannella Jr (2007), and Yuan et al. (2016), we match each observation in the marital leadership firm sample with one firm observation without marital leadership by year, industry, and firm size.

#### 3.2. Main variables

##### 3.2.1. Dependent variable: financial fraud

The essence of financial fraud is that managers deliberately forge or conceal financial information to deceive stakeholders. Following previous studies such as Dong et al. (2018) and Yao et al. (2020), we adopt the following two variables to proxy financial fraud.

The first measure of financial fraud is *Fdum*, which equals one if a given firm was reported by the China Securities Regulatory Commission (CSRC) to have any type of financial fraud behavior in the given year, and zero otherwise. There are several types of violation of listed firms' information disclosure such as falsely listing firm's assets, fictitious

<sup>3</sup> The actual controllers of SOEs are generally either the government, the Chinese State-Owned Assets Administration, or enterprise groups that perform the functions of state-owned assets supervision. In addition, the chairpersons and CEOs of SOEs are always directly appointed by the government. Therefore, compared with non-SOEs, marital leadership is not a common phenomenon in SOEs. The government also does not allow couples to simultaneously be executives of the same listed SOE. Consequently, the samples studied in this paper are all private firms.

profits, false records (especially, misleading statements), material omissions (such as the omissions of part-time jobs of important management personnel, major litigation matters, related transactions, etc.), and false disclosure of other matters. For each firm's financial fraudulent reporting behavior, the CSRC makes a specific announcement that includes the enforcement year, the firm's violation year, and the type of enforcement. Following Dong et al. (2018) and Yao et al. (2020), we adopt the published violation year to identify the time of financial fraud.

The second variable *Fdeg* measures the severity of the financial fraud behavior. The CSRC conduct different types of warning or punishment according to the severity of firms' financial fraud behavior. We assign different values according to the following four types of enforcement: fines on illegal income (3), criticism (2), warning or condemnation (1), other types of punishment and no punishment (0).  $Fdeg_{i,t}$  equals the sum of the assigned values if firm *i* faces multiple punishments in the same year. For the same fraudulent case in year *t*,  $Fdeg_{i,t}$  equals the greatest assigned value.

##### 3.2.2. Test variable: marital leadership

Contrary to the situation in the U.S. or Europe, the board chair typically has the most authority in China when it comes to making operational decisions (Feng & Johansson, 2018). Especially in private firms, the position of chairman of the board is generally held by the actual controller, and this person plays a crucial role for corporate policy, while the CEO in such firms is more dependent on the chairman's decision (Chen, Li, Su, & Sun, 2011).

Marital leadership means the husband and wife are the actual controllers, and they have residual control rights (Hart, 2017) over the firm's decision-making. Following Amore et al. (2017) and Hu and Zhang (2018), we adopt an indicator variable to measure whether a given firm is marital leadership: *Mlead* equals one if both husband and wife are the actual controllers, and at least one of them holds the position of the chairman of the board in private firms, and zero otherwise. This setting includes the following two scenarios: (1) Both husband and wife are the actual controller. Only husband or wife works for the firm and serves as the board chair or is dual Chair-CEO, or (2) Both husband and wife are the actual controller. Both husband and wife work for the firm, with one serving as chairman, and the other as CEO or another executive officer. In both cases, the couple have the actual decision-making power for the corporate policy.<sup>4</sup>

##### 3.2.3. Control variables

In the literature, the risk attitude and financial stability of a given firm are found to be potential factors in the implementation of financial fraud. Therefore, we also include several control variables which may affect financial fraud in the regression model, including firm size ( $Size_{i,t}$ , the natural logarithm value of the market value of equity), return on assets ( $ROA_{i,t}$ , net income divided by total assets), financial leverage ( $Lev_{i,t}$ , the book value of all liabilities divided by the total assets at the end of fiscal year), listing age ( $Age_{i,t}$ , the difference between the current year and the year of listing), largest shareholder's ownership ( $Topshare_{i,t}$ , the ratio of the market value of the largest shareholdings to the total

<sup>4</sup> We also adopt the second scenario in our definition to measure a stronger marital leadership; wherein both husband and wife are the actual controller, with both husband and wife working for the firm, with one serving as chairperson, and the other as CEO or another executive officer. Empirical results indicate that this kind of strengthened marital leadership leads to more significant financial fraud, which further verifies the negative effect of marital leadership. In general, compared to the second scenario of marital leadership, our setting is more general and contains more sample observations which can provide a more comprehensive understanding. Therefore, in the rest of the paper, we use the more general setting in our analysis.



market value), and managerial ownership ( $Mgshare_{i,t}$ , the ratio of the market value of managerial shareholdings to the total market value).<sup>5</sup>

In addition, the interest tendency and decision-making of actual control affects the credibility of accounting information, so we also consider the excess control of actual controllers over the listed firm.  $Differ_{i,t}$  is calculated as the difference between the actual controllers' ratio of control and ownership in the firm, obtained from CSMAR database.  $Duality_{i,t}$  is a dummy variable that equals one if the chairperson of board also serves as the CEO for firm  $i$  in year  $t$  and zero otherwise. The concentration of insider power is not conducive to the firm's control environment and hinders the effectiveness of monitoring financial fraud.

### 3.3. Regression model

Following Amore et al. (2017), we construct the following panel regression model to examine the effect of marital leadership on financial fraud:

$$Fdum_{i,t} \text{ or } Fdeg_{i,t} = \beta_0 + \beta_1 Mlead_{i,t} + \sum_k \beta_k Controls_{k,i,t} + \varepsilon_{i,t}, \quad (1)$$

where  $i$  represents firms, and  $t$  denotes years.  $Fdum_{i,t}$  and  $Fdeg_{i,t}$  are the proxies for financial fraud and  $Mlead_{i,t}$  represents marital leadership,  $Controls_{k,i,t}$  represents a set of control variables including  $Size_{i,t}$ ,  $Lev_{i,t}$ ,  $ROA_{i,t}$ ,  $Age_{i,t}$ ,  $Topshare_{i,t}$ ,  $Mgshare_{i,t}$ ,  $Differ_{i,t}$ , and  $Duality_{i,t}$ . To control for the heterogeneities caused by year and industry, we adopt a two-way fixed effect model to estimate our regression model. Following Petersen (2009), we adopt the view that with a relatively full sample of firms, over a moderate time span, that fixed effects modeling with standard errors using double-clustering (firm and year) is the best approach to minimize estimation bias caused by any dependency in the distribution of the error terms.<sup>6</sup>

## 4. Empirical results

### 4.1. Descriptive statistics

Firstly, we examine the descriptive statistics of the employed variables and their average pairwise correlation coefficients. Panel A of Table 1 reports the time variation in the number of listed firms with marital and non-marital leadership from 2008 to 2017. The number of marital leadership firms increases in time, to accounting for more than 20% of the total number of firms by the end of our sample period. Panel B reports the descriptive statistics of the observations.  $Fdum$  and  $Fdeg$  have different profiles in terms of mean and standard deviation. Particularly, there are large variations in  $Fdeg$  among the sample. Considering the characteristics of the means and quantiles, we infer that the degree of financial fraud is more significant, compared to the proportion of listed firms with financial fraud.

In Panel C, we estimate the correlations between the selected variables. All correlations between the independent variables in Eq. (1) are relatively low. Meanwhile, we also conduct the variance inflation factor (VIF) test. The untabulated results suggest that there is no potential multicollinearity concern since the VIF results of the corresponding variables in this paper are all  $< 10$ . Second,  $Mlead$  is positively correlated with  $Fdum$  and  $Fdeg$ , with Pearson and Spearman correlations being 0.014 (0.007) and 0.017 (0.009) for  $Fdum$  ( $Fdeg$ ), respectively, supporting Hypothesis 1b.

<sup>5</sup> Following many corporate finance papers, we measure firm size through equity. While not reported in the paper, alternatively using total assets yields qualitatively similar results.

<sup>6</sup> This method helps to avoid potential heteroscedasticity and autocorrelation problems.

