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CEO organizational identification and firm cash holdings

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ABSTRACT

As the decision-makers and implementers of a firm's financial strategy, executives play a critical role in cash holding activities, and their psychological characteristics have a major impact on cash holdings. This paper investigates the association between CEO organizational identification and firm cash holdings. The empirical results show that CEO organizational identification is negatively associated with firm cash holdings, and the negative association is more pronounced when the level of financial development is higher and economic uncertainty is lower. Further analysis reveals that the higher a CEO's organizational identification, the higher the firm's R&D investment and capital expenditure, and high CEO organizational identification can increase the value of firm cash holdings. Overall, our findings supplement the literature on organizational identification and cash holdings, and on the effect of executives' psychological characteristics on corporate financial decision-making.
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1. Introduction

Akerlof and Kranton (2005) point out that an important source of employees' motivation, their self-image as part of the organization (e.g., organizational identification), is omitted in current economic models. Organizational identification plays an important role in employees' work effort, contract design, and organizational design. For example, from the perspective of motivation and constraint, Akerlof and Kranton (2008) examine how employees perceive intrinsic motivation in their relationship with the company and find that self-

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motivated employees are less hostile to the company and require less compensation; thus, the optimal management design relies on employees' identification with the organization (Abernethy et al., 2017; Boivie et al., 2011).[1]

Firms' cash holding decisions have attracted widespread attention from academics and practitioners. Due to the principal-agent problem and information asymmetry, firms may reserve a large amount of cash due to the opportunistic behavior of major shareholders or management. Dittmar et al. (2003) declare that the principal-agent problem is the most important determinant of firm cash holdings, and based on multinational data they find that listed firms' cash holdings in countries with lower investor protection are twice as high as in countries with better investor protection. Xin and Xu (2006) also find that the cash holdings of firms with better corporate governance are more reasonable, which is consistent with the free cash flow hypothesis proposed by Jensen (1986). Executives with higher organizational identification are more likely to make decisions in the interest of their firm, instead of their self-interest, and do their best to avoid the negative impact of individuals on the firm. Therefore, firms whose executives have higher organizational identification should have less cash holdings. In addition, as a scarce resource, cash can be easily abused by agents; thus, it is logical to ask whether CEO organizational identification may exert a corporate governance function for cash holdings. We therefore investigate the association between CEO organizational identification and cash holdings in this paper.

Previous studies show that corporate cash holdings are closely related to the external environment, especially in emerging markets such as China, where local financial development and national economic policies have a greater impact on firms. Financial development affects the firms' financing constraints, and financing convenience has a direct impact on firm cash holdings. Fluctuations in economic policy induce operation uncertainty, and firms will in response defensively increase their cash holdings (Wang et al., 2014; Li and Shi, 2016). Following this line of research, we examine the moderating effects of financial development and economic policy uncertainty on the association between CEO organizational identification and cash holdings.

Using a questionnaire sent to listed firms' CEOs in 2014, we empirically investigate the association between CEO organizational identification and cash holdings. The results show that CEO organizational identification is significantly negatively associated with cash holdings; that is, the higher the CEO's organizational identification, the lower the cash holdings, which indicates that CEO organizational identification mitigates agency problems. Considering financial development and economic policy uncertainty, we find that financial development strengthens the negative association between CEO organizational identification and cash holdings, while economic policy uncertainty weakens the negative association between CEO organizational identification and cash holdings. These results reveal that when making financial decisions, CEOs are influenced by the firm's operating environment. In addition, we examine the association between CEO organizational identification and investment expenditure, and find that CEO organizational identification is significantly positively associated with R&D investment and capital expenditure, and can increase the value of firm cash holdings. Overall, our findings suggest that the higher a CEO's organizational identification, the lower the firm's cash holdings. Furthermore, the CEO will make more investments, which further increases the value of the firm's cash holdings. In a robustness test, we add CFO organizational identification to the regression model, and construct CEO organizational identification using the principal component analysis method, and the results remain unchanged. Our findings supplement the literature on organizational identification and cash holdings, and shed light on the effect of executives' psychological characteristics on corporate financial decision-making.

Our paper contributes to the literature in the following ways. First, the psychological characteristics of executives have a major impact on firm decision-making. However, due to data availability, studies in this area mainly focus on the impact of overconfidence (Hsieh et al., 2018; Jiang et al., 2009) and narcissistic personality (Wen et al., 2015; Olsen and Stekelberg, 2016) on firm performance and financial behavior. Unlike these psychological characteristics, organizational identification derives from individuals' emotional dependence on an organization, which has a greater impact on the enterprise. At present, China is at the stage of emerging eco-

[1] The 2008 financial crisis severely hurt Lenovo Group, and Mr. Chuanzhi Liu took up his former post (Chairman of Lenovo Group) again in February 2009. In an interview with the media, he said, "Lenovo is my life, when it needs me, it's my duty to come out." Ultimately, he led Lenovo Group out of its crisis, which reflects the important role of senior executives' organizational identification. Source: http://tech.sina.com.cn/it/2009–02-05/14402796517.shtml.

nomic development, as manifested by high economic policy uncertainty, an imperfectly constructed legal system, and weak law enforcement. In such an environment (e.g., a weak external governance environment), the organizational identification of senior executives may exert a corporate governance role. CEOs with stronger organizational identification are more likely to care about the future of the firm and be cautious when making financial decisions to avoid future financial distress. They are also more concerned about outsiders' evaluation of the firm, so would try their best to prevent the firm from being involved in legal disputes. Based on developed markets, Boivie et al. (2011) study the role of CEO organizational identification in corporate governance from the perspective of the principal-agent theory, and find that CEO organizational identification enhances pay-performance sensitivity, and decreases CEOs' personal use of corporate aircraft. Unlike Boivie et al. (2011), this paper focuses on the world's largest developing country and studies the association between CEO organizational identification and cash holdings from the perspectives of the principal-agent theory and defensive incentive, thus adding to the literature on organizational identification (the psychological characteristics of executives).

Second, this paper finds that in regions with higher levels of financial development, CEOs with higher organizational identification further decrease cash holdings, whereas when economic policy uncertainty is higher, CEOs with higher organizational identification increase cash holdings. The results indicate that CEOs carefully consider the external environment when making financial decisions, which provides direct evidence for the effect of the macro environment on the micro-decision-making behavior of the firm.

Third, when analyzing executive behavior, traditional economics is premised on a rational-economic assumption and excludes executives' psychological characteristics such as organizational identification from the analytical framework. Obviously, the explanatory power of this theoretical paradigm is limited. A series of studies by Akerlof and Kranton (2005. 2008) has pointed out that organizational identification is an important motivation mechanism, and we provide empirical evidence for this assertion.

