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Family control and corporate risk-taking in China: Does working capital strategy matter?

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ABSTRACT

This study uses the data of A-share listed family firms during the period 2010-18 and employs multiple regression analysis to verify the role of family control and working capital strategy for corporate risk-taking in China. This study also explores the regulatory role of family control in the relationship between working capital strategy and corporate risk-taking of Chinese listed family firms. Results show that greater family control encourages risk-taking behavior in Chinese firms whereas conservative working capital strategy diminishes corporate risk-taking. The results also suggest a regulatory role for family control on the effects of working capital strategy for family firms' risk-taking behavior. Strong family control weakens the negative association between working capital conservatism and corporate risk-taking. This study's findings may help managers of family firms to adjust risk-taking behavior in response to changing working capital strategy. The results are robust to different measures of corporate risk-taking and working capital strategy.

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1. Introduction

Family businesses play an essential role in economic activities and significantly contribute to economies globally. The statistics show that family-owned or operated firms accounted for 70–90%[1], globally (Chrisman et al., 2015; De Massis et al., 2018) and play a vital role in a country's overall economic development. Many private family-owned firms have been established in mainland China since the beginning of the opening-up reforms (see Global Family Business Survey 2018 – China Report[2]) and about 80% of Chinese firms, including 55.7% of A-share listed firms, are family

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businesses that are contributing more than 60% in China's total GDP. Family businesses have become one of the fundamental driving forces of China's economic and social development by providing 80–90% of total employment. China's family-owned firms have developed for decades and many have become significant source of economic contribution, e.g., Midea Group, Country Garden, and BYD. However, since the beginning of 2017, the Chinese economy has experienced some turbulence which has affected private businesses in various sector, specifically steel, robotics, telecommunication, and real estate. Many of these firms have suffered stagnation with higher level of risk, leading to operational volatility.

In family businesses, where the control is exercised by family members, the ownership and management rights are not separated or are not entirely separated. Studies have shown that the strength of family control can directly affect a firm's financial decision-making and business strategy (Chai & Mirza, 2019; Chen & Hsu, 2009; Choi et al., 2015; González-Cruz et al., 2020; Rondi et al., 2019). Choi et al. (2015) argue that the family-owned firms hold ownership and management control rights concurrently and use these arrangements to pursue family interests. Standard family controls include pyramid structure, cross-shareholding, control of board seats, and dual-equity election agreements (Chrisman et al., 2015; Debellis et al., 2021; Kim & Lu, 2011; Lien et al., 2016; Nordqvist et al., 2014). Faccio (2006, 2010) underscores family businesses as a significant contributor to the world's socio-economic development. However, family firms are more pronounced in emerging economies due to weaker institutional settings. Agency theory suggests that the concentration of ownership and control in the same hands (family firms) could reduce agency costs (Jensen & Meckling, 1976), encouraging managers to take risks. Several other studies, scrutinizing various governance mechanisms, have argued that agency costs may bring self-control and altruism which can hamper decision-making on innovative strategies in family firms (Hernández-Perlines et al., 2020; Lubatkin et al., 2005).

Choi et al. (2015) and Filatotchev et al. (2005) argue that due to the 'difference of pattern' of interpersonal relationships in China the degree of trust inside and outside the family circle are quite different. The family relationship network with kinship has a higher degree of trust which forms a strong cohesiveness and can effectively stimulate and restrain family members' behavior, thus enhancing the value of a family business (Karra et al., 2006).

Prior studies have also conducted in-depth analysis on the separation of control and cash flow rights under family control, family sentiment preferences on investment and financing policies, and business performance, etc. (Anderson et al., 2012; Gómez-Mejía et al., 2007; Nordqvist et al., 2014; Sharma & Chua, 2013). He et al. (2017) and Ren et al. (2019) have pointed out that systematic cooperation in working capital investment and financing policies directly determines the firm's overall risk and operating performance, as firms with low working capital investment can be under significant financial pressure and excessive working capital holdings may reduce profitability. Besides, when a firm face financial constraints the working capital plays a vital role in buffering the volatility of capital investment and this role becomes more prominent as firms' financial constraints increase (Brown & Petersen,

2011). Researchers have discovered that working capital has a significant impact on the performance and operational risks of the firms and plays a prominent role in easing fluctuations in capital expenditure (Deloof, 2003; Ren et al., 2019).

Moreover, the corporate risk-taking is affected by many factors including the legal system (John et al., 2008) and equity incentives (Huang & Wang, 2015). The financing and investment strategies jointly determine the firms' risk-taking level (Mirza & Ahsan, 2019). Faccio et al. (2011) argue that the firms pursue high risk-taking where large shareholders have a more diversified shareholding portfolio. Laeven and Levine (2009) note that the firms with higher concentration of shareholding are more involved in risk-taking activities. Further empirical evidence also shows that the heterogeneity of shareholding can impact the level of firm risk-taking (Low, 2009; Ross, 2004). Compared with state-owned holding firms, family-controlled listed firms exhibit higher risk-taking behavior. Accordingly, family control and working capital strategy are two important determinants of corporate risk-taking, and it is essential to investigate their separate and joint impact on corporate risk-taking behavior in China.