### 4.2. Regression results: the impact of marital leadership on financial fraud

We first take  $Mlead$  as the treatment variable, and match samples based on industry, year, and firm size to obtain 1:1, 1:2, and 1:3 matching samples. The basic regressions include 1:m matching sample regression and full sample regression. Table 2 displays the results of four regression models used to test our hypotheses. The coefficients on  $Mlead_{i,t}$  are all significantly positive at least at the 5% significance level, regardless of whether we adopt  $Fdum$  or  $Fdeg$  to measure financial fraud and regardless of whether a matching sample or full sample is used. The above results indicate that marital leadership is associated with higher likelihood and severity of financial fraud, thus supporting Hypothesis 1b.

Concerning the regression coefficients of the control variables, they are generally consistent with prior studies (Firth, Fung, & Rui, 2007; Farber, 2005; Ding, Liu, & Wu, 2016). Specifically, the test results of  $ROA_{i,t}$  and  $Mgshare_{i,t}$  are significant and relatively stable in both the matching sample and the full sample regression, indicating that firms with poorer performance and weaker management incentives are more prone to engaging in financial fraud. In addition, in terms of the full sample regression results, the possibility and severity of financial fraud in listed firms are higher in older firms and firms with smaller caps. The shareholding ratio of major shareholders ( $Topshare_{i,t}$ ) is significantly and negatively correlated with the possibility of financial fraud, indicating that major shareholders have a certain degree of supervision, making listed firms engage in less financial fraud. Meanwhile, the regression coefficient of  $Duality_{i,t}$  is significantly positive in the full sample regression results of Panel A, which indicates that the possibility of financial fraud is higher in those firms in which the board chair also serves as the CEO.<sup>7</sup>

### 4.3. Robustness checks

In this section, we conduct several robustness checks including an alternative financial fraud measure, using firm fixed-effects modeling, and controlling for macro-economic variables and local factors.

#### 4.3.1. An alternative financial fraud measure

In the previous section, we apply  $Fdum$  and  $Fdeg$  to measure financial fraud. To prevent the dependence of the empirical results on these proxy variables, we adopt an alternative measure,  $Fdeg_{est}$ , to re-estimate Eq. (1). When a given firm faces multiple penalties at the same time, the variable  $Fdeg_{est}$  is defined as the highest of the various penalty degrees.

The regression results in Table 3 show that the coefficients on  $Mlead_{i,t}$  are all significantly positive regardless of whether a matching sample or a full sample is used for regressions. This indicates that the conclusions of this paper do not depend on the applied measures of financial fraud. That is, the degree of seriousness of financial fraud of listed firms led by marital leaders is greater than that of non-marital leaders.

#### 4.3.2. Firm fixed effects model

Moreover, there may exist potential problems arising from omitted time-invariant and firm-specific factors. To exclude the above influence, we adopt a two-way fixed effect model including firm and time fixed effects to re-estimate the regressions. Table 4 reports the regression results, which show that the regression coefficients on marital leadership are all significantly positive, indicating that our findings are not driven by firm-specific and time-invariant factors.

<sup>7</sup> To simplify the presentation of our regression results, we just report the results when adopting  $Fdeg$  as dependent variable in the following sections, as the results of  $Fdum$  are basically similar.

**Table 1**  
Descriptive statistics and correlation coefficients.

Panel A: Mlead statistics											
Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Mlead	38	60	110	173	205	211	229	280	276	383	1965
Non-Mlead	400	474	708	924	1045	1071	1159	1291	1357	1407	9836
Total	438	534	818	1097	1250	1282	1388	1571	1633	1790	11,801

  

Panel B: Descriptive statistics								
Variable	Mean	Std.	P25	P50	P75	Min	Max	
<i>Fdum</i>	0.123	0.328	0.000	0.000	0.000	0.000	1.000	
<i>Fdeg</i>	0.241	1.093	0.000	0.000	0.000	0.000	24.000	
<i>Mlead</i>	0.172	0.378	0.000	0.000	0.000	0.000	1.000	
<i>Size</i>	6.447	0.456	6.120	6.450	6.750	5.210	8.410	
<i>Lev</i>	0.350	0.214	0.190	0.330	0.490	0.000	8.050	
<i>ROA</i>	0.045	0.080	0.020	0.040	0.070	-3.890	0.720	
<i>Age</i>	7.799	6.047	3.000	6.000	11.000	1.000	28.000	
<i>Topshare</i>	0.328	0.140	0.221	0.307	0.419	0.022	0.900	
<i>Mgshare</i>	0.210	0.225	0.000	0.120	0.400	0.000	0.900	
<i>Differ</i>	0.066	0.082	0.000	0.024	0.120	0.000	0.535	
<i>Duality</i>	0.379	0.485	0.000	0.000	1.000	0.000	1.000	

  

Panel C: Pearson (above diagonal) and Spearman (below diagonal) correlation coefficients											
	<i>Fdum</i>	<i>Fdeg</i>	<i>Mlead</i>	<i>Size</i>	<i>Lev</i>	<i>ROA</i>	<i>Age</i>	<i>Topshare</i>	<i>Mgshare</i>	<i>Differ</i>	<i>Duality</i>
<i>Fdum</i>		0.587***	0.014**	-0.047***	0.082***	-0.094***	0.059***	-0.045***	-0.043***	-0.004	0.008
<i>Fdeg</i>	0.922***		0.007***	-0.044***	0.055***	-0.091***	0.055***	-0.052***	-0.036***	-0.012	0.000
<i>Mlead</i>	0.017**	0.009***		-0.073***	-0.071***	0.043***	-0.153***	0.024***	0.134***	-0.050***	0.052***
<i>Size</i>	-0.042***	-0.054***	-0.068***		0.260***	0.057***	0.467***	-0.103***	-0.327***	0.117***	-0.079***
<i>Lev</i>	0.086***	0.077***	-0.065***	0.278***		-0.244***	0.338***	-0.032***	-0.257***	0.121***	-0.068***
<i>ROA</i>	-0.132***	-0.126***	0.066***	0.045***	-0.355***		-0.122***	0.118***	0.087***	0.013	0.005
<i>Age</i>	0.043***	0.025***	-0.150***	0.580***	0.367***	-0.246***		-0.185***	-0.523***	0.221***	-0.145***
<i>Topshare</i>	-0.035***	-0.022**	0.032***	-0.132***	-0.035***	0.132***	-0.233***		-0.016*	0.257***	0.057***
<i>Mgshare</i>	-0.049***	-0.037***	0.149***	-0.283***	-0.268***	0.183***	-0.551***	-0.014		-0.552***	0.145***
<i>Differ</i>	0.002	0.001	-0.067***	0.142***	0.154***	-0.032***	0.271***	0.233***	-0.661***		-0.117***
<i>Duality</i>	0.008	0.013	0.052***	-0.077***	-0.079***	0.027***	-0.150***	0.066***	0.146***	-0.129***	

Panel A reports the time variation in the number of listed firms with marital and non-marital leadership from 2008 to 2017. Panel B reports the descriptive statistics of the variables. Panel C estimates the Pearson (above diagonal) and Spearman (below diagonal) correlation coefficients between variables. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

#### 4.3.3. Controlling for macro-environmental factor

As suggested by Li, Wang, and Wang (2017), macro-economic factors may affect firms' opportunistic behaviors. To exclude the impact of macro-economic factors, following Baker, Bloom, and Davis (2016), we adopt the economic policy uncertainty (EPU) index to measure whether the macro-economy is tranquil or not. Compared to a single indicator, the Chinese EPU index can not only reflect the economic condition in China, but also present information about the changes in interest rates, tax policy, and the overall government policies. Specifically, we control for the *EPU\_dummy* variable a dummy variable equals to one if the economic policy uncertainty (EPU) level is higher than the median of the EPU level during the sample period, and zero otherwise in our regression model. Then, we re-estimate Eq. (1) to test whether our empirical results are robust when we excluding the impact of macro-environmental factors. As is shown in the Table 5, when we control for the macro-economic variable *EPU\_dummy*, the coefficients on *Mlead* are all still significantly positive at least at the 5% level, indicating that our findings are not influenced by the macro-factor.

#### 4.3.4. Controlling for local factors

As is discussed in Parsons, Sulaeman, and Titman (2018), the financial fraud rates of firms in the same locale have a significantly effect on a given firm's likelihood of financial fraud. Thus, the marital leadership effect on financial fraud is likely driven by social interactions among neighboring firms. Moreover, other local factors such as local economic conditions and politics may impact the incidence of financial fraud (Liu, 2016). To address the above concerns, we control for time-varying province-specific factors such as local cultural and economic

conditions and time-varying industry-specific factors including industry growth opportunities, as suggested by Liu (2016). The regression results in Table 6 indicate that  $Mlead_{i,t}$  has a significantly positive effect on financial fraudulent probability and severity. The above results indicate that our results are still robust after controlling for potential local factors.