2. Literature review

2.1. Organizational identification

Ashforth and Mael (1989) introduced the theory of social identification into the organizational environment and redefined the concept of organizational identification. Since then, organizational identification has become an important topic in the study of organizational behavior and received more and more attention from scholars (Pratt, 1998; Rousseau, 1998). Organizational identification plays an important role at the individual, group, and organization levels. An individual with higher organizational identification will be more supportive of the organization. Social identification theory is the dominant paradigm in research on the outcome variables of organizational identification. It proposes three mechanisms to explain the impact of organizational identification on an employee's attitudes and behavior: identity consistency, depersonalization, and self-affirmation. According to Mael and Ashforth (1992), alumni with a high sense of identification with their alma mater are more likely to donate to it and participate in or persuade others to attend events there. Employees with high organizational identification tend to rate characteristics positively when they share them with their organization. Dick et al. (2004) examine the association between organizational identification and job satisfaction, and find that the evaluation dimension of career identification and team identification can significantly improve job satisfaction. Guo and Xiao (2017) find that the organizational identification of employees in state-owned enterprises inhibits deviant work behavior. Further, Bamber and Iyer (2002) show that organizational identification can significantly reduce organization-career conflicts and employee turnover intention. Zhang and Liu (2016) use meta-analysis to explore the association between organizational identification and turnover intention, and find that organizational identification and turnover intention are highly negatively correlated.

In empirical studies of organizational identification, researchers generally collect data on organizational identification from questionnaires; the studies discussed above are all based on surveys of employees or alumni. Boivie et al. (2011) embed CEO organizational identification into the corporate governance framework and explore its role in corporate governance. The results show that CEO organizational identification can significantly mitigate agency costs. They also show that when CEO organizational identification is high,

the governance effect of board independence on agency cost is diminished, indicating that there is a substitution effect between the two, and CEO organizational identification can play a role in corporate governance. This paper extends the research on the psychological characteristics of executives to research in corporate governance. Using Chinese state-owned listed firms as a sample, Zhu and Yoshikawa (2016) investigate how board members with government backgrounds supervise and manage firms. They find that board directors with higher corporate identification provide more efficient supervision and more resource supports, and board directors with higher government identification modify the two effects according to the state-owned equity. Abernethy et al. (2017) study the association between CFO organizational identification and earnings manipulation from the perspective of executive compensation contracts and firms. The results show that CFOs with higher organizational identification are less likely to manipulate earnings to satisfy compensation contracts, indicating that organizational identification is an effective complement to compensation contracts.

2.2. Cash holdings

The determinants of cash holdings can be divided into two main categories: defensive incentives and agency problems. Based on the precautionary motive of cash holdings, Opler et al. (1999) find that when the external financing cost is high and the firm has more investment opportunities, it will hold more cash, which is consistent with the prediction of Kim et al. (1998). Kim et al. (1998) argue that the optimal cash holding level of a company is determined by low return on cash and the need to ensure financial support for future investment opportunities. Bates et al. (2009) find that from the early 1980s to the early 2000s, the level of cash holdings of American companies doubled, accounting for about a quarter of total assets. Further studies show that the increase of cash holdings is related to the risk associated with cash flow, which leads to a defensive incentive. Companies' tendency to hold onto large amounts of cash may be a global phenomenon. Ferreira and Vilela (2004) focus on European companies and Ozkan and Ozkan (2004) focus on British companies, and both find that the level of cash holdings is positively correlated with the companies' investment opportunities and negatively correlated with bank debts. Song and Lee (2012) find that due to the defensive incentive, the affected listed companies increased their cash holdings after the Asian financial crisis. Duchin et al. (2010) find that the excess cash held by American companies is positively correlated with capital investment during the 2008 financial crisis. Jiang and Liu (2011) also find that during an economic recession, listed companies hold more cash. Based on the defensive incentive, Luo and Zhang (2007) find that companies increase the value of intertemporal investment options by reducing investment and increasing cash reserves to cope with the risk of cash shortage caused by economic uncertainties.

The financing conditions of a company will significantly affect its cash flow and cash holding level. Almeida et al. (2004) find that financing constraints will increase the propensity of a company to retain cash to ensure future investment. Han and Qiu (2007) also find that financing constrained companies increase the level of cash holdings to defend against the risks resulting from cash flow volatility. McLean (2011) analyzes data on corporate cash holdings from the 1970s to the 2000s and finds that companies are more likely to obtain cash by issuing new shares than from operating cash flows. Further research has shown that this trend is associated with greater defensive incentive, and especially R&D investment and cash fluctuations. Yang et al. (2016) find that industry growth is significantly positively correlated with cash holdings, and that greater industry competition and financing constraints increase this preventive effect. Zhu and Lu (2009) also find that when monetary policy is stricter, external financing constraints become stronger, and enterprises increase their cash holdings. All of these studies find that the financing environment has an important impact on a company's cash holding level.

The effect of the macro environment on the micro behavior of enterprises is currently a subject of much debate. Khurana et al. (2006) study the effect of financial development on financing constraints and find that it increases a company's financial capital market channels and reduces the defensive incentive for cash holdings; Kusnadi and Wei (2011) obtain results consistent with this finding, but use a multinational sample and study countries' legal systems rather than financial development. Economic policy uncertainty also has a significant impact on the management strategy and financial behaviors of enterprises. Wang et al. (2014), Li and Shi (2016), and Phan et al. (2019) use the monthly China economic uncertainty index jointly issued by Stanford University and the University of Chicago as a measure of economic policy uncertainty, and find that the

higher it is, the higher the level of cash holdings. Julio and Yook (2012) find that political uncertainty increases companies' cash holdings and reduces investment projects. Building on the literature, this paper examines the moderating effects of financial development and economic policy uncertainty on the association between CEO organizational identification and cash holdings in different scenarios.

Due to the separation of ownership and control rights, there is a widespread agency problem in listed firms. Shareholders expect management to distribute the remaining cash to them as dividends after all profitable projects have been invested in. However, Jensen (1986) points out that self-interested managers may invest cash in unprofitable but personally beneficial projects instead of issuing dividends, or the company may keep excess cash directly. Therefore, the more serious the agency problem, the more cash the company will hold, and the lower the value will be. Yang et al. (2014) provide empirical evidence that the more powerful the management is, the greater the cash holdings. If cash holding is the consequence of agency problems, then mechanisms that alleviate agency problems should also reduce cash holdings. Nikolov and Whited (2014) find that the lower the management's shareholding, the higher the company's cash holdings. Similarly, Liu et al. (2017) find that equity incentive plans can reduce cash holdings, especially of excess cash, supporting the agency view of cash holdings. Elyasiani and Zhang (2015) find that companies with serious agency problems are more inclined to hold current assets, which can reduce the company's risks and increase the security of senior executives. The board of directors has a statutory obligation to supervise the company executives, and an effective board can reduce the firm's cash levels if the agency motive of cash holding is in operation. However, Harford et al. (2008) and Mikkelson and Partch (2003) fail to find a significant relationship between board structure (e.g., board independence) and cash holdings. Masulis and Reza (2015) study the philanthropic use of corporate cash and find that cash is often donated to charitable organizations related to the firm's independent directors, which at least shows that the senior executives destroy the independence of the independent directors. Masulis et al. (2009) find that when executives' voting rights increase relative to cash flow rights, the value of the firm's cash holdings decreases. They argue that the reason for this result is that the anti-takeover clause protects the company from being taken over, and then the executives can usurp the private gains of the cash holdings. According to the principal-agent perspective, executives desire to build an "Enterprise Empire." Harford (1999) finds that companies flush with cash are more likely to conduct mergers and acquisitions, but after completion the value of the company is destroyed. These findings are consistent with the predictions of the principal-agent theory. Liu et al. (2015) find that family firms hold more cash based on opportunistic behavior.