Consequently, this study's contribution is multi-faceted. Firstly, the extant literature on family businesses mainly focuses on the study of equity concentration, principal-agent theory, the influence of large shareholders' social capital on family business performance, the intergenerational inheritance of family firms, and family business corporate governance (Bertrand & Schoar, 2006; Daspit et al., 2019; Hernández-Perlines et al., 2020; Hussinger & Issah, 2019; Nordqvist et al., 2014). However, the risk-taking behavior of family businesses has received much less attention from researchers, specifically the empirical research on the level of risk-taking of Chinese listed family firms. Therefore, this study investigates the mechanism of family control and working capital strategy in reference to corporate risk-taking behavior and provides an essential supplement to the previous literature on the risk-taking behavior of family firms. Second, the existing literature on family business risk-taking behavior focuses on the perspectives of CEO sources, social & emotional wealth, and intergenerational inheritance. However, this study focuses on the strength of family control to investigate its impact on corporate risk-taking behavior. Thirdly, the study investigates the regulatory effect of family control on the relations between working capital strategy and corporate risk-taking behavior. Results show that there is a positive association between family control and corporate risk-taking behavior. These results are against socioemotional wealth theory, which believes that the family firms' risk-taking level decreases with increased family control. However, this study finds that family control can promote corporate risk-taking behavior, *ceteris paribus*. Results also explain that a robust family control weakens the negative association between working capital conservatism and corporate risk-taking. This study also sheds light on the impact of family control on corporate risk-taking more comprehensively. These results can help managers of family firms to devise strategies to adjust risk-taking behavior by changing working capital strategy.

Rest of the paper is structured as follows: Section 2 reviews the literature and develops hypotheses, Section 3 describes the data and methodology, Section 4 explains the study results, and Section 5 concludes the study.

2. Literature review and hypotheses development

2.1. Family control and corporate risk-taking

In family-controlled firm the family has both the ownership and the control of the business and it dominates the investment and financing decisions of the business. Agency theory illustrates that families running businesses mitigate agency problems due to the alignment of ownership and management rights, leading to the consistency of interests. Therefore, family businesses are more willing to sacrifice short-term benefits to ensure long-term investment success (Duran et al., 2016). Further, research and development (R&D) is part of the long-term investment decisions of a firm, which has high profitability and can significantly enhance its competitive advantage and create value for the firm in the long run. However, it accompanies a higher degree of uncertainty, increasing the volatility of a firm's operations (Anderson et al., 2012; Kosmidou & Ahuja, 2019). Accordingly, the family control can affect firms' risk-taking level through financial decisions such as R&D (innovation) and merger and acquisition (M&A).

Studies have shown that risk-taking can significantly increase corporate value as a firm's investment in R&D and capital expenditures, while indicating higher risk-taking, are conducive to improved firm performance (Bjuggren et al., 2018; Lattuch, 2019; Lee et al., 2003). Behavioral agency theory, which combines behavioral theory, agency theory, and prospect theory, explains firm's risk-taking behaviors from various perspectives like risk-taking, goal settings, governance structure, ownership, and social contribution, etc. (Hussinger & Issah, 2019). It further elaborates that the risk-taking behaviors of a family firm's managers are shown in their strategic decision-making to avoid losses as they put their wealth at stake while making any strategic risk-taking decision. However, the resource-based view isolates idiosyncratic resources that are dynamic, complex, and intangible within firms and considers family itself valuable, rare, and non-substitute-able resources to create a competitive advantage that outperforms non-family firms (Hernández-Perlines et al., 2020). However, researchers have argued that excessive risk exposure would reduce corporate value due to resource constraints. Poletti-Hughes and Williams (2019) combine institutional and managerial perspectives with the concept of socioemotional wealth (SEW) and find that family businesses have higher value and a higher level of risk. Therefore, higher risk of R&D (innovation) can constrain the investment level of family firms. However, a family can be more willing to increase investment in R&D (innovation) of the firm to keep the family control (Daspit et al., 2019; Diéguez-Soto et al., 2016; Kammerlander & van Essen, 2017).

Moreover, merger and acquisitions (M&A) provide an advantage to a business to pursue long-term value faster and less risky than creating value through normal business operations. Family members with roles in the board of directors, the supervisory board, and management have a consistent desire to do a great job in the family, and they face less resistance than non-family firms in the entire process of creating, reviewing, approving, and implementing M&A decisions, which can be more conducive to the success of M&A. Furthermore, empirical evidences also show that the opportunities for mergers and acquisitions increase with the proportion of family

ownership (Bertrand & Schoar, 2006; Feito-Ruiz & Menéndez-Requejo, 2010; Rondi et al., 2019). Therefore, it can be assumed that family businesses are more willing to take risks in their production operations, and the corporate risk-taking may increase as the strength of family control increases. Based on these arguments, this study proposes the following hypothesis:

H1: Chinese firms with stronger family control pursue higher risk-taking.

2.2. Working capital strategy and corporate risk-taking

Working capital strategy refers to a series of actions taken by firms to improve the utilization of their working capital by adjusting the ratio of various components of working capital. Based on prior studies, working capital strategy can be divided into two parts, i.e., working capital investment strategy and financing strategy (Cote & Latham, 1999; Hill et al., 2010). The working capital investment strategy refers to the current assets holding plan, allowing firms to ensure that market demand is met and to avoid sales losses due to inadequate inventories. By granting commercial credit to the customers, the firm can effectively attract customers to expand sales and reduce operational risk. The working capital financing strategy refers to the current debt carrying plan. By using accounts payable, firms can ease the pressure of cash flows, increase the utilization of funds, reduce the cost of financing, and improve the overall firm performance (Brown & Petersen, 2011).