#### 4.4. Endogeneity

Even though we have conducted the above robustness checks to verify our empirical results, there may still exist endogeneity issues such as reverse causality and potential omitted unobservable factors. To deal with potential endogeneity problems, we conduct several tests to examine the sensitivity of our results, including the Heckman two-step sample selection modeling and the propensity score matching (PSM).<sup>8</sup>

##### 4.4.1. Heckman model

The fact that the actual controllers of listed firms exist in the form of marital leadership may not be a random event to some extent. To prevent sample selection bias caused by data collection and firms' potentially non-random decisions regarding material leadership, we adopt the

<sup>8</sup> In fact, the firms led by marital leaders are mostly founded by the couples and achieve listing conditions after the spouses' efforts. Therefore, the firms' financial fraud may not affect the choice of selecting the couples as the actual controller. Based on the above analysis, our results are not affected by reverse causality concerns.

**Table 2**  
The effect of marital leadership on financial fraud.

Panel A: Dependent variable = $Fdum_t$				
	(1) 1:1 matching	(2) 1:2 matching	(3) 1:3 matching	(4) Full sample
$Mlead_t$	0.308*** (2.74)	0.336*** (3.66)	0.388*** (4.51)	0.363*** (4.59)
$Size_t$	0.040 (0.20)	-0.045 (-0.28)	-0.187 (-1.34)	-0.195** (-2.00)
$Lev_t$	0.765** (2.20)	1.096*** (4.29)	1.177*** (5.21)	0.954*** (5.45)
$ROA_t$	-0.837*** (-6.50)	-0.609*** (-6.40)	-0.606*** (-7.57)	-0.594*** (-8.87)
$Age_t$	0.003 (0.19)	0.013 (1.28)	0.024*** (2.77)	0.026*** (3.72)
$Topshare_t$	-0.005 (-0.98)	-0.005 (-1.41)	-0.006* (-1.75)	-0.004* (-1.75)
$Mgshare_t$	-0.589* (-1.74)	-0.832*** (-3.11)	-0.626*** (-2.59)	-0.573*** (-2.96)
$Differ_t$	-0.001 (-0.08)	-0.012* (-1.72)	-0.010* (-1.69)	-0.016*** (-3.34)
$Duality_t$	-0.004 (-0.03)	0.092 (1.03)	0.074 (0.92)	0.118* (1.88)
Constant	-0.863 (-0.68)	-1.462 (-1.38)	-0.371 (-0.40)	-0.561 (-0.87)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Obs.	3344	5400	6842	11,119
Pseudo R <sup>2</sup>	0.077	0.071	0.069	0.062

  

Panel B: Dependent variable = $Fdeg_t$				
	(1) 1:1 matching	(2) 1:2 matching	(3) 1:3 matching	(4) Full sample
$Mlead_t$	0.078** (2.40)	0.075*** (2.77)	0.077*** (2.82)	0.078*** (3.05)
$Size_t$	-0.045 (-0.78)	-0.060 (-1.26)	-0.084* (-1.92)	-0.056* (-1.82)
$Lev_t$	-0.084 (-0.79)	0.105 (1.34)	0.167** (2.25)	0.093 (1.62)
$ROA_t$	-0.290*** (-7.68)	-0.172*** (-5.94)	-0.185*** (-6.68)	-0.191*** (-9.07)
$Age_t$	-0.001 (-0.21)	0.003 (1.02)	0.006* (1.93)	0.004* (1.79)
$Topshare_t$	0.002 (1.16)	0.001 (0.15)	-0.001 (-1.22)	-0.001 (-1.63)
$Mgshare_t$	-0.310*** (-3.14)	-0.298*** (-3.85)	-0.209*** (-2.80)	-0.197*** (-3.28)
$Differ_t$	-0.004 (-1.55)	-0.005** (-2.24)	-0.002 (-1.25)	-0.005*** (-3.05)
$Duality_t$	0.058* (1.73)	0.033 (1.26)	0.008 (0.32)	0.025 (1.27)
Constant	0.776** (2.03)	0.576* (1.85)	0.741** (2.54)	0.619*** (3.03)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Obs.	3344	5400	6842	11,119
Adjusted R <sup>2</sup>	0.039	0.029	0.029	0.043

This table presents the regression coefficients of marital leadership on financial fraud using both the matching sample and the full sample with fixed effect. The test variable is  $Mlead$ . The dependent variable in Panel A is the possibility of financial fraud  $Fdum$ , which is a dummy variable. Simultaneously, dependent variable  $Fdeg$  in Panel B represents the overall degree of the severity of financial fraud. Following Petersen (2009), we correct the standard errors using the double-clustering (firm and year) method. The values in the parenthesis are  $t$ -statistics. \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

**Table 3**  
Robustness check: the effect of marital leadership on  $Fdeg_{est}$ .

Dependent variable = $Fdeg_{est_t}$				
	(1) 1:1 matching	(2) 1:2 matching	(3) 1:3 matching	(4) Full sample
$Mlead_t$	0.052** (2.33)	0.051*** (2.75)	0.048** (2.50)	0.048*** (2.76)
$Size_t$	-0.021 (-0.54)	-0.044 (-1.37)	-0.085*** (-2.77)	-0.060*** (-2.84)
$Lev_t$	-0.024 (-0.34)	0.089* (1.66)	0.148*** (2.84)	0.094** (2.39)
$ROA_t$	-0.204*** (-7.91)	-0.131*** (-6.64)	-0.133*** (-6.89)	-0.136*** (-9.44)
$Age_t$	-0.001 (-0.32)	0.004* (1.69)	0.006*** (2.98)	0.004*** (2.82)
$Topshare_t$	0.001 (0.37)	-0.001 (-0.26)	-0.001 (-1.45)	-0.001* (-1.69)
$Mgshare_t$	-0.173** (-2.57)	-0.178*** (-3.36)	-0.115** (-2.21)	-0.115*** (-2.79)
$Differ_t$	-0.002 (-1.11)	-0.003* (-1.87)	-0.001 (-0.77)	-0.002** (-2.44)
$Duality_t$	0.024 (1.05)	0.020 (1.11)	-0.001 (-0.01)	0.019 (1.38)
Constant	0.559** (2.14)	0.446** (2.10)	0.685*** (3.36)	0.568*** (4.06)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Obs.	3344	5400	6842	11,119
Adjusted R <sup>2</sup>	0.038	0.032	0.030	0.038

This table reports the estimated results of the impact of marital leadership on financial fraud using both the matching sample and the full sample with fixed effect. The test dependent variable is the highest degree of the severity of financial fraud. Following Petersen (2009), we correct the standard errors using the double-clustering (firm and year) method. \*, \*\*, and \*\*\* denote 10%, 5%, and 1% statistical significance levels.

Heckman two-step sample selection model to adjust the corresponding estimation error. Heckman two-step sample selection model is a common method to deal with sample selection in empirical research, which is mainly used to solve the problem that the data sample obtained in empirical research cannot represent the whole sample, which leads to some missing explanatory variables not controlled. The core idea of Heckman two-step method is to use estimated residuals to measure the influence of the missing explanatory variables (i.e., inverse mills ratio) and add them to the regression model.