2.3. Summary

The preceding literature review shows that the determinants of cash holdings include the macro environment, corporate financial situation, and corporate governance, and that research has focused on the defensive incentive and agency problems perspectives. There have been few studies of the determinants of cash holdings from the perspective of executives' psychology, especially organizational identification, largely due to the lack of data. Generally, the measurement of organizational identification comes from questionnaires, and it is extremely difficult to survey the executives of listed firms. By issuing questionnaires to executives of listed firms through CSRC (China Securities Regulatory Commission), we ensure the response rate and relatively accuracy of the questionnaires. At the same time, we use the internationally recognized organizational identification scale to measure CEO organizational identification objectively, and investigate the association between CEO organizational identification and cash holdings, thus expanding and supplementing the research to date.

3. Theoretical analysis and research hypothesis

3.1. CEO organizational identification and firm cash holdings

The separation of ownership and control rights leads to the possibility that the goals pursued by managers may not be consistent with those of shareholders, resulting in a so-called Type 1 agency problem (Jensen and Meckling, 1976). In emerging markets such as China, equity shareholding is relatively concentrated, and major shareholders encroach on minority shareholders, which is a so-called Type 2 agency problem. From the perspective of the principal-agent theory, managers tend to hold more cash no matter whether an agency

problem exists, because more cash holdings provide managers with the opportunity for more perquisite consumption, and because more cash holdings act as a "buffer," which means that when the firm makes a poor investment, there is no shortage of cash, so managers can avoid the constraints of the capital market or creditors. Finally, when the firm accumulates a large amount of cash, self-interested managers may carry out inefficient mergers and acquisitions to build their own "Enterprise Empire" (Jensen, 1986).

Organizational identification is a form of social identification that derives from the relationship between individuals and organizations. It emphasizes the influence of organizational membership on individuals' self-concept, and their sense of belonging to and agreement with organizations. Strong organizational commitment will have a strong influence on individual behavior. For example, Akerlof and Kranton (2008) study employees' intrinsic motivation in their relationship with their company, and find that self-motivated employees are less hostile to the company and require less compensation; thus, optimal management should rely on employees' organizational identification. Boivie et al. (2011) find that CEO organizational identification can relieve agency problems and perform a corporate governance function. Therefore, from the perspective of principal-agent theory, firms with severe agency problems may have more cash holdings, while firms with higher CEO organizational identification will have less cash holdings because the CEO's organizational identification restrains agency problems. In addition, when individuals and the organization conform, executives are more likely to safeguard the organization's interests, avoid the negative impact of personal behavior on the organization, and maintain and enhance its positive image. The CEO will devote himself/herself to the enterprise, binding his/her personal career to the destiny of the firm more closely when he/she has strong organizational identification. Such a CEO will pay more attention to the firm's long-term performance goals and development. Therefore, we propose that the higher the CEO's organizational identification, the lower the firm's cash holdings.

In addition, the defensive incentive for cash holdings suggests that firms need to hold a certain amount of cash for emergencies when their investment opportunities are uncertain or they are facing financing constraints (Opler et al., 1999). In addition to the need to seize investment opportunities, it is worth noting that many companies founder or even go bankrupt due to cash flow shortage, which is one reason for the gradual increase of cash holdings in American firms (Bates et al., 2009). Therefore, when the CEO has higher organizational identification, he/she is more closely bound to the firm's fate, and will care more about the firm's future, which in turn leads to more cash holdings. Thus, we propose the following competing hypotheses.

H1a: Ceteris paribus, CEO organizational identification is negatively associated with firm cash holdings.
H1b: Ceteris paribus, CEO organizational identification is positively associated with firm cash holdings.

3.2. Moderating effect of financial development

Firm cash holdings also depend on financial development. First, financial development eases firms' financing constraints and promotes economic growth (Rajan and Zingales, 1998). Zhu et al. (2006) find that financial development reduces the dependence of firm investment on internal cash flow; that is, high financial development makes it easier to find an external financing source and firms may therefore have lower cash holdings. Second, financial intermediaries perform various functions, including centralized savings, liquidation and payment, information transmission and processing, resource allocation, supervising and motivating managers, and dispersing risks, which helps to alleviate the firms' principal-agent problem. Third, law and finance research shows that the financial development of a country or a region is closely related to its institutional environment. A strong legal environment and a high level of investor protection will limit the motivation and ability of insiders to usurp private gains from control rights, thereby decreasing managers' earnings management (Leuz et al., 2003), and further improving corporate transparency. Hail and Leuz (2006) demonstrate that strict information disclosure requirements, a high level of securities supervision, and a strict enforcement mechanism can lower the cost of equity financing. Therefore, from the perspectives of both financing convenience and principal-agent problem, the negative association between CEO organizational identification and cash holdings would be more pronounced in regions with high financial development. In particular, although the overall level of financial development in China is still relatively low (Allen et al.,

2005), remarkable progress has been made since the reform and opening-up. However, due to regional differences in the reform process, the institutional environment varies considerably across provinces (Fan et al., 2011), which provides a unique setting for examining the moderating effect of financial development on the association between CEO organizational identification and firm cash holdings. Based on the above analysis, we propose Hypothesis 2.

H2: Ceteris paribus, the level of financial development strengthens the negative association between CEO organizational identification and firm cash holdings.

3.3. Moderating effect of economic policy uncertainty

Currently, China's economy is characterized by government intervention, frequent policy adjustments, weak investor protection, and political connection (Piotroski and Wong, 2012), which means that the management decisions of Chinese firms are highly dependent on the government's economic policy. As a result, executives are more sensitive to economic policy uncertainty, and reallocate the firm's liquid assets accordingly (Baum et al., 2006). According to the defensive incentive for cash holdings, when external environmental uncertainty increases, firms will directly increase cash holdings to deal with sudden external shocks and provide a buffer against temporary cash flow shortage. Previous studies have consistently shown a significantly positive association between economic policy uncertainty and cash holdings (Baum et al., 2006; Wang et al, 2014; Li and Shi, 2016).