Corporate risk-taking is determined by the size of the operational risk faced by the business and the level of financial risk arising from the firm's financing decisions (Ren et al., 2019). A high level of risk-taking indicates that the firms will participate more in venture investments and indicate that the existing set of operating assets and investment opportunities may bring higher uncertainty to value-addition and future cash flows (Choi et al., 2015; Daspit et al., 2019). Anderson et al. (2012) find that family firms with higher risk-taking have a smaller working capital holding ratio. Firms with aggressive working capital strategies can be detrimental to their operational efficiency and market positioning. However, family firms with stable working capital policy hold more cash and choose a lower rate of return for investment to maintain higher liquidity, thus maintain a lower level of financial risk-taking (Hernández-Perlines et al., 2020; Meroño-Cerdán et al., 2018). In short, a conservative working capital strategy reduces the overall risk-taking level of family firms by reducing the level of exposure to operational and financial risks. Therefore, we present our second hypothesis as under:

H2: Stable working capital strategy pursued by the family firms lower their risk-taking.

2.3. Family control, working capital strategy, and corporate risk-taking

The research on the risk-taking of family businesses emanates mostly from the perspective of managerial heterogeneity, socio-emotional wealth, and large shareholders' social capital (Hernández-Perlines et al., 2020; Wu & Mazur, 2018; Zellweger et al., 2012). The actual controller controls the proportion of ownership of listed firms to

represent the strength of family control. The actual controller plays a leading role in the family and is the primary decision-maker of the working capital strategy and the level of corporate risk-taking, which links the actual controller to certain representativeness, and reducing the interference of dissent to a certain extent (König et al., 2013; Nordqvist et al., 2014). Firms with a stable working capital strategy hold more current assets that exceed the current operating liabilities. It provides firms with sufficient liquidity and financial flexibility to reduce financial risk and make their business operations more stable (Cote & Latham, 1999; Daspit et al., 2019). However, this can significantly reduce the firms' profitability and be detrimental to the long-term development of the firms.

Working on the long-term business orientation, family firm seeks long-term development of the family. Thus, there is a tendency to opt for long-term investment activities such as research and development and, thereby, taking more risks and generating higher returns (Nordqvist et al., 2014; Poletti-Hughes & Williams, 2019). This willingness is reflected in the formulation of a working capital strategy that, on the one hand, may make the firms to reduce the cash and other current assets and improve the utilization of funds while, on the other hand, may make the firms to seek a higher level of current liabilities to reduce financing costs. These two roles can destabilize the working capital strategy, which changes the firm's risk-taking level and profitability. Therefore, the magnitude of family control can have a regulatory effect on the working capital strategy and corporate risk-taking. Accordingly, we propose the following hypothesis regarding the relationship between family control, working capital strategy, and the corporate risk-taking:

H3: Family control plays a regulatory role in the association between working capital strategy and corporate risk-taking.

3. Research design

3.1. Sample and data

This study takes Chinese listed family firms as a sample and collects data of A-share private listed firms from Shenzhen and Shanghai Stock Exchanges. The required data is extracted from the CSMAR database. The following criteria is adopted in selecting the sample firms: (1) the actual controlling person is a natural person, or a family (or group) formed by kinship; (2) the ultimate controller directly or indirectly controls the listed firm and is the largest shareholder; (3) the proportion of ownership and control held by the actual controller is 10% or greater. To ensure data reliability, this study takes the following steps to filter and process the final data: (1) listed family firms belonging to the insurance, financial industries, and specially treated (ST) firms in 2008 and 2018 are excluded; (2) variables needed to calculate the corporate's risk-taking level have three consecutive years of data. After screening, the study manages 7,551 firm-year observations of 1,306 listed family firms from 2010 to 2018. The variables are winsorized at 1% to deal with potential outliers.

3.2. Measurements of variables

3.2.1. Corporate risk-taking

Following Faccio et al. (2011) and Boubakri et al. (2013) this study employs corporate income volatility as a measure of corporate risk-taking (Risk). It uses the standard deviation of total return on assets (ROA) to measure the income volatility of listed family firms. The standard deviation of ROA is based on three-years rolling window. ROA is the ratio of EBIT over total assets (ASSET) at the end of the period. Further, the individual firm's ROA is adjusted to the industry average to eliminate industry bias. Equation (1) presents the computation of industry-adjusted ROA.

$$AdjROA_{it} = \frac{EBIT_{it}}{ASSET_{it}} - \frac{1}{n}\sum_{j=1}^{n}\frac{EBIT_{jt}}{ASSET_{jt}} \tag{1}$$

where '**i**' and '**j**' represent the firm, '**n**' represents the total number of firms in an industry, and '**t**' represents the year. Next, the three-year standard deviation of the industry-adjusted ROA is computed for each listed family firm for each year (e.g., 2008–2010) as measure of level of risk-taking as presented in the following Equation (2). Where 'N' is 3, representing the rolling period of 3 years, and 'n' indicates the year number.

$$Risk_{it} = \sqrt{\frac{1}{N-1}\sum_{n=1}^{N}\left(AdjROA_{it} - \frac{1}{N}\sum_{n=1}^{N}AdjROA_{it}\right)^2} \tag{2}$$

3.2.2. Family control

This study measures the degree of family control by the ownership proportion. The percentage of the family ownership is often used measure of the family control (Gersick et al., 1997). As the family firms have a familial culture, family consciousness, emotional and close relationship it is, therefore, easy to appoint a concerted person to represent the family. Consequently, the family head has great authority in the family and serves as the family's core. His/her consciousness can have a strong influence on other family members. So, the actual controller can significantly influence the firm's investment and financing decisions and working capital strategy. Hence, following Gersick et al. (1997), this study uses the listed firm's proportion of ownership held by the actual controller to represent the strength of the family control. The study obtains the initial data about family ownership from the National Security database.