In the first step, we estimate a probit model with an indicator marital leadership variable ( $Mlead$ ) as the dependent variable using the 1:1 matching sample, as suggested by Yuan et al. (2016). Earlier, in the analysis of the pairwise correlation results, we find that the control variables in Eq. (1) have significant correlations with  $Mlead$  at different levels. Consequently, following Kotlar and De Massis (2013) and Hsu et al. (2016), we consider that the length of time that the firm has been growing might also have an effect in these relationships, i.e., a firm is more likely to develop the husband-and-wife co-leadership mode at the start-up stage of growth which creates an advantage for the firm. In terms of space, factors such as cultural traditions and family concepts in the region in which the firm is located also affect the relationship between husband and wife. For example, Xiao, Pan, and Dai (2018) show that the regional marriage atmosphere affects the behavior and consequences of couples' joint holdings. Therefore, in the first step of Heckman's variable selection, in addition to considering company characteristics such as  $Size_{i,t}$ ,  $Lev_{i,t}$ ,  $ROA_{i,t}$ ,  $Topshare_{i,t}$ ,  $Mgshare_{i,t}$ ,  $Differ_{i,t}$ , and  $Duality_{i,t}$ , we also introduce the life cycle stage of a given firm ( $Stage_{i,t}$ ), the area where the headquarters of the listed firm are located ( $Area_{i,t}$ ), and the divorce rate in that area ( $Divorce_{i,t}$ ) as supplementary variables. Heckman's estimator requires exogenous variables that are correlated with a firm's propensity to have marital

**Table 4**  
Robustness check: firm fixed effects model.

Dependent variable = <i>Fdeg<sub>t</sub></i>				
	(1) 1:1 matching	(2) 1:2 matching	(3) 1:3 matching	(4) Full sample
<i>Mlead<sub>t</sub></i>	0.228*** (2.71)	0.137** (2.48)	0.167*** (3.06)	0.184*** (3.57)
<i>Size<sub>t</sub></i>	0.179* (1.92)	0.118** (2.02)	0.035 (0.58)	0.026 (0.60)
<i>Lev<sub>t</sub></i>	-0.038 (-0.24)	0.211** (2.10)	0.158 (1.52)	0.140* (1.75)
<i>ROA<sub>t</sub></i>	-0.885* (-1.73)	-0.292 (-0.82)	-0.305 (-0.99)	-0.440* (-1.88)
<i>Age<sub>t</sub></i>	-0.037** (-2.31)	-0.021** (-2.07)	-0.013 (-1.35)	-0.011* (-1.74)
<i>Topshare<sub>t</sub></i>	0.004 (1.05)	0.001 (0.53)	-0.000 (-0.04)	0.000 (0.04)
<i>Mgshare<sub>t</sub></i>	0.146 (0.70)	0.154 (0.98)	0.100 (0.66)	0.093 (0.78)
<i>Differ<sub>t</sub></i>	0.006* (1.69)	0.004* (1.87)	0.002 (0.85)	-0.001 (-0.38)
<i>Duality<sub>t</sub></i>	0.012 (0.28)	0.007 (0.22)	0.020 (0.66)	0.020 (0.81)
Constant	-1.018* (-1.83)	-0.719** (-2.08)	-0.151 (-0.42)	-0.072 (-0.27)
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Obs.	3344	5400	6842	11,119
Adjusted R <sup>2</sup>	0.023	0.017	0.011	0.014

This table re-estimates the regression of Eq. (1) using firm and year fixed effects models. The test variable is *Mlead*. The dependent variable *Fdeg* represents the overall degree of the severity of financial fraud. Following Petersen (2009), we correct the standard errors using the double-clustering (firm and year) method. \*, \*\*, and \*\*\* denote 10%, 5%, and 1% statistical significance levels.

leadership, but not with financial fraud, so we adopt the ratio of marital leadership firms in the same industry-year (*Ind\_Mlead<sub>i,t</sub>*) as an instrumental variable. Then, we construct the following probit model to estimate the probability of marital leadership of a given firm.

$$\begin{aligned}
 Mlead_{i,t} = & \beta_0 + \beta_1 Size_{i,t} + \beta_2 Lev_{i,t} + \beta_3 ROA_{i,t} + \beta_4 Topshare_{i,t} + \beta_5 Mgshare_{i,t} \\
 & + \beta_6 Differ_{i,t} + \beta_7 Duality_{i,t} + \beta_8 Age_{i,t} + \beta_9 Stage_{i,t} + \beta_{10} Area_{i,t} \\
 & + \beta_{11} Divorce_{i,t} + \beta_{12} Ind\_Mlead_{i,t} + \sum Year + \sum Industry + \epsilon_{i,t},
 \end{aligned}
 \tag{2}$$

To control for potential self-selection bias, the inverse Mills ratio (*IMR*) is generated and then included in the second-step model. The specification of the second-step model is consistent with Eq. (1) in Section 3.3. The Heckman model estimation results are shown in Table 7. In the regression results of the first step, dependent variables for firm characteristics, such as *Size<sub>i,t</sub>*, *Topshare<sub>i,t</sub>*, and *Age<sub>i,t</sub>*, have significantly negative impact on marital leadership, whereas *ROA<sub>i,t</sub>*, *Mgshare<sub>i,t</sub>*, *Differ<sub>i,t</sub>*, *Duality<sub>i,t</sub>*, and *Stage<sub>i,t</sub>* have significantly positive impact. The results are generally in line with expectations and consistent with the previous correlation analysis and the prior studies in the literature.

The results of the second step show that the coefficient of variable *Mlead<sub>i,t</sub>* remains significantly positive when *Fdeg* is adopted. Meanwhile, the significant and negative coefficient of the inverse Mills ratio indicates that the unobserved factors that motivate firms to adopt marital leadership are negatively related to financial fraud. In all, our main findings remain stable when we exclude the impact of possible sample-selection bias.

#### 4.4.2. PSM approach

Due to significant differences between marital leadership and non-marital leadership firms in terms of size, performance, and other firm characteristics, we also control for potential endogeneity between marital leadership and financial fraud by comparing firms with marital

**Table 5**  
Robustness check: considering macro-environmental factor.

Dependent variable = <i>Fdeg<sub>t</sub></i>				
	(1) 1:1 matching	(2) 1:2 matching	(3) 1:3 matching	(4) Full sample
<i>Mlead<sub>t</sub></i>	0.007** (2.04)	0.008*** (2.77)	0.008*** (2.80)	0.010*** (3.11)
<i>Size<sub>t</sub></i>	-0.006 (-1.14)	-0.005 (-1.24)	-0.008** (-2.11)	-0.006** (-2.01)
<i>Lev<sub>t</sub></i>	0.011 (0.95)	0.013 (1.33)	0.017** (2.26)	0.009* (1.92)
<i>ROA<sub>t</sub></i>	-0.280*** (-6.97)	-0.171*** (-6.07)	-0.184*** (-6.15)	-0.187*** (-7.18)
<i>Age<sub>t</sub></i>	-0.002 (-0.31)	0.002 (1.02)	0.006* (1.93)	0.004 (1.53)
<i>Topshare<sub>t</sub></i>	0.002 (1.01)	0.001 (0.15)	0.001 (1.31)	0.001 (1.63)
<i>Mgshare<sub>t</sub></i>	-0.035*** (-3.11)	-0.028*** (-3.88)	-0.021*** (-2.93)	-0.020*** (-3.46)
<i>Differ<sub>t</sub></i>	0.005 (1.25)	0.002 (1.24)	0.002 (1.25)	0.003 (0.95)
<i>Duality<sub>t</sub></i>	0.006 (1.64)	0.004 (1.26)	0.001 (0.32)	0.003 (1.31)
<i>EPU_dummy<sub>t</sub></i>	0.003** (2.12)	0.004*** (3.07)	0.006* (1.87)	0.005** (2.24)
Constant	0.280 (0.67)	-0.621** (-2.40)	-0.749*** (-2.99)	-0.801*** (-3.96)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Obs.	3344	5400	6842	11,119
Adjusted R <sup>2</sup>	0.038	0.032	0.031	0.041

This table re-estimates the regression of Eq. (1) when considering macro-environmental factor. The test variable is *Mlead*. The dependent variable *Fdeg* represents the overall degree of the severity of financial fraud. Following Petersen (2009), we correct the standard errors using the double-clustering (firm and year) method. \*, \*\*, and \*\*\* denote 10%, 5%, and 1% statistical significance levels.

leadership to a sample of control firms matched on the propensity to be led by couples. As suggested by Bowen et al. (2010), using a control sample matched on propensity scores enables us to compare the marital leadership firms to a set of firms which are similar on the observable dimensions, which enabling us to attribute any observed effects to marital leadership itself rather than to those observed firm characteristics which may related to marital leadership.