Greater economic policy uncertainty will reduce the observability of management's efforts, increase the difficulty of shareholders' supervision, and lead to more serious information asymmetry between shareholders and management (Liu and Han, 2010), which will make it easier for self-interested managers to hold more cash to engage in opportunistic behavior (Li and Shi, 2016). Therefore, economic policy uncertainty will lead to an increase in firm cash holdings from the perspectives of both the defensive incentive or principal-agent theory. Rational CEOs will consider the risk of financial distress or bankruptcy induced by cash shortage when making cash holding decisions, and CEOs with higher organizational identification will care more about the firm's future development. Therefore, when economic policy uncertainty increases, CEOs will appropriately increase cash holdings. Based on the above analysis, we propose Hypothesis 3.

H3: Ceteris paribus, economic policy uncertainty weakens the negative association between CEO organizational identification and firm cash holdings.

4. Research design

4.1. Data source and sample selection

The CEO organizational identification data we use in this paper come from a survey sponsored by the Listed Firms Internal Control Research Group of the China Securities Regulatory Commission. On September 5, 2014, the Research Group sent the questionnaires to A-share listed companies, certified accounting firms with a securities and futures practicing qualification, and institutional investors, through the Shanghai Stock Exchange, Shenzhen Stock Exchange, Accounting Department of China Securities Regulatory Commission, and Asset Management Association of China. As of October 31, 2014, 2,536 A-share listed companies were issued questionnaires, and 2,154 sets of questionnaires (12,551 copies) were collected, with an overall response rate of 84.95%.[2] Other data are from the CSMAR and Wind databases.

Following previous studies, we use the following criteria to select our sample: (1) we exclude listed companies in the finance industry; (2) we exclude samples with missing data; (3) all continuous variables are win-

[2] The questionnaires were issued by the China Securities Regulatory Commission, which imposed certain legal constraints. Therefore, the response rate and the authenticity are remarkably high. In addition, members of the Research Group conducted field surveys of more than 10 companies, provided telephone guidance, and paid return visits to many companies in an effort to ensure the authenticity and reliability of the survey data. For a more detailed account of the survey process, please refer to Zhao et al. (2015).

sorized at the levels of 1% and 99%; and (4) given that organizational identification would not change greatly in a short time, we expand our sample period one year forward and backward. The sample period is thus from 2013 to 2015, and we further exclude firms whose CEO resigned during these three years. The final sample contains 5,081 firm-year observations.

4.2. Variable definitions

(1) Cash holdings

The dependent variable is measured in two ways. The first is cash holdings (*Cash*), based on Dittmar et al. (2003) and Wang et al. (2014); we define *Cash* as the ratio of cash and cash equivalents to total assets minus cash and cash equivalents. The second is industry adjusted cash holdings (*INDCash*), based on Opler et al. (1999) and Li et al. (2018); we define *INDCash* as *Cash* minus the average *Cash* of a specific industry to eliminate the impact of industry.

(2) CEO organizational identification

The independent variable in this paper is CEO organizational identification (*OI*), which is measured by the 6-item scale developed by Mael and Ashforth (1992).[3] The scale focuses on employees' emotions towards the organization and has a simple and clear structure and high credibility of 0.81; it is favored by many scholars.[4] The questionnaire asks the respondent to assess to what extent he or she agrees with the following statements (1 = Strongly disagree; 5 = Strongly agree): "When someone criticizes (name of firm), it feels like a personal insult"; "I am very interested in what others think about (name of firm)"; "When I talk about this firm, I usually say 'we' rather than 'they'"; "This firm's successes are my successes"; "When someone praises the firm, it feels like a personal compliment"; and "If a story in the media criticized the firm, I would feel embarrassed." When calculating organizational identity variables, we sum the total scores of the six items.

(3) Financial development

Following Zhong and Wang (2017), financial development is constructed at the provincial level and is measured as stock market development (*Stocksize*) and banking sector development (*Banksize*). *Stocksize* is the ratio of the stock market value to the GDP of the province, and *Banksize* is the ratio of the sum of deposit balances of the financial institutions to the GDP of the province.

(4) Economic policy uncertainty

Consistent with Li and Shi (2016), we use the monthly China economic policy uncertainty index (*EPU*) released by Stanford University and the University of Chicago as an indicator.[5] To measure economic policy uncertainty in China, they construct a scaled frequency count of articles about policy-related economic uncertainty in the *South China Morning Post* (SCMP), Hong Kong's leading English-language newspaper. First, they identify SCMP articles about economic uncertainty pertaining to China by flagging all articles that contain at least one term from each of the China economic uncertainty term sets. Second, they identify the subset of these articles that also discusses policy matters. Third, they apply these requirements to an automated search of every SCMP article published since 1995. This search yields a monthly frequency count of SCMP articles about policy-related economic uncertainty. Fourth, they divide the monthly frequency count by the total number of SCMP articles in the same month. Finally, they normalize the resulting series to a mean value

[3] Another widely used scale is the three-dimensional (membership, loyalty, and similarity) questionnaire developed by Cheney (1983). The initial version of the questionnaire had 30 questions, and the updated version has 25 questions. The main controversy over this questionnaire is that there are too many questions and too many of them concern organizational commitment. In contrast, Mael and Ashforth's scale is more representative of organizational identification.

[4] For example, Zhu and Yoshikawa (2016) and Boivie et al. (2011) use the same scale as the one used in Mael and Ashforth (1992).

[5] Data download address: http://www.policyuncertainty.com/scmp_monthly.html.

of 100 from January 1995 to December 2020 by applying a multiplicative factor. Because we use quarterly data for our empirical test of H3, we average the three-month data of a quarter to convert monthly data into quarterly data and obtain the quarterly economic policy uncertainty index (Li and Shi, 2016).