3.2.3. Working capital strategy

To measure the working capital strategy (WCS) various studies including Chen and Kieschnick (2018), Ding et al. (2013), and He et al. (2017) adopted the ratio of net working capital to total assets. The larger values indicate stable working capital. This study also uses the same indicator, where the net working capital is calculated from operating current assets minus current operating liabilities. Positive values indicate

that the current operating assets are higher than the current operating liabilities and, hence, the long-term liabilities partially finance the operating assets. Alternatively, the negative values of the net working capital indicate that current operating assets are less than current liabilities and, hence, some of the long-term assets are financed by current liabilities. The larger values of net working capital to total assets represent a more stable working capital strategy.

3.2.4. Control variables

Based on prior literature (Armstrong & Vashishtha, 2012; Chen & Kieschnick, 2018; Faccio et al., 2011; He et al., 2017; Kim & Lu, 2011; Mirza & Ahsan, 2019), this study uses various control variables to ensure the accuracy of empirical results. The selected control variables are as follows:

(1) Age of business (Age), computed as the natural logarithm of the difference between the year of a firm's establishment and the year of sample observation. As risk management and control increases with the firm's age, it can increase the risk-taking level of the firm. (2) Return on equity (ROE). This indicator reflects the profitability of a firm's shareholders, and the profitability level of the firm may affect the risk-taking tendency. (3) The growth rate of sales revenue (Growth). This indicator reflects the growth of business revenue, and a higher growth rate can increase business value and increase investment, which may affect the level of corporate risk-taking. (4) Asset-liability ratio (Leverage). This indicator is used to represent the capital structure and reflects the level of corporate debt. The level of indebtedness affects ventures' investment and financing decisions and changes the level of corporate risk-taking. (5) Firm Size (Size). Firms of different sizes, owing to their heterogeneity, may have different appetite for risk-taking. (6) Industry factors (Industry). Firms in different industries are affected by the level of risk-taking due to industry-specific differences. Following the 2013 'Guidelines for the Classification of Listed Firms,' this study uses a dummy variable assigning '1′ to manufacturing firms and '0′ to non-manufacturing firms. (7) Time factor (Year). This study has nine dummy variables to control time-fixed effects during the sample period (2010-2018). Detailed variable descriptions are provided in Table 1.

3.3. Modeling

This study focuses on the relationship between family control, working capital strategy, and corporate risk-taking and, following similar studies (Ahsan et al., 2021; Mirza & Ahsan, 2019; Qureshi et al., 2020; Shahzad et al., 2019), employs a multiple regression model to investigate the impact of explanatory variables on the interpreted variable. The following model is developed to investigate the impact of family control on corporate risk-taking (hypothesis 1):

$$\begin{aligned} Risk_{it} = {} & \alpha_0 + \beta_1 \text{Family}_{it} + \beta_2 Age_{it} + \beta_3 ROE_{it} + \beta_4 Growth_{it} + \beta_5 Lev_{it} + \beta_6 Size_{it} \\ & + \beta_7 Industry_i + \beta_8 Year_t + \varepsilon_{it} \end{aligned} \tag{3}$$

Table 1. Description of variables.

Variable level	Name of variable	Code	Variable descriptions
Dependent variable	Corporate Risk-Taking	Risk	Three years rolling average of Industry-adjusted Standard deviation of ROA
Independent variable	Family Control	Family	The actual controller's shareholding ratio indicates the strength of family control.
	Working Capital Strategy	WCS	WCS is the ratio of net working capital to total assets, while the net working capital is the difference between current operating assets and operating current liabilities.
Control variable	Firm Age	Age	Age = Ln (Firm's establishment year +1)
	Return on equity	ROE	ROE = Net profit/ net assets at the end of the year
	Growth rate of sales revenue	Growth	Sales revenue growth rate = (this year's sales revenue amount – the previous year's sales revenue amount)/the previous year's sales revenue amount
	Asset-liability ratio (Leverage)	Lev	Total Liabilities/Total Assets
	Firm Size	Size	Scale = Ln (total assets)
	Industry	Industry	According to the < Guidelines for the Classification of Listed Companies in the Industry > of the SFC in 2013, '1' is the manufacturing industry, and '0' is the non-manufacturing industry.
	Year	Year	Dummy variable, 2010–2018

Source: CSMAR database.