First, we estimate Eq. (2) in Section 4.4.1 with *Mlead* as the dependent variable adopting the full sample. Next, we calculate a propensity score for each firm. That is, for each marital leadership firm, we select one control firm with the closest propensity score, which constitutes the matched control sample. Before the regression analysis, we assess covariate balance and test joint hypotheses to ensure that the matching is satisfactory. The results in Panels A and B of Table 8 indicate that the PSM control sample resembles the marital leadership firms along virtually all dimensions. Finally, we re-estimate Eq. (1) using the marital and matched control sample. Panel C of Table 8 shows that the coefficient of variable *Mlead<sub>i,t</sub>* remains significantly positive. The above results prove a solid positive impact of marital leadership on financial fraud.

## 5. Channel tests

The causes of financial fraud have received considerable attention for a long time, leading to numerous of explanatory theories, such as iceberg theory, fraud triangle theory, GONE theory, and corporate fraud risk factor theory. Among these, the fraud triangle theory is the most widely recognized (Dorminey, Fleming, Kranacher, & Riley Jr, 2012; Homer, 2019; Mansor, 2015). According to this theory, self-rationalization, opportunity, and pressure induce financial fraud



**Table 6**  
Robustness check: considering province fixed effects.

Dependent variable = $Fdeg_t$	Dependent variable = $Fdeg_t$			
	(1) 1:1 matching	(2) 1:2 matching	(3) 1:3 matching	(4) Full sample
$Mlead_t$	0.046*** (3.01)	0.018** (2.50)	0.022*** (2.59)	0.024*** (3.01)
$Size_t$	0.011 (0.88)	0.013 (1.64)	0.006 (0.66)	0.007 (1.03)
$Lev_t$	-0.015 (-0.65)	0.031** (2.07)	0.016 (1.17)	0.016 (1.45)
$ROA_t$	-0.108 (-1.21)	-0.050 (-1.03)	-0.065 (-1.53)	-0.053 (-1.61)
$Age_t$	0.022 (0.78)	-0.291*** (-6.34)	-0.010 (-0.22)	0.019 (0.68)
$Topshare_t$	0.005 (0.67)	0.004 (1.05)	0.003 (0.73)	0.001 (0.21)
$Mgshare_t$	-0.013 (-0.41)	0.011 (0.49)	0.005 (0.27)	0.007 (0.39)
$Differ_t$	0.001 (0.82)	0.002 (0.75)	0.001 (0.53)	-0.003 (-1.02)
$Duality_t$	0.003 (0.34)	0.005 (1.14)	0.004 (0.93)	0.003 (0.88)
$GDPG_t$	0.087* (1.87)	-0.880*** (-9.06)	0.051 (0.44)	-0.024 (-0.23)
$MI_t$	-0.067** (-2.41)	0.380*** (11.76)	-0.050 (-1.00)	0.093 (0.66)
$MP_t$	-0.102 (-1.17)	-0.647*** (-7.73)	-0.001 (-0.01)	0.295 (0.76)
$POPG_t$	0.734** (2.28)	-0.303*** (-7.67)	0.418 (0.11)	0.322 (0.90)
Constant	0.556** (2.07)	-0.128*** (-7.00)	0.435 (1.57)	-0.989 (-0.71)
Firm FE	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes
Province*Year FE	Yes	Yes	Yes	Yes
Obs.	3344	5400	6842	11,119
Adjusted R <sup>2</sup>	0.071	0.037	0.033	0.040

This table reports the regression results of Eq. (1) after controlling for province fixed effects. The test variable is  $Mlead$ . The dependent variable  $Fdeg$  represents the overall degree of the severity of financial fraud. Following Petersen (2009), we correct the standard errors using the double-clustering (firm and year) method. The values in the parenthesis are  $t$ -statistics. \*, \*\*, and \*\*\* denote 10%, 5%, and 1% statistical significance levels.

together.

The self-rationalization in fraud triangle theory is that corporate fraudsters must find some seemingly reasonable reasons to make frauds conform to their own moral concept, regardless of whether this explanation is truly reasonable (Dorminey et al., 2012). Common reasons used by corporate fraudsters are “the firm owes it to me”, “I’m borrowing the money temporarily”, and so on (Homer, 2019). Compared to other firms, the most prominent feature of marital leadership firms is the centralized control of ownership and management. The couples in marital leadership firms control the main resources, and their families overlap with the firm. Therefore, they tend to regard the enterprise as personal property, regarding it as a vehicle to attain private benefits by harming the interests of minority shareholders, creditors, and other stakeholders.

The above analysis indicates that the centralized control of ownership and management of marital leadership leads couples to treat the firm as personal property. Thus, they can naturally find a reason for any behavior that may harm the interests of other shareholders. The above-mentioned management style and self-rationalization often leads to the lack of effective internal supervision. Additionally, prior studies have noted that the lack of effective supervision in family-controlled firms leads to a lack of functions such as financial and audit supervision (Jaggi et al., 2009; Villalonga & Amit, 2006), leading to ‘black holes’ in internal supervision. Moreover, considering that most of the family firms in

**Table 7**  
Endogeneity: Heckman analysis.

First step: Probit regression	Second step: OLS regression	
	Dependent variable = $Mlead_t$	Dependent variable = $Fdeg_t$
$Size_t$	-0.323*** (-6.29)	$Mlead_t$ 0.086** (2.57)
$Lev_t$	-0.006 (-0.07)	$IMR_t$ -0.418* (-1.85)
$ROA_t$	1.935*** (5.52)	$Size_t$ 0.046 (0.58)
$Topshare_t$	-0.003** (-2.06)	$Lev_t$ 0.100 (0.92)
$Mgshare_t$	0.403*** (4.32)	$ROA_t$ -2.635*** (-5.23)
$Differ_t$	0.008*** (3.23)	$Age_t$ 0.013 (1.60)
$Duality_t$	0.067** (2.16)	$Topshare_t$ 0.001 (0.74)
$Age_t$	-0.035*** (-9.07)	$Mgshare_t$ -0.388*** (-3.15)
$Stage_t$	0.075*** (2.85)	$Differ_t$ -0.004 (-1.46)
$Area_t$	0.016 (1.34)	$Duality_t$ -0.022 (-0.60)
$Divorce_t$	-0.037 (-1.64)	
$Ind\_Mlead_t$	2.994*** (5.22)	
Constant	0.309 (0.84)	Constant 0.762* (1.94)
Year FE	Yes	Year FE Yes
Industry FE	Yes	Industry FE Yes
Obs.	3070	Obs. 3070
Pseudo R <sup>2</sup>	0.067	Adjusted R <sup>2</sup> 0.037

The first step is a probit model with a binary  $Mlead$  dummy, and the second step is the ordinary least square regression of the marital leadership impact on the overall degree of the severity of financial fraud. Specifically, we treat the ratio of marital leadership-list companies in each industry  $Ind\_Mlead$ , as the instrumental variable in the first step.  $IMR_t$  denotes the inverse Mills ratio generated from the first step. Following Petersen (2009), we correct the standard errors using the double-clustering (firm and year) method. \*, \*\*, and \*\*\* denote 10%, 5%, and 1% statistical significance levels.

China are still dominated by men, custom dictates that the wife should support the husband’s actions in most cases to maintain family harmony and stability. This supporting behavior increases a party’s tolerance of his/her spouse’s fraud, which means that husband and wife have limitations in mutual supervision. Therefore, we can infer that the weaker internal supervision under marital leadership may provide an opportunity for listed firms to implement financial fraud.

Furthermore, when the centralized decision-making of marital leadership lacks constraints, its management style and self-rationalization can also lead to the risk of decision-making errors. For example, the limited rationality and overconfidence of decision makers may lead to the decline of judgment and decision quality. On the other hand, heterogeneity and conflicts between couples can also hinder the effectiveness of decision-making, increasing communication costs and operating pressures (Danes & Olson, 2003). Therefore, it is reasonable to infer that more decision-making errors can create pressures, which can result in more financial fraud behavior in marital-leadership firms.