4.3. Empirical model

To empirically test our hypotheses, we refer to Li and Shi (2016), Li et al. (2018), and Xu et al. (2016) to construct Model (1).

$$\begin{aligned} Cash_{it} &= \alpha_0 + \alpha_1 OI_{it} + \alpha_2 Cash_{it-1} + \alpha_3 LEV_{it} + \alpha_4 CF_{it} + \alpha_5 AGE_{it} \\ &+ \alpha_6 NWC_{it} + \alpha_7 CAPEX_{it} + \alpha_8 SIZE_{it} + \alpha_9 DSD_{it} + \alpha_{10} CFVOL_{it} + \alpha_{11} BM_{it} \\ &+ \alpha_{12} DIV_{it} + \alpha_{13} LOSS_{it} + \alpha_{14} SOE_{it} + \alpha_{15} FIRST_{it} + \sum IND + \sum YEAR + \varepsilon_{it} \end{aligned} \tag{1}$$

The dependent variable is measured in two ways. The first is cash holdings (*Cash*), defined following Dittmar et al. (2003) and Wang et al. (2014) as the ratio of cash and cash equivalents to total assets minus cash and cash equivalents. The second is industry adjusted cash holdings (*INDCash*), defined following Opler et al. (1999) and Li et al. (2018) as *Cash* minus the average *Cash* of a specific industry to eliminate the impact of industry. The independent variable is firm *i*'s CEO's organizational identification in year *t* (*OI*). $CASH_{it\text{-}1}$ is firm *i*'s cash holdings in year *t-1*, which is used to control the continuity of corporate cash holdings. In addition, we control firm *i*'s leverage rate in year *t* (LEV_{it}), net cash flow from operations in year *t* (CF_{it}), listing age in year *t* (AGE_{it}), net working capital in year *t* (NWC_{it}), capital expenditure in year *t* ($CAPEX_{it}$), size in year *t* ($SIZE_{it}$), short-term debt changes rate in year *t* (DSD_{it}), fluctuation of operating cash flow in year *t* ($CFVOL_{it}$), book-to-market ratio in year *t* (BM_{it}), whether firm *i* pays cash dividends in year *t* (DIV_{it}), whether firm *i* posts a loss in year *t* ($LOSS_{it}$), the nature of property rights of firm *i* in year *t* (SOE_{it}), and the largest shareholder's shareholding ratio of firm *i* in year *t* ($FIRST_{it}$). See Table 1 for the variable definitions.

To test the moderating effect of financial development and economic policy uncertainty, we first add the interaction of financial development (*Stocksize* and *Banksize*) and *OI* to Model (1) to test Hypothesis 2, and then add the interaction of economic policy uncertainty (*EPU*) and *OI* to Model (1) to test Hypothesis 2.

Table 1
Variable Definitions.

Variable	Definition
Cash	Cash and cash equivalents/(Total assets - Cash and cash equivalents)
INDCash	*Cash* adjusted by industry (*Cash* - average value of *Cash* in the specific industry)
OI	Natural logarithm of the CEO's response to the 6-item scale (Mael and Ashforth, 1992)
Stocksize	Natural logarithm of the ratio of the stock market value to GDP in the specific province
Banksize	Natural logarithm of the ratio of sum of deposit balances of financial institutions to the GDP of the specific province
EPU	Natural logarithm of the Economic Policy Uncertainty Index published by Stanford University and the University of Chicago
LEV	Total liabilities/Total assets
CF	Net cash flow from operations/Total assets
AGE	Ln (Listed years + 1)
NWC	Net working capital/(Total assets - Cash and cash equivalents)
CAPEX	Capital expenditure/(Total assets - Cash and cash equivalents)
SIZE	Ln (Total assets)
DSD	(Short-term debt in year *t* - Short-term debt in year *t-1*)/Total assets
CFVOL	Standard deviation of each firm's net operating cash flow in the same industry in year *t*
BM	Book equity value/Market equity value
DIV	If the firm paid cash dividends in year *t*, equal to 1, and otherwise 0
LOSS	If the firm posted a loss in year *t*, equal to 1, and otherwise 0
SOE	If the firm is a state-owned enterprise, equal to 1, and otherwise 0
FIRST	Shares held by the largest shareholder/Outstanding shares × 100
IND	CSRC industry classification standards
YEAR	Year effect

5. Empirical results

Table 2 presents the descriptive statistics. The mean and median of cash holdings (*Cash*) are 0.2162 and 0.1288, respectively, which is consistent with the literature (Yang and Yin, 2018). The standard deviation of *Cash* is 0.2792, indicating that the cash holding level of listed firms varies considerably. *OI* is the logarithmic value of CEO organizational identification, and *CEO_OI* is the original value of CEO organizational identification before being convert to the logarithm value, with a mean and median of 25.547 and 26. Furthermore, the min and max of *CEO_OI* are 6 and 30, indicating that *CEO_OI* is right skewed and CEOs have relatively high organizational identification with their firms. The mean and median of *EPU* are 4.9144 and 4.7769 respectively, which differ from the findings of Wang et al. (2014) to some extent, possibly because the sample period is different (2003 to 2011 in Wang et al., 2014). The mean value of *DIV* is 0.7142, indicating that a large proportion of listed firms pay cash dividends, which is probably because of the semi-mandatory dividend payout requirements in China. Other variables are basically consistent with the literature, such as Li et al. (2018).

Table 3 shows the correlations of selected variables. It should be noted that the number of observations for calculating the correlation coefficient is 5,081, so *EPU* is not included in Table 3. CEO organizational iden-

Table 2
Descriptive statistics.

VARIABLE	*N*	*Mean*	*Sd.*	*Median*	*Min*	*Max*
Cash	5081	0.2162	0.2792	0.1288	0.0059	2.4542
INDCash	5081	0.0628	0.2691	−0.0138	−0.2160	2.2388
OI	5081	3.2265	0.1789	3.2581	1.7918	3.4012
CEO_OI	5081	25.547	3.8464	26	6	30
Stocksize	5081	0.4439	0.7504	0.1660	−0.9995	2.0577
Banksize	5081	2.7067	0.3279	2.6396	2.1159	3.3953
EPU	20,317	4.9144	0.3718	4.7769	4.4896	5.6881
LEV	5081	0.4366	0.2183	0.4207	0.0354	1.1471
CF	5081	0.0490	0.0910	0.0463	−0.2688	0.3200
AGE	5081	2.2461	0.6405	2.2725	0.6222	3.2600
NWC	5081	0.0556	0.2125	0.0654	−0.7371	0.5521
CAPEX	5081	0.0555	0.0551	0.0404	−0.0233	0.2593
SIZE	5081	22.0146	1.2385	21.8595	14.9416	28.0035
DSD	5081	0.0165	0.0653	0.0136	−0.1963	0.2162
CFVOL	5081	0.3313	0.6547	0.1049	0.0636	2.8144
BM	5081	0.8609	0.9719	0.5484	0.0752	7.9269
DIV	5081	0.7142	0.4518	1	0	1
LOSS	5081	0.1092	0.3120	0	0	1
SOE	5081	0.3757	0.4844	0	0	1
FIRST	5081	0.3531	0.1471	0.3346	0.0863	0.7525

Table 3
Correlations of selected variables.