$Risk_{it}$ is the corporate risk-taking of the ith firm at time t measured as three years rolling Industry-adjusted Standard deviation of ROA. $Family_{it}$ is the family control of a given firm measured as the actual controller's shareholding ratio indicating the strength of family control. Age_{it} is the age of a given firm i at time t measured as the natural logarithm of a firm's establishment year plus one. ROE_{it} is the ratio of net profit to total assets of the ith firm at time t. $Growth_{it}$ is the revenue growth rate of ith firm at time t. Lev_{it} is the ratio of total liabilities to total assets of the ith firm at time t. $Size_{it}$ is the natural logarithm of total assets of the ith firm at time t. $Industry_i$ is a dummy variable that takes a value of '0' for non-manufacturing industries and '1' for manufacturing. $Year_t$ is the time fixed effect, and ε_{it} is the unexplained error term of the ith firm at time t. α_0 is the intercept.

To measure the impact of working capital strategy on corporate risk-taking in family firms, this study develops the following regression model (Hypothesis 2):

$$\begin{aligned} \mathrm{Risk}_{it} = {} & \alpha_0 + \beta_1 \mathrm{WCS}_{it} + \beta_2 Age_{it} + \beta_3 ROE_{it} + \beta_4 Growth_{it} + \beta_5 Lev_{it} + \beta_6 Size_{it} \\ & + \beta_7 Industry_i + \beta_8 Year_t + \varepsilon_{it} \end{aligned} \tag{4}$$

$Risk_{it}$ is corporate risk-taking of the ith firm at time t measured as three years rolling Industry-adjusted standard deviation of ROA. WCS_{it} is working capital strategy of

the *i*th firm at time *t* measured as the ratio of net working capital to total assets. Other control variables are same as explained for Equation (3).

To measure the regulatory role of family control in the association between working capital strategy and corporate risk-taking in family firms, this study divides the firms into two groups based on strength of family control. As the mean value of family ownership inn our sample is 33.34%, the firms above the average and the firms below the average are grouped separately. We then estimate the following regression model for each group to test our 3rd hypothesis.

$$Risk_{it} = \alpha_0 + \beta_1 WCS_{it} + \beta_2 Age_{it} + \beta_3 ROE_{it} + \beta_4 Growth_{it} + \beta_5 Lev_{it} + \beta_6 Size_{it} + \beta_7 Industry_i + \beta_8 Year_t + \varepsilon_{it} \quad (5)$$

$Risk_{it}$ is corporate risk-taking of the *i*th firm at time *t* measured as three years rolling Industry-adjusted Standard deviation of ROA. WCS_{it} is working capital strategy of the *i*th firm at time *t* measured as the ratio of networking capital to total assets. FCS_i is a dummy for family control strength that takes the value of '0' for strong family control and '1' for weak family control. Other control variables are same as explained for Equation (3).

4. Empirical analysis

4.1. Descriptive statistics

Table 2 presents descriptive statistics. The mean value of risk-taking of listed family firms in China is 0.0236, indicating that the average risk-taking of family firms is low. However, the maximum value of risk-taking is 0.4981 with a standard deviation of 0.0268, indicating that the risk-taking of family-listed firms in China is quite heterogeneous, and some of the firms have a significantly higher level of risk-taking. The mean value of 0.3428 of family control indicates that family control in China is generally substantial. The minimum value of family control is 0.1000, the maximum value is 0.8999, and the standard deviation is 0.1518, which indicates that the strength of family control of our sampled listed family firms in China has large variation. The mean value of 0.3690 indicates that, on average, the net working capital of family-listed firms in China is moderate. Its minimum value is −0.5070 and its maximum value is 0.9590 with a standard deviation of 0.1873, which indicates that the working capital strategy of family firms included in our sample varies greatly.

Table 2. Descriptive statistics.

Variable	N	Mean	Standard deviation	Minimum	Maximum
Risk	7551	0.0236	0.0268	0.0001	0.4981
Family	7551	0.3428	0.1518	0.1000	0.8999
WCS	7551	0.3691	0.1873	−0.5070	0.9590
Age	7551	1.9742	0.6223	0.6931	3.3322
ROE	7551	0.0637	0.1540	−7.5876	0.9900
Growth	7551	0.4008	3.0627	−0.9532	140.2414
Lev	7551	0.3857	0.1982	0.0071	0.9890
Size	7551	21.7914	1.0488	17.8035	26.6525

Source: CSMAR database.

The mean value of firm age is 1.9742 with a standard deviation of 0.6223. It has a maximum value of 3.3322 and a minimum value of 0.6931 indicating that the listed Chinese family firms included in our sample have different experience levels. The average return on net assets (ROE) is 0.0637 with a standard deviation of 0.1540, indicating that the profitability of a family firm in China is moderate. The average growth rate of sales is 0.4008 with a standard deviation of 3.0627, which indicates that at least some family businesses in China are growing fast. The mean value of firm size is 21.7914 with a standard deviation of 1.0488. Its maximum value is 26.6525 and the minimum value is 17.8035, indicating that the family firms in China are quite big. The mean leverage ratio is 0.3857 and its standard deviation is 0.1982. Its maximum value is 0.9890 and the minimum value is 0.0071, indicating that the average debt level of family firms is high, but the difference between the firms is quite significant.