In general, the centralized control of the ownership and management of marital leadership firms make the couples more likely to treat the firm as personal property. Thus, they can inherently self-rationalize reasons for behavior that may harm the interests of the other shareholders. Under the above management style, marital leadership can result in poor internal supervision and a greater risk of decision-making errors, thus forming opportunities and pressures for financial fraud. Under this framework, we conduct a sequential test following the test procedure proposed by Bentley-Goode, Omer, and Twedt (2019), and set the following three models:

**Table 8**  
Endogeneity: the regression results of the PSM procedure.

Panel A: The results of covariate balance checks							
Variable	Probit regression	Sample	Mean		t-test		
			Treated	Control	t	$p >  t $	
$Size_t$	-0.323***	Unmatched	6.394	6.486	-8.090	0.000	
	(-6.29)	Matched	6.394	6.394	0.050	0.957	
$Lev_t$	-0.006	Unmatched	0.318	0.352	-6.670	0.000	
	(-0.07)	Matched	0.318	0.318	-0.010	0.993	
$ROA_t$	0.194***	Unmatched	0.053	0.045	5.900	0.000	
	(5.52)	Matched	0.053	0.054	-0.670	0.504	
$Topshare_t$	-0.003**	Unmatched	0.333	0.326	1.980	0.047	
	(-2.06)	Matched	0.333	0.333	0.150	0.880	
$Mgshare_t$	0.403***	Unmatched	0.279	0.206	12.790	0.000	
	(4.32)	Matched	0.279	0.290	-1.390	0.164	
$Differ_t$	0.008***	Unmatched	0.055	0.065	-4.670	0.000	
	(3.23)	Matched	0.055	0.051	1.630	0.104	
$Duality_t$	0.067**	Unmatched	0.440	0.379	4.880	0.000	
	(2.16)	Matched	0.440	0.434	0.400	0.690	
$Age_t$	-0.035***	Unmatched	5.852	8.160	-14.930	0.000	
	(-9.07)	Matched	5.852	5.869	-0.100	0.917	
$Stage_t$	0.075***	Unmatched	1.976	1.969	0.420	0.675	
	(2.85)	Matched	1.976	1.990	-0.700	0.484	
$Area_t$	0.016	Unmatched	3.478	3.473	0.160	0.873	
	(1.34)	Matched	3.478	3.555	-1.770	0.077	
$Ind\_Mlead_t$	2.994***	Unmatched	0.197	0.175	15.090	0.000	
	(5.22)	Matched	0.197	0.196	0.590	0.557	
$Divorce_t$	-0.037	Unmatched	2.584	2.579	0.260	0.797	
	(-1.64)	Matched	2.584	2.565	0.740	0.459	

  

Panel B: Joint Hypotheses Test				
Sample	Ps R <sup>2</sup>	LR chi <sup>2</sup>	$p > \chi^2$	B
Unmatched	0.057	543.4	0.000	61.60
Matched	0.002	8.180	0.771	9.400

  

Panel C: The regression results using PSM procedure				
First step: Probit regression		Second step: OLS regression		
Dependent variable = $Mlead_t$		Dependent variable = $Fdeg_t$		
$Size_t$	-0.323*** (-6.29)	$Mlead_t$	0.085** (2.55)	
$Lev_t$	-0.006 (-0.07)	$Size_t$	-0.054 (-0.95)	
$ROA_t$	1.935*** (5.52)	$Lev_t$	0.116 (1.07)	
$Topshare_t$	-0.003** (-2.06)	$ROA_t$	-2.028*** (-5.31)	
$Mgshare_t$	0.403*** (4.32)	$Age_t$	0.001 (0.13)	
$Differ_t$	0.008*** (3.23)	$Topshare_t$	0.000 (0.19)	
$Duality_t$	0.067** (2.16)	$Mgshare_t$	-0.259** (-2.55)	
$Age_t$	-0.035*** (-9.07)	$Differ_t$	-0.002 (-0.75)	
$Stage_t$	0.075*** (2.85)	$Duality_t$	0.001 (0.02)	
$Area_t$	0.016 (1.34)	Constant	0.727* (1.85)	
$Divorce_t$	-0.037 (-1.64)	Year fixed effects	Yes	
$Ind\_Mlead_t$	2.994*** (5.22)	Industry fixed effects	Yes	
Constant	0.309 (0.84)	Obs.	3070	
Year fixed effects	Yes	Adjusted R <sup>2</sup>	0.036	
Industry fixed effects	Yes			
Obs.	10,117			
Pseudo R <sup>2</sup>	0.067			

This table represents the test process based on the PSM method. The marital leadership company is set as a treatment group, and the non-marital leadership company is set as a control group. In Panel A, the dependent variable is  $Mlead$ , and the fitted value of the propensity score can be calculated by the regression coefficients of the variables regressed by the probit model. Panel C reports the results from a probit model with a binary  $Mlead$  dummy using the unmatched sample and the ordinary least square regression of the impact of marital leadership impact on  $Fdeg$  using the matched sample generating from the probit regression. Following Petersen (2009), we correct the standard errors using the double-clustering (firm and year) method. \*, \*\*, and \*\*\* denote 10%, 5%, and 1% statistical significance levels.

$$Fdeg_{i,t} = c_0 + c_1 Mlead_{i,t} + \sum_k \beta_k Controls_{k,i,t} + \varepsilon_{i,t} \quad (\text{Path A})$$

$$M_{i,t} = a_0 + a_1 Mlead_{i,t} + \sum_k \beta_k Controls_{k,i,t} + \varepsilon_{i,t} \quad (\text{Path B})$$

$$Fdeg_{i,t} = c_0 + c_1' Mlead_{i,t} + bM_{i,t} + \sum_k \beta_k Controls_{k,i,t} + \varepsilon_{i,t} \quad (\text{Path C})$$

If both the coefficients  $a_1$  and  $b$  are significant in the above test process, we can continue to observe the coefficient  $c_1'$  in Path C. Specifically, if  $c_1'$  is significant, the mediating variable  $M$  plays a partial mediating role in the channel; otherwise,  $M$  is fully mediating. If one of the coefficients  $a_1$  and  $b$  does not reach the significance level, the Sobel test is required to further investigate whether the mediating effect is significant.

First, we focus on the opportunity channel for financial fraud (the lack of internal supervision). Following Jaggi et al. (2009), we choose the size of the board of supervisors (*Spvivor*) to proxy for the internal supervision of listed firms. Specifically, as a firm's internal supervision institution, the board of supervisors has duty to supervise and inspect financial accounting activities. When the actions of directors and senior managerial personnel harm a firm's interests, the board of supervisors has the right to ask the directors and senior managers to take corrective action. Considering the provisions of the CSRC and other supervisory committees, the larger the supervisory board of a given firm is, the more effective its role in the supervision function, and the more effective it is in preventing and constraining financial fraud behaviors.

Results of these tests are presented in Panel A of Table 9. The coefficient of the variable  $Mlead_{i,t}$  is significantly positive in Path A, which is totally consistent with that in Table 2. In Path B, the coefficient of the variable  $Mlead_{i,t}$  is significantly negative at the 1% level, which suggests that marital leadership limits the size of listed firms' board of supervisors. The coefficient of the variable  $Spvivor_{i,t}$  is significantly negative in Path C, indicating that the larger the size of the board of supervisors is, the greater the suppression of the degree of financial fraud of listed companies. Meanwhile, the coefficient of variable  $Mlead_{i,t}$  is significantly positive at the 1% level, suggesting that internal supervision is a mediator between marital leadership and financial fraud. Results show that weaker internal supervision under marital leadership provides an opportunity for listed firms to commit financial fraud.

Additionally, we look at the pressure channel of financial fraud (decision-making errors). Following Richardson (2006), we adopt inefficient investment (*Ineffi*) as a proxy variable for the decision-making effect of listed firms. The specific calculation method is shown in Appendix A. We use the residuals of the regression in Eq. (A1) presented in the Appendix A to measure inefficient investment. Negative (positive) values correspond to underinvestment (overinvestment).

Similarly, the results of each link are obtained according to the mediation effect test procedure. As shown in Panel B in Table 9, the coefficient of variable  $Mlead_{i,t}$  is still significantly positive in Path A. In Path B, the coefficient of  $Mlead_{i,t}$  is also significantly positive, indicating that marital leadership firms have inefficient investment behavior compared to non-marital ones. In Path C, the coefficient of  $Mlead_{i,t}$  is significantly positive, while the coefficient of variable  $Ineffi_{i,t}$  is positive yet insignificant. Therefore, the Sobel test is required. The  $p$ -value of the Sobel test is significant at the 10% level, supporting the mediating effect of inefficient investment. This analysis shows that the decision-making errors brought by marital leadership, such as inefficient investment, exert great pressure on the listed firms and further aggravate financial fraud.

## 6. Additional analyses

To further ensure the heterogenous impact of marital leadership on financial fraud, we also examine the relation between marital leadership and financial fraud, conditional on firm characteristics and monitoring.