VARIABLE	*Cash*	*INDCash*	*OI*	*Stocksize*	*Banksize*	*CF*	*SIZE*
Cash	1.0000						
INDCash	0.9814	1.0000					
	(0.0000)						
OI	−0.0069	−0.0047	1.0000				
	(0.6252)	(0.7359)					
Stocksize	0.1365	0.1115	0.0133	1.0000			
	(0.0000)	(0.0000)	(0.3439)				
Banksize	0.0798	0.0577	−0.0024	0.7663	1.0000		
	(0.0000)	(0.0000)	(0.8635)	(0.0000)			
CF	0.1827	0.1818	0.0069	0.0454	0.0250	1.0000	
	(0.0000)	(0.0000)	(0.6208)	(0.0012)	(0.0751)		
SIZE	−0.2606	−0.2377	0.0054	0.0140	0.0515	0.0286	1.0000
	(0.0000)	(0.0000)	(0.6993)	(0.3187)	(0.0002)	(0.0416)	

Notes: *P* value are in parentheses.

tification (*OI*) is negatively correlated with both cash holdings variables (*Cash* and *INDCash*), but the coefficients are insignificant. The two financial development variables (*Stocksize* and *Banksize*) are positively correlated with cash holdings (*Cash* and *INDCash*), which is intuitively consistent. The correlation coefficient between stock market development (*Stocksize*) and banking sector development (*Banksize*) is 0.7663, indicating that both types of development represent the level of financial development in the region. Both cash holdings variables (*Cash* and *INDCash*) are significantly positively correlated with net cash flow from operations (*CF*) and negatively correlated with firm size (*SIZE*).

Table 4 shows the regression results from testing Hypothesis 1. Following Li and Shi (2016), we add lagged cash holdings as a control variable, because cash is a firm's most liquid and flexible asset and its cash policy is often affected by previous periods. The dependent variables in column (1) and (2) are cash holdings (*Cash*) and cash holdings adjusted by industry (*INDCash*). The coefficients of *OI* are significantly negative at the 5% level in both regression models, suggesting that CEOs with higher organizational identification have lower firm cash

Table 4
CEO organizational identification and cash holdings.

VARIABLE	(1) *Cash*	(2) *INDCash*
OI	−0.0402**	−0.0385**
	(−2.4241)	(−2.3153)
$Cash_{t-1}$	0.6230***	
	(80.6378)	
$INDCash_{t-1}$		0.6205***
		(80.1132)
LEV	−0.1835***	−0.1856***
	(−10.4866)	(−10.5664)
CF	0.1487***	0.1451***
	(5.4113)	(5.2581)
AGE	−0.0007	−0.0052
	(−0.1536)	(−1.1034)
NWC	−0.1542***	−0.1551***
	(−9.9523)	(−9.9696)
CAPEX	−0.1021**	−0.0929**
	(−2.2397)	(−2.0316)
SIZE	−0.0079***	−0.0087***
	(−2.9062)	(−3.1593)
DSD	−0.2206***	−0.2210***
	(−6.3750)	(−6.3621)
CFVOL	0.0022***	0.0019***
	(5.5014)	(4.6085)
BM	0.0040	0.0037
	(1.1375)	(1.0633)
DIV	0.0061	0.0071
	(0.9916)	(1.1510)
LOSS	0.0163**	0.0161**
	(2.2900)	(2.2507)
SOE	0.0153***	0.0164***
	(2.7149)	(2.8873)
FIRST	0.0149	0.0142
	(0.9257)	(0.8798)
IND	YES	YES
YEAR	YES	YES
Constant	0.4080***	0.3786***
	(5.0722)	(4.6970)
F	305.68***	270.93***
Observations	5,081	5,081
Adj-R^2	0.6894	0.6629

Notes: *T* statistics are in parentheses. Significance is indicated at the ***0.01, **0.05, and *0.1 levels.

holdings, which is consistent with H1a. The results indicate that CEO organizational identification can alleviate the agency problem and improve firm transparency, and thus firm cash holdings are lower.

Among the other variables, we find that firms with higher net cash flow from operations (*CF*) and higher cash flow volatility (*CFVOL*) usually have more cash holdings. In addition, state-owned enterprises (*SOE*) also tend to retain more cash. However, leverage (*LEV*), net working capital (*NWC*), capital expenditure (*CAPEX*), and short-term debt changes rate (*DSD*) are significantly negatively associated with cash holdings.

Table 5
Moderating effect of financial development.

VARIABLE	(1) *Cash*	(2) *INDCash*	(3) *Cash*	(4) *INDCash*
OI	−0.0238*	−0.0227*	0.0297	0.0297
	(−1.8888)	(−1.7982)	(0.9380)	(1.1101)
Stocksize	0.0409**	0.0410**		
	(2.1741)	(2.1879)		
OI × *Stocksize*	−0.0135**	−0.0136**		
	(−2.1054)	(−2.1305)		
Banksize			0.0745**	0.0835**
			(2.3543)	(2.3250)
OI × *Banksize*			−0.0211**	−0.0244**
			(−2.0705)	(−2.0995)
$Cash_{t-1}$	0.6269***		0.4689***	
	(25.5354)		(74.6902)	
$INDCash_{t-1}$		0.6200***		0.5000***
		(24.8250)		(75.4808)
LEV	−0.1721***	−0.1774***	−0.1764***	−0.1874***
	(−7.9222)	(−8.1006)	(−12.4536)	(−12.4991)
CF	0.1466***	0.1426***	0.1296***	0.1427***
	(3.4109)	(3.3076)	(5.7690)	(6.0607)
AGE	0.0002	−0.0055	−0.0068*	−0.0105***
	(0.0410)	(−0.9114)	(−1.7873)	(−2.6119)
NWC	−0.1384***	−0.1487***	−0.0918***	−0.1196***
	(−8.1109)	(−8.6502)	(−7.3795)	(−9.0111)
CAPEX	−0.1030*	−0.0944	−0.0183	−0.0278
	(−1.7113)	(−1.5579)	(−0.4939)	(−0.7111)
SIZE	−0.0083**	−0.0095***	−0.0073***	−0.0085***
	(−2.2687)	(−2.6086)	(−3.2794)	(−3.6395)
DSD	−0.2088***	−0.2194***	−0.1569***	−0.1849***
	(−6.0694)	(−6.3613)	(−5.5567)	(−6.2364)
CFVOL	0.0022***	0.0018**	0.0010***	0.0011***
	(2.9134)	(2.4656)	(2.9287)	(3.0612)
BM	0.0020	0.0038	−0.0015	0.0020
	(0.7293)	(1.4058)	(−0.5175)	(0.6638)
DIV	0.0069	0.0073	0.0076	0.0082
	(1.0217)	(1.0864)	(1.5115)	(1.5711)
LOSS	0.0158**	0.0166**	0.0157***	0.0245***
	(2.4116)	(2.5228)	(2.6901)	(3.4422)
SOE	0.0153***	0.0155***	0.0204***	0.0195***
	(2.8304)	(2.8876)	(4.4423)	(4.0446)
FIRST	0.0119	0.0131	0.0234*	0.0221
	(0.7728)	(0.8522)	(1.7765)	(1.6017)
IND	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
Constant	0.3529***	0.3416***	0.1815*	0.1547*
	(4.0538)	(3.8998)	(1.6606)	(1.6531)
F	87.81***	73.67***	350.56***	246.80***
Observations	5,081	5,081	5,081	5,081
Adj-R^2	0.6901	0.6650	0.6737	0.6536

Notes: *T* statistics are in parentheses. Significance is indicated at the ***0.01, **0.05, and *0.1 levels.