4.2. Correlation matrix

The pairwise correlation matrix is presented in Table 3, which shows that the correlation coefficient between family control (Family) and risk-taking level (Risk) is −0.051 and is significant at 1% . The correlation coefficient between working capital strategy (WCS) and risk-taking level (Risk) is −0.050 and significant at 1%. It indicates that the family firms and the firms with stable working capital strategy have lower risk-taking levels. The correlation coefficient between WCS and Family is 0.135, significant at 1%, indicating that firms with greater family control tend to have greater net working capital. Firm age (Age) and sales growth (Growth) have significantly positive correlation, i.e., 0.060 significant at 1%. The return on net assets (ROE), Leverage, and firm size (Size) have a significant negative correlation with the level of risk-taking. The industry dummy has a negative correlation with the level of risk-taking (−0.075, significant at 1%), indicating that manufacturing firms are on average lower risk taking than non-manufacturing firms. The maximum correlation

Table 3. Pairwise correlation.

Variables	Risk	Family	WCS	Age	ROE	Growth	Lev	Size	Industry
Risk	1								
Family	−0.051***	1							
WCS	−0.050***	0.135***	1						
Age	0.118***	−0.338***	−0.295***	1					
ROE	−0.195***	0.091***	0.101***	−0.026**	1				
Growth	0.130**	0.012	−0.015	0.060***	0.025**	1			
Lev	−0.028**	−0.070***	−0.436***	0.358***	−0.081***	0.057***	1		
Size	−0.124***	0.027**	−0.245***	0.300***	0.156***	0.049***	0.483***	1	
Industry	−0.075***	0.038***	0.051***	−0.189***	−0.033***	−0.035***	−0.178***	−0.127***	1

Note: Risk is three years rolling average of Industry-adjusted Standard deviation of ROA; Family is the actual controller's shareholding ratio indicates the strength of family control; WCS is the ratio of net working capital to total assets while, the net working capital is the difference between current operating assets and operating current liabilities; Age is Ln (Firm's establishment year +1); ROE is Net profit/ net assets at the end of the year; Growth is Sales revenue growth rate = (this year's sales revenue amount - the previous year's sales revenue amount) / the previous year's sales revenue amount; Lev is Total Liabilities/Total Assets; Size is Ln (total assets); Industry is a dummy variable that takes the value of '1' for the manufacturing industries, and '0' for non-manufacturing industries. ***, **, and * indicate that the significance level is 1%, 5%, and 10%, respectively.
Source: CSMAR database.

Table 4. The impact of family control on corporate risk-taking.

	Corporate risk-taking	
Variables	*Coefficient*	*T-Value*
Family	0.004**	1.981
Age	0.006***	11.188
ROE	−0.032***	−16.207
Growth	0.001***	11.892
Lev	−0.008***	−4.064
Size	−0.003***	−9.701
Constant	0.092***	12.257
Industry	Control	
Year	Control	
Observations	7551	
R-Square	0.098	
Adjusted R-Square	0.096	
F-Value	54.333***	

Note: The table presents the results of regression analysis for family control effect on corporate risk-taking. Risk is three years rolling average of Industry-adjusted Standard deviation of ROA; Family is the actual controller's shareholding ratio indicates the strength of family control; Age is Ln (Firm's establishment year +1); ROE is Net profit/net assets at the end of the year; Growth is Sales revenue growth rate = (this year's sales revenue amount – the previous year's sales revenue amount) / the previous year's sales revenue amount; Lev is Total Liabilities/Total Assets; Size is Ln (total assets); Industry is a dummy variable that takes the value of '1' for the manufacturing industries, and '0' for non-manufacturing industries. ***, **, and * indicate that the significance level is 1%, 5%, and 10%, respectively.
Source: CSMAR database.

coefficient between all these variables is less than 0.50, indicating that the multicollinearity problem[3] is not severe and further regression analysis can be performed.

4.3. Family control and corporate risk-taking

Table 4 presents the regression results of Equation (3). The coefficient on family control is 0.004 (significant at 5%, t-statistic 1.981) indicating that degree of family control is positively associated with corporate risk-taking. It illustrates that family firms with strong control over management and financial decision-making pursue high risk-taking and lend empirical support to Hypothesis 1. Firm age and Growth are significantly positively associated with corporate risk-taking, indicating that experienced and growing family firms are more inclined to take risks than the young and less experienced family firms. The coefficient on Leverage is negative (0.008) and highly significant, indicating that highly leveraged firms tend to maintain lower level of risk-taking. The coefficients on return on equity and firm size are also negative and highly significant suggesting that more profitable firms and bigger Chinese family firms tend to have stable returns and, hence, maintain a low risk-taking profile.

4.4. Working capital strategy and corporate risk-taking

Table 5 presents the regression results of model (4). The regression coefficient on WCS is negative (−0.007) and highly significant at 1%. It suggests that the conservativeness of family firm's working capital strategy is significantly negatively associated with the firm's risk-taking. In other words, firms maintaining higher level of net working capital are associated with low risk-taking. It suggests that the family firms with stable working capital strategies have lower risk-taking, hence, lending empirical

Table 5. The impact of working capital strategy on corporate risk-taking.