**Table 9**  
Channel tests.

Panel A: Marital leadership, internal supervision and financial fraud					
Dependent variable =					
Path A	(1) <i>Fdeg<sub>t</sub></i>	Path B	(2) <i>Spvivor<sub>t</sub></i>	Path C	(3) <i>Fdeg<sub>t</sub></i>
<i>Mlead<sub>t</sub></i>	0.078*** (3.05)	<i>Mlead<sub>t</sub></i>	-0.058*** (-3.02)	<i>Mlead<sub>t</sub></i>	0.076*** (2.98)
<i>Size<sub>t</sub></i>	-0.056* (-1.82)	<i>Size<sub>t</sub></i>	0.128*** (5.53)	<i>Spvivor<sub>t</sub></i>	-0.036*** (-2.85)
<i>Lev<sub>t</sub></i>	0.093 (1.62)	<i>Lev<sub>t</sub></i>	0.169*** (3.90)	<i>Size<sub>t</sub></i>	-0.052* (-1.68)
<i>ROA<sub>t</sub></i>	-0.191*** (-9.07)	<i>ROA<sub>t</sub></i>	0.035 (0.22)	<i>Lev<sub>t</sub></i>	0.100* (1.73)
<i>Age<sub>t</sub></i>	0.004* (1.79)	<i>Age<sub>t</sub></i>	0.014*** (8.54)	<i>ROA<sub>t</sub></i>	-0.191*** (-9.07)
<i>Topshare<sub>t</sub></i>	-0.001 (-1.63)	<i>Topshare<sub>t</sub></i>	-0.003*** (-4.85)	<i>Age<sub>t</sub></i>	0.004** (2.01)
<i>Mgshare<sub>t</sub></i>	-0.197*** (-3.28)	<i>Mgshare<sub>t</sub></i>	-0.057 (-1.25)	<i>Topshare<sub>t</sub></i>	-0.001* (-1.75)
<i>Differ<sub>t</sub></i>	-0.005*** (-3.05)	<i>Differ<sub>t</sub></i>	0.006*** (5.11)	<i>Mgshare<sub>t</sub></i>	-0.199*** (-3.31)
<i>Duality<sub>t</sub></i>	0.025 (1.27)	<i>Duality<sub>t</sub></i>	0.017 (0.41)	<i>Differ<sub>t</sub></i>	-0.004*** (-2.92)
				<i>Duality<sub>t</sub></i>	0.023 (1.13)
Constant	0.619*** (3.03)	Constant	2.703*** (7.61)	Constant	0.718*** (3.46)
Year FE	Yes	Year FE	Yes	Year FE	Yes
Industry	Yes	Industry	Yes	Industry	Yes
FE		FE		FE	
Obs.	11,119	Obs.	11,119	Obs.	11,119
Adjusted R <sup>2</sup>	0.043	Adjusted R <sup>2</sup>	0.063	Adjusted R <sup>2</sup>	0.044

  

Panel B: Marital leadership, inefficient investment and financial fraud					
Dependent variable =					
Path A	<i>Fdeg<sub>t</sub></i>	Path B	<i>Ineffi<sub>t</sub></i>	Path C	<i>Fdeg<sub>t</sub></i>
<i>Mlead<sub>t</sub></i>	0.078*** (3.05)	<i>Mlead<sub>t</sub></i>	0.007** (1.99)	<i>Mlead<sub>t</sub></i>	0.081** (2.43)
<i>Size<sub>t</sub></i>	-0.056* (-1.82)	<i>Size<sub>t</sub></i>	-0.115*** (-9.36)	<i>Ineffi<sub>t</sub></i>	0.074 (0.64)
<i>Lev<sub>t</sub></i>	0.093 (1.62)	<i>Lev<sub>t</sub></i>	-0.001 (-0.16)	<i>Size<sub>t</sub></i>	-0.044 (-1.05)
<i>ROA<sub>t</sub></i>	-0.191*** (-9.07)	<i>ROA<sub>t</sub></i>	0.035 (1.39)	<i>Lev<sub>t</sub></i>	0.111 (1.59)
<i>Age<sub>t</sub></i>	0.004* (1.79)	<i>Age<sub>t</sub></i>	0.004*** (13.45)	<i>ROA<sub>t</sub></i>	-0.181*** (-7.04)
<i>Topshare<sub>t</sub></i>	-0.001 (-1.63)	<i>Topshare<sub>t</sub></i>	-0.001*** (-3.56)	<i>Age<sub>t</sub></i>	0.003 (1.13)
<i>Mgshare<sub>t</sub></i>	-0.197*** (-3.28)	<i>Mgshare<sub>t</sub></i>	-0.050*** (-6.25)	<i>Topshare<sub>t</sub></i>	-0.001 (-1.43)
<i>Differ<sub>t</sub></i>	-0.005*** (-3.05)	<i>Differ<sub>t</sub></i>	-0.001*** (-7.15)	<i>Mgshare<sub>t</sub></i>	-0.184** (-2.28)
<i>Duality<sub>t</sub></i>	0.025 (1.27)	<i>Duality<sub>t</sub></i>	0.018** (2.23)	<i>Differ<sub>t</sub></i>	-0.004** (-2.30)
				<i>Duality<sub>t</sub></i>	0.032 (1.29)
Constant	0.619*** (3.03)	Constant	0.770*** (9.31)	Constant	0.480* (1.71)
Year	Yes	Year	Yes	Year	Yes
Industry	Yes	Industry	Yes	Industry	Yes
Obs.	11,119	Obs.	11,053	Obs.	11,053
Adjusted R <sup>2</sup>	0.043	Adjusted R <sup>2</sup>	0.033	Adjusted R <sup>2</sup>	0.050
Sobel-Goodman Mediation Tests			$p$ -value = 0.071		

This table presents the impact of marital leadership on financial fraud through weakening internal supervision and exacerbating inefficient investment. Following Petersen (2009), we correct the standard errors using the double-clustering (firm and year) method. \*, \*\*, and \*\*\* denote 10%, 5%, and 1% statistical significance levels.

## 6.1. The impact of firm characteristics

Regarding firm characteristics, previous studies note that small-cap and younger firms are prone to whitewashing operational problems through a series of approaches, such as corporate tax avoidance and earnings management (Cheng, Wang, Chiao, Yao, & Fang, 2021). Management of such listed firms may also have greater incentives to commit financial fraud. We select the above two perspectives of *Size* and *Age* and analyze the impact of marital leadership on financial fraud in terms of firm characteristics.

Specifically, according to the median of firm size of the sample firms in the same industry and year, we divide the 1:1 matching sample into larger-cap (smaller-cap) firms. Meanwhile, we also divide the 1:1 matching sample into older (younger) firms if the listed years in SHSE or SZSE of firm *i* in year *t* is larger (smaller) the median.

The re-estimation results with the above groups are shown in Panel A of Table 10. Specifically, the coefficients in Columns (2) and (4) are all significantly positive at least at the 5% level, while those in Columns (1) and (3) are insignificant. Considering the potential interpretations, compared to large-cap firms, small-cap firms receive less market

**Table 10**  
Further analyses.

Panel A: The impact of firm characteristics					
Dependent variable = $Fdeg_t$					
	(1) Larger-cap	(2) Smaller-cap	(3) Older	(4) Younger	
$Mlead_t$	-0.028 (-0.61)	0.116*** (2.82)	0.032 (0.72)	0.103** (2.34)	
$Size_t$	-0.186 (-1.54)	0.054 (0.52)	-0.170** (-2.13)	0.132 (1.42)	
$Lev_t$	0.030 (0.21)	-0.140 (-1.04)	0.013 (0.10)	-0.175 (-1.14)	
$ROA_t$	-0.497 (-0.98)	-0.402*** (-8.12)	-0.733 (-1.60)	-0.503*** (-8.48)	
$Age_t$	0.005 (0.97)	-0.003 (-0.56)	0.009* (1.76)	-0.036* (-1.89)	
$Topshare_t$	0.002 (1.16)	0.002 (1.17)	-0.001 (-0.80)	0.002 (1.23)	
$Mgshare_t$	-0.056 (-0.35)	-0.322*** (-2.65)	-0.203 (-1.19)	-0.295** (-2.30)	
$Differ_t$	-0.004 (-1.12)	-0.004 (-1.09)	-0.002 (-0.67)	-0.004 (-0.97)	
$Duality_t$	0.078 (1.56)	0.052 (1.26)	0.105** (2.23)	0.040 (0.91)	
Constant	1.350* (1.69)	0.284 (0.43)	1.271** (2.39)	-0.007 (-0.01)	
Year fixed effects	Yes	Yes	Yes	Yes	
Industry fixed effects	Yes	Yes	Yes	Yes	
Obs.	1682	1662	1727	1617	
Adjusted R <sup>2</sup>	0.030	0.049	0.052	0.050	