Table 5 shows the moderating effect of financial development on the association between CEO organizational identification and firm cash holdings. The financial development in columns (1) and (2) is stock market development (*Stocksize*), and in columns (3) and (4) is banking sector development (*Banksize*). The empirical results show that the coefficients on financial development are significantly positive in all four models, while the four interactions of CEO organizational identification and financial development ($OI \times Stocksize$; $OI \times Banksize$) are significantly negative at the 5% level, suggesting that in regions with greater financial development, higher CEO organizational identification leads to lower firm cash holdings. The reason is that financing is easier to obtain in regions with better financial development, and CEOs with stronger organizational identification are more likely to invest cash into projects in such an environment. The results are consistent with H2.

Table 6
Moderating effect of economic policy uncertainty.

VARIABLE	(1) *Cash*	(2) *INDCash*
OI	−0.0711***	−0.0696***
	(−3.7551)	(−3.6660)
EPU	−0.0095	−0.0090
	(−1.0557)	(−1.0038)
$OI \times EPU$	0.0050**	0.0049*
	(2.0043)	(1.9457)
$Cash_{t-1}$	0.8250***	
	(63.3413)	
$INDCash_{t-1}$		0.8252***
		(63.1756)
LEV	−0.2197***	−0.2200***
	(−18.2144)	(−18.2507)
CF	0.0346	0.0370
	(1.0480)	(1.1043)
AGE	−0.0126***	−0.0123***
	(−3.8931)	(−3.7825)
NWC	−0.2450***	−0.2457***
	(−21.4415)	(−21.3372)
CAPEX	−0.2195***	−0.2214***
	(−4.2552)	(−4.2512)
SIZE	−0.0073***	−0.0075***
	(−3.5973)	(−3.6485)
DSD	−0.3285***	−0.3281***
	(−13.7738)	(−13.6958)
CFVOL	0.0007**	0.0007**
	(2.5375)	(2.5157)
BM	0.0089***	0.0092***
	(5.8068)	(5.8828)
DIV	0.0074**	0.0074**
	(2.2780)	(2.2636)
LOSS	−0.0016	−0.0017
	(−0.4485)	(−0.4656)
SOE	0.0036	0.0033
	(1.2656)	(1.1604)
FIRST	0.0023	0.0030
	(0.2576)	(0.3291)
IND	YES	YES
YEAR	YES	YES
Constant	0.3797***	0.2229***
	(4.9763)	(2.8808)
F	237.24***	220.37***
Observations	20,317	20,317
Adj-R^2	0.6279	0.5975

Notes: *T* statistics are in parentheses. Significance is indicated at the ***0.01, **0.05, and *0.1 levels.

Table 6 shows the results of the moderating effect of economic policy uncertainty on the association between CEO organizational identification and firm cash holdings. Following Wang et al. (2014) and Li and Shi (2016), we use firm-quarter observations (20,317) for the empirical test presented in Table 6. The results show that the coefficients on the interaction between economic policy uncertainty and CEO organizational identification ($OI \times EPU$) are significantly positive, which illustrates that the negative association between CEO organizational identification and firm cash holdings is weakened by higher economic policy uncertainty, and further demonstrates the defensive incentive for cash holdings. The moderating effects of financial development and economic policy uncertainty suggest that the association between CEO organizational identification and firm cash holdings varies with different contexts, which further supports the association between CEO organizational identification and firm cash holdings.

6. Further analysis

The results above show that CEO organizational identification lowers firm cash holdings, but they raise an interesting and intuitive question: where does this cash go? According to the preceding analysis, CEOs with stronger organizational identification are more likely to care about the firm's long-term performance; thus, it might seem logical that he/she would invest more to support firm development. To further explore this matter, we examine two possible channels: the association between CEO organizational identification and R&D investment, and the association between CEO organizational identification and capital expenditure. CEO organizational identification would alleviate agency costs and ensure the CEO has a longer investment horizon when making investment decisions. Therefore, we can infer that CEO organizational identification should be significantly positively associated with R&D investment and capital expenditure. We construct Model (2) to test this hypothesis.

$$\begin{aligned} R\&D_{it}/CAPEX_{it} &= \alpha_0 + \alpha_1 OI_{it} + \alpha_2 LEV_{it} + \alpha_3 SIZE_{it} + \alpha_4 CF_{it} + \alpha_5 ROA_{it} \\ &+ \alpha_6 Tobin'sQ + \alpha_7 SOE_{it} + \alpha_8 TOP_{it} + \sum IND + \sum YEAR + \varepsilon_{it} \end{aligned} \tag{2}$$

Table 7
CEO organizational identification and investment expenditure.

VARIABLE	(1) *R&D*	(2) *CAPEX*
OI	1.2026***	0.0097**
	(2.6711)	(1.9995)
LEV	−7.2521***	−0.0225***
	(−15.3136)	(−5.6731)
SIZE	0.6256***	0.0024***
	(6.7808)	(3.2073)
CF	4.5357***	0.0926***
	(3.7725)	(11.6639)
ROA	−10.2180***	0.0540***
	(−6.8458)	(3.3458)
Tobin'sQ	0.2531***	−0.0010***
	(5.3698)	(−3.1464)
SOE	−1.1638***	−0.0146***
	(−6.5407)	(−9.6357)
TOP	−0.0878	0.0009
	(−0.1639)	(0.1943)
Constant	−13.9900***	−0.0148
	(−5.6104)	(−0.6548)
LR chi2/F	2369.24***	36.94***
Observations	5,081	5,081
PseudoR^2/*Adj-*R^2	0.0975	0.1739

Notes: *T* statistics are in parentheses. Significance is indicated at the ***0.01, **0.05, and *0.1 levels.

The dependent variable in Model (2) is either R&D investment (*RD*) or capital expenditure (*CAPEX*). *RD* is defined as the ratio of the firm's R&D investment to operating income. We also add *Tobin's Q* as a control variable. All of the other variables are as defined in Table 1.

Table 7 shows the regression results of Model (2). Column (1) reports the estimates from the Tobit model and shows that higher CEO organizational identification is associated with higher R&D investment. The dependent variable in Column (2) is capital expenditure and the coefficient on CEO organizational identification (*OI*) is significantly positive, indicating that CEOs with stronger organizational identification are associated with more capital expenditure. Taking these results together, we find that CEOs with stronger organizational identification are more likely to make long-term plans for the firm, hold less cash, and make more investment expenditures to seize development opportunities.