	Corporate risk-taking	
Variables	Coefficient	*T*-Value
WCS	−0.007***	−3.866
Age	0.006***	10.598
ROE	−0.031***	−15.843
Growth	0.001***	12.035
Lev	−0.010***	−5.117
Size	−0.003***	−9.549
Constant	0.099***	12.966
Industry	Control	
Year	Control	
Observations	7551	
R-Square	0.099	
Adjusted R-Square	0.097	
F-Value	55.147***	

Note: The table presents the results of regression analysis for working capital stability effect on corporate risk-taking. Corporate Risk-Taking is three years rolling average of Industry-adjusted Standard deviation of ROA; WCS is the ratio of net working capital to total assets while, the net working capital is the difference between current operating assets and operating current liabilities; Age is Ln (Firm's establishment year +1); ROE is Net profit/ net assets at the end of the year; Growth is Sales revenue growth rate = (this year's sales revenue amount – the previous year's sales revenue amount) / the previous year's sales revenue amount; Lev is Total Liabilities/Total Assets; Size is Ln (total assets); Industry is a dummy variable that takes the value of '1' for the manufacturing industries, and '0' for non-manufacturing industries. ***, **, and * indicate that the significance level is 1%, 5%, and 10%, respectively.
Source: CSMAR database.

support to our 2nd hypothesis. The coefficients on control variables remain similar to those of model 3.

4.5. Family control, working capital strategy, and the corporate risk-taking

Table 6 presents the regression results of model (5). In this model, the study categorizes family firms based on the mean value of the actual controller shareholding ratio, which is 33.34%. The sample is divided into two groups. If the actual controller shareholding ratio is less than 33.34%, it is indicated as weak family control, and if more than 33.34%, it is indicated as strong family control. The results show that the negative association between working capital strategy and corporate risk-taking significant both group, i.e., weak and strong family control. In weak family control, the regression coefficient of working capital strategy is −0.008 and significant at the level of 1%. In strong family control, the regression coefficient of working capital strategy is −0.007 and significant at the level of 1%. These values of regression coefficients for weak and strong family control power, respectively, indicate that the increase in family control strength stabilizes the working capital strategy of the family and consequently lowers their level of risk-taking. It shows that family control can affect the interaction between the working capital strategy and the level of corporate risk-taking. Family control strength can weaken the negative association between the working capital strategy and the level of corporate risk-taking, which verifies our hypothesis 3.

4.6. Robustness

The study adopts two methods for robustness. The first method uses an alternative measure to measure corporate risk-taking and applies the same regression analysis as

Table 6. The impact of family control and working capital strategy on corporate risk-taking.

	Corporate risk-taking			
	Weak		Strong	
Family control	Coefficient	*T*-value	Coefficient	*T*-value
WCS	−0.008***	−3.060	−0.007***	−2.908
Age	0.007***	8.692	0.005***	5.713
ROE	−0.025***	−10.455	−0.054***	−13.631
Growth	0.002***	9.860	0.001***	7.980
Lev	−0.009***	−3.183	−0.016***	−5.488
Size	−0.005***	−9.945	−0.001*	−1.920
Constant	0.126***	11.962	0.052***	4.695
Industry	Control		Control	
Year	Control		Control	
Observations	4019		3532	
R-Square	0.116		0.092	
Adjusted *R*-Square	0.113		0.089	
F-Value	35.131***		23.857***	

Note: The table presents the results of regression analysis for family control and working capital stability effect on corporate risk-taking. Corporate Risk-Taking is three years rolling average of Industry-adjusted Standard deviation of ROA; Family control is a dummy variable that takes a value of '0' for weak family control and '1' for string family control; WCS is the ratio of net working capital to total assets while, the net working capital is the difference between current operating assets and operating current liabilities; Age is Ln (Firm's establishment year +1); ROE is Net profit/ net assets at the end of the year; Growth is Sales revenue growth rate = (this year's sales revenue amount - the previous year's sales revenue amount)/the previous year's sales revenue amount; Lev is Total Liabilities/Total Assets; Size is Ln (total assets); Industry is a dummy variable that takes the value of '1' for the manufacturing industries, and '0' for non-manufacturing industries. ***, **, and * indicate that the significance level is 1%, 5%, and 10%, respectively.
Source: CSMAR database.

for model (5). The second method uses an alternative measure of working capital strategy and applies the same regression analysis as for model (5).

4.6.1. Robust analysis-corporate risk-taking (alternate proxy)

This method uses the differences between the maximum and minimum values of the industry-adjusted ROA during the study period to represent corporate risk-taking (Faccio et al., 2011). The calculation formula is as follows:

$$Risk_{it} = MAX(AdjROA_{it}) - MIN(AdjROA_{it})$$

where MAX ($AdjROA_{it}$) is the maximum value of the adjusted total return on assets in the three-year rolling average period, MIN ($AdjROA_{it}$) is the minimum value of the adjusted total return on assets in the three-year rolling average period, and $Risk_{it}$ is the difference between the two, indicating the corporate risk-taking.

The level of risk-taking of corporate ($Risk_{it}$) calculated by the above formula is substituted into the model (5) for regression analysis, and the regression results are shown in Table 7. At both levels of family control, there is still a significant negative association between the working capital strategy and the level of corporate risk-taking. In weak family control, the regression coefficient of working capital strategy is −0.018 and significant at the level of 1%. In strong family control, the regression coefficient of working capital strategy is −0.016 and significant at the level of 5%. The regression results of the robustness test (Table 7) are in line with the original regression results (Table 6).

Table 7. The impact of family control and working capital strategy on corporate risk-taking (robustness test-alternate proxy for corporate risk-taking).