  

Panel B: The impact of external monitoring mechanisms						
Dependent variable = $Fdeg_t$						
	(1) Big 4	(2) High-IO	(3) High-Media	(4) Non-Big4	(5) Low-IO	(6) Low-Media
$Mlead_t$	0.092 (0.62)	0.047 (0.96)	0.087 (1.40)	0.079** (2.40)	0.094** (2.27)	0.136*** (2.79)
$Size_t$	0.078 (0.31)	-0.114 (-1.32)	-0.145 (-1.35)	-0.047 (-0.81)	0.041 (0.50)	-0.015 (-0.15)
$Lev_t$	-1.585** (-2.47)	-0.107 (-0.70)	-0.277 (-1.41)	-0.069 (-0.64)	-0.070 (-0.51)	0.080 (0.49)
$ROA_t$	-0.363* (-1.95)	-0.155*** (-2.77)	-0.414*** (-6.05)	-0.292*** (-7.60)	-0.338*** (-6.88)	-0.263*** (-4.24)
$Age_t$	0.032 (1.69)	-0.003 (-0.60)	0.005 (0.69)	-0.001 (-0.30)	-0.001 (-0.22)	-0.006 (-0.90)
$Topshare_t$	-0.010 (-1.59)	-0.001 (-0.03)	0.005** (2.20)	0.002 (1.30)	0.002 (1.31)	-0.001 (-0.01)
$Mgshare_t$	0.049 (0.09)	-0.447*** (-2.63)	-0.356* (-1.87)	-0.315*** (-3.15)	-0.304** (-2.41)	-0.273* (-1.86)
$Differ_t$	0.001 (0.02)	-0.006* (-1.89)	-0.005 (-1.05)	-0.004 (-1.49)	-0.002 (-0.56)	-0.005 (-1.31)
$Duality_t$	0.179 (1.03)	0.002 (0.05)	0.135** (2.08)	0.053 (1.57)	0.074* (1.75)	0.014 (0.28)
Constant	0.093 (0.06)	1.149** (1.98)	1.158 (1.61)	0.789** (2.02)	0.322 (0.60)	0.795 (1.20)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	253	1650	1715	3091	1694	1629
Adjusted R <sup>2</sup>	0.065	0.021	0.042	0.039	0.043	0.053

This table reports the results of marital leadership on financial fraud under different firm characteristics and external monitoring mechanisms. Specifically, the full sample is divided into larger/smaller cap sample, older/younger sample, Big 4/Non-Big 4 audition sample, higher/lower institutional ownership (IO) sample and media coverage sample. Following Petersen (2009), we correct the standard errors using the double-clustering (firm and year) method. \*, \*\*, and \*\*\* denote 10%, 5%, and 1% statistical significance levels.



attention. Consequently, such firms are more prone to poor internal governance mechanisms, with internal control likely to be flawed. This provides 'favorable conditions' for marital leaders to manipulate financial fraud. Although large-cap firms may also have incentives to manipulate accounting figures to raise more social funds, they are more likely to abandon this motivation by balancing social and regulatory pressures (Chen, Xie, You, & Zhang, 2018).

Similarly, compared to firms with longer listed years, younger firms are immature in corporate governance and internal control. In addition, the slow-growing economy in China also exerts pressure on younger firms to some extent. Therefore, the influence of marital leaders on financial fraud is more pronounced for younger firms.

## 6.2. The impact of external monitoring mechanisms

The results of channel tests in this paper show that weaker internal supervision and poor decisions of marital leadership are the potential linkages that aggravate financial fraud. Yuan et al. (2016) and Chen et al. (2018) argue that a higher level of external monitoring (such as higher auditing quality, higher institutional ownership, and higher media coverage) can effectively restrain managers' opportunistic behaviors, strengthen the supervision of listed firms, and reduce the benefit encroachment and wrong decisions. Therefore, the conditioning role of external monitoring mechanisms on the relation between marital leadership and financial fraud is also of great interest.

Following Cheng, Chiao, Fang, Wang, and Yao (2020), we examine the relation between marital leadership and financial fraud conditional on the proxies for monitoring mechanisms, including auditor affiliation, institutional ownership, and media attention, to investigate whether the external supervision mechanism can effectively restrain the moral hazard of marital leaders and thus curb financial fraud. Among these variables, media attention is measured by the number of news reports on listed firms by SINA Finance and Economics.<sup>9</sup>

Specifically, using a 1:1 matching sample, the sample is divided into the following sub-groups: Big 4/Non-Big 4 firms based on whether firms appoint Big 4 auditors to provide auditing services, higher/lower institutional ownership (IO) firms, and higher/lower media attention (Media) firms. The regression results in Panel B show that the coefficients on  $Mlead_{i,t}$  are all significant and positive in Columns (4) to (6), while those are insignificant in Columns (1) to (3). That is, the effect of marital leadership on financial fraud is stronger for firms with weaker monitoring mechanisms. The above results also verify that well-regulated corporate governance mechanisms can effectively reduce the

## Appendix A. The specific method of inefficient investment

Regarding inefficient investment, for each firm year, we follow Richardson (2006) to conduct the following regression:

$$Invest_{i,t+1} = \beta_0 + \beta_1 Growth_{i,t} + \beta_2 Size_{i,t} + \beta_3 Lev_{i,t} + \beta_4 Cash_{i,t} + \beta_5 Age_{i,t} + \beta_6 Ret_{i,t} + \beta_7 Invest_{i,t} + \sum Industry + \sum Year + \epsilon_{i,t+1}, \quad (A1)$$

where  $Invest_{i,t+1}$  represents the new investment of firm  $i$  in year  $t+1$ , which is calculated as the sum of the cash paid for fixed assets, other long-term assets, as well as the purchase and disposal of subsidiaries and other business units, divided by the total assets;  $Growth_{i,t}$  represents the growth capacity, measured as the Tobin's Q value;  $Cash_{i,t}$  denotes the cash and cash equivalent balance;  $Ret_{i,t}$  is the mean of the firm-specific weekly returns over the fiscal year;  $Industry$  and  $Year$  are vectors of dummy variables capturing the industry and annual fixed effects, respectively. Finally, inefficient investment ( $Ineff_{i,t}$ ) is calculated as the absolute value of the residual of the above regression ( $\epsilon_{i,t}$ ).

impact of marital leadership on financial fraud.

## 7. Conclusion

We examine the impact of marital leadership on firm-specific financial fraud. Using a unique hand collected dataset, we find that marital-leadership firms are more likely to have financial irregularities. In other words, marital leadership significantly increases the likelihood of financial fraud. Additionally, we analyze the economic linkages between marital leadership and financial fraud. Evidence shows that weaker internal supervision and more decision-making errors are positively associated with marital leadership, thereby establishing motives and opportunities for financial fraud. Results indicate that the impact of marital leadership is more pronounced for small-cap and younger firms, while a strong external supervision environment can mitigate these vulnerabilities.

Overall, we contribute substantially to both the literature on how marital literature impacts agency costs, as well as to the literature on the determinants of financial fraud. Our results indicate that in markets where corporate governance systems are bounded and suboptimal, marital leadership potentially leads to a serious agency conflicts, especially between controlling family shareholders and external minority shareholders. Accordingly, it is important for firms and regulators to understand the need for heightened supervision, and to evolve protective mechanisms. Our results should be of great interest to investors, policy makers, and scholars interested in the role of marital leadership on corporate governance.

## Author statement

The authors assert that this is a joint project where all authors have contributed meaningfully, and that this paper is original and not under consideration elsewhere.

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<sup>9</sup> SINA is one of the biggest detailed business news and reports provider in China. For details, see <http://english.sina.com/news/biz-tech/economy.html>

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