	Corporate risk-taking (alternate proxy)			
	Weak		Strong	
Family control	Coefficient	*T*-value	Coefficient	*T*-value
WCS	−0.018**	−3.029	−0.016**	−2.967
Age	0.016***	8.862	0.011***	5.884
ROE	−0.056***	−10.357	−0.126***	−13.766
Growth	0.004***	9.989	0.002***	7.896
Lev	−0.019**	−3.137	−0.037***	−5.662
Size	−0.011***	−10.054	−0.002*	−1.855
Constant	0.289***	12.065	0.117***	4.663
Industry	Control		Control	
Year	Control		Control	
Observations	4019		3532	
R-Square	0.094		0.117	
Adjusted *R*-Square	0.090		0.114	
F-Value	24.239***		35.494***	

Note: The table presents the results of regression analysis for family control and working capital stability effect on corporate risk-taking. Corporate Risk-Taking is an alternate proxy of risk following the model of (Faccio et al., 2011); Family control is a dummy variable that takes a value of '0' for weak family control and '1' for string family control; WCS is the ratio of net working capital to total assets while, the net working capital is the difference between current operating assets and operating current liabilities; Age is Ln (Firm's establishment year +1); ROE is Net profit/net assets at the end of the year; Growth is Sales revenue growth rate = (this year's sales revenue amount - the previous year's sales revenue amount)/the previous year's sales revenue amount; Lev is Total Liabilities/Total Assets; Size is Ln (total assets); Industry is a dummy variable that takes the value of '1' for the manufacturing industries, and '0' for non-manufacturing industries. ***, **, and * indicate that the significance level is 1%, 5%, and 10%, respectively.
Source: CSMAR database.

4.6.2. Robust analysis – working capital strategy (alternate proxy)

Following Baños-Caballero, García-Teruel, and Martínez-Solano (in press), the study divides net working capital by operating income to indicate the stability of working capital strategy. It replaces it with the previous WCS (net working capital ratio to total assets) in the model (5) for multiple regression analysis. The results are presented in Table 8. In both levels of family control, there is still a significant negative correlation between working capital strategy (WCS) and the level of corporate risk-taking. The regression results of the robustness test with an alternate proxy of working capital strategy (Table 8) are also in line with the original regression results (Table 6). The results of the two robustness tests are consistent with the above original results, indicating that the empirical results of this study are valid and reliable.

5. Conclusions

This study takes family-owned A-share firms listed in Shanghai and Shenzhen stock exchanges from year 2010 to 2018 and investigates the impact of family control on corporate risk-taking, the impact of the working capital strategy on corporate risk-taking, and the role of family control on the interaction between working capital strategy and the level of corporate risk-taking. The main findings are as follows. (1) There is a positive relationship between the strength of family control and the risk-taking of family firms, indicating that it is easier for family firms with higher family control to choose investment projects with higher risk. (2) There is a negative

Table 8. The impact of family control and working capital strategy on corporate risk-taking (robustness test-alternate proxy for working capital strategy).

	Corporate risk-taking			
	Weak		Strong	
Family control	Coefficient	*T*-value	Coefficient	*T*-value
WCS (Alternate Proxy)	−0.0003**	−2.097	−0.0001**	−2.128
Age	0.005***	5.938	0.007***	9.384
ROE	−0.055***	−13.832	−0.025***	−10.741
Growth	0.001***	7.991	0.002***	9.704
Lev	−0.014***	−5.003	−0.006**	−2.309
Size	−0.001*	−1.951	−0.005***	−9.923
Constant	0.048***	4.429	0.121***	11.658
Industry	Control		Control	
Year	Control		Control	
Observations	3532		4019	
R-Square	0.091		0.115	
Adjusted *R*-Square	0.087		0.112	
F-Value	23.559***		34.767***	

Note: The table presents the results of regression analysis for family control and working capital stability effect on corporate risk-taking. Corporate Risk-Taking is three years rolling average of Industry-adjusted Standard deviation of ROA; Family control is a dummy variable that takes a value of '0' for weak family control and '1' for string family control; WCS is an alternate proxy for working capital stability, i.e., the ratio of net working capital to operating income; Age is Ln (Firm's establishment year +1); ROE is Net profit/net assets at the end of the year; Growth is Sales revenue growth rate = (this year's sales revenue amount − the previous year's sales revenue amount) / the previous year's sales revenue amount; Lev is Total Liabilities / Total Assets; Size is Ln (total assets); Industry is a dummy variable that takes the value of '1' for the manufacturing industries, and '0' for non-manufacturing industries. ***, **, and * indicate that the significance level is 1%, 5%, and 10%, respectively.
Source: CSMAR database.

relationship between the working capital strategy of the family firms and their risk-taking, indicating that lower net working capital is associated with family firms undertaking risky projects. (3) Family control has a regulatory role in the relationship between working capital strategy and the corporate risk-taking of family firms. Strong family control weakens the negative relationship between the working capital strategy and the corporate risk-taking, indicating that in the family firms the strong family control is likely to diminish the tendency of firms having lower net working capital to undertake risky projects. Therefore, family firms need to incorporate the intensity of family control and the working capital strategy into their risk assessment mechanism and systematically assess and adjust the level of risk-taking to attain sustainable firm development.

Notes

1. https://www.russellreynolds.com/insights/thought-leadership/2019-pan-european-rra-study-on-family-owned-business
2. https://www.pwccn.com/en/services/entrepreneurial-and-private-business/2018-family-business-survey.html
3. *We also check for Variation Inflation Factor (VIF) and do not find its value greater than 10 for any regression models explained in section 4.5.*

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