We further investigate whether CEO organizational identification promotes the value of cash holdings. Based on the agency motivation for cash holdings, we expect that CEO organizational identification can enhance the firm value of cash holdings. Following Zheng et al. (2014) and Li et al. (2018), we construct Model (3) for our test.

$$\begin{aligned} ROA_{it}/Tobins'Q_{it} &= \alpha_0 + \alpha_1 OI_{it} + \alpha_2 Cash_{it} + \alpha_3 OI_{it} \times Cash_{it} + \alpha_4 LEV_{it} \\ &+ \alpha_5 SIZE_{it} + \alpha_6 FIRST_{it} + \alpha_7 SOE_{it} + \alpha_8 SALE_{it} + \sum IND + \sum YEAR + \varepsilon_{it} \end{aligned} \tag{3}$$

$SALE_{it}$ refers to firm i's revenue growth rate in year t, and other variables are the same as in Table 1. In Model (3), we use the accounting performance indicator ROA_{it} (firm i's return on total assets in year t) and the market performance indicator *Tobin's* Q_{it} as the measurement variable for firm value.

In columns (1) and (3) of Table 8, where ROA_{it} is the dependent variable, the interaction of CEO organizational identification and cash holdings is significantly positive at the 10% level. In columns (2) and (4), where *Tobin's* Q_{it} is the dependent variable, the interaction of CEO organizational identification and cash holdings is significantly positive at the 1% level. Notably, the coefficients on *OI* are significantly positive in columns (2)

Table 8
CEO organizational identification, cash holdings, and firm value.

VARIABLE	(1) *ROA*	(2) *Tobin's Q*	(3) *ROA*	(4) *Tobin's Q*
OI	−0.0002	0.4770***	0.0039	0.4780***
	(−0.0475)	(2.7537)	(0.9419)	(2.7569)
Cash	−0.0718	0.8880***		
	(−1.5811)	(5.8566)		
OI × Cash	0.0250*	0.0125***		
	(1.7785)	(2.6507)		
INDCash			−0.0717	0.7468***
			(−1.5051)	(5.1977)
OI × INDCash			0.0245*	0.0122**
			(1.6588)	(2.5729)
LEV	−0.1223***	−0.2392	−0.1230***	−0.3007*
	(−32.2066)	(−1.4186)	(−32.5162)	(−1.7963)
SIZE	0.0118***	−0.9965***	0.0118***	−0.9989***
	(17.9884)	(−34.8205)	(17.9368)	(−34.8916)
FIRST	0.0184***	0.2989	0.0186***	0.3085
	(3.8493)	(1.4472)	(3.8854)	(1.4924)
SOE	−0.0111***	−0.3043***	−0.0112***	−0.3017***
	(−7.1873)	(−4.5554)	(−7.1950)	(−4.5138)
SALE	0.0211***	0.3888***	0.0211***	0.3880***
	(18.3128)	(7.6414)	(18.2924)	(7.6187)
Constant	−0.2036***	24.4246***	−0.2148***	24.6263***
	(−9.2223)	(29.3318)	(−11.0526)	(29.6462)
F	98.76***	165.07***	98.49***	164.45***
Observations	5,118	5,118	5,118	5,118
Adj-R^2	0.2761	0.4024	0.2756	0.4015

Notes: *T* statistics are in parentheses. Significance is indicated at the ***0.01, **0.05, and *0.1 levels.

and (4), indicating that firms with higher CEO organizational identification perform better in the market. These results suggest that CEO organizational identification can alleviate agency problems, improve the value of cash holdings, and promote firm value in the long term.

7. Robustness and endogeneity tests

Considering that the CFO may also play a significant role in a firm's financial decision making, we control the effect of CFO organizational identification (*CFO_OI*) in Table 4 to regress Model (1); the measurement is consistent with CEO organizational identification. As shown in Table 9, the coefficients on CFO organizational identification (*CFO_OI*) are positive but insignificant in both regression models. The core variable that we focus on, CEO organizational identity (*OI*), is still significantly negative at the 5% level, suggesting that our

Table 9
Robustness test adding CFO organizational identification.

VARIABLE	(1) *Cash*	(2) *INDCash*
OI	−0.0441**	−0.0417**
	(−2.4093)	(−2.2655)
CFO_OI	0.0028	0.0013
	(0.2279)	(0.1070)
$Cash_{t-1}$	0.6137***	
	(78.2872)	
$INDCash_{t-1}$		0.6114***
		(77.7877)
LEV	−0.1836***	−0.1856***
	(−10.4470)	(−10.5165)
CF	0.1376***	0.1341***
	(4.9753)	(4.8259)
AGE	−0.0011	−0.0056
	(−0.2396)	(−1.1816)
NWC	−0.1536***	−0.1545***
	(−9.8668)	(−9.8794)
CAPEX	−0.0874*	−0.0788*
	(−1.9077)	(−1.7112)
SIZE	−0.0081***	−0.0088***
	(−2.9540)	(−3.1870)
DSD	−0.2220***	−0.2225***
	(−6.3870)	(−6.3717)
CFVOL	0.0023***	0.0019***
	(5.5797)	(4.6960)
BM	0.0037	0.0034
	(1.0466)	(0.9626)
DIV	0.0070	0.0081
	(1.1391)	(1.3012)
LOSS	0.0163**	0.0162**
	(2.2849)	(2.2545)
SOE	0.0152***	0.0162***
	(2.6822)	(2.8478)
FIRST	0.0176	0.0169
	(1.0893)	(1.0389)
IND	YES	YES
YEAR	YES	YES
Constant	0.4165***	0.3870***
	(5.1077)	(4.7335)
F	281.06***	248.89***
Observations	4,985	4,985
Adj-R^2	0.6810	0.6540

Notes: *T* statistics are in parentheses. Significance is indicated at the ***0.01, **0.05, and *0.1 levels.

result is not influenced by CFO organizational identification. In addition, when CFO organization identification (*CFO_OI*) is included in Tables 5 and 6, the results remain unchanged (untabulated).

Since there is some homogeneity in the 6-item scale of organizational identification, we directly sum the scores to measure CEO organizational identification. To obtain more robust results, we adopt the principal component analysis method to construct CEO organizational identification. Through dimensionality reduction, principal component analysis can transform multiple variables into a few comprehensive indicators through linear transformation, in which each principal component reflects most of the information from the original variables. Table 10 shows the results of using CEO organizational identification constructed by the first principal component. We find that CEO organizational identification is still significantly negative at the 5% level, which is consistent with Table 4.

In the hypothesis development section, our preliminary theoretical argument concerning CEO organizational identification and firm cash holdings relied on the principal-agent theory. To make our results more robust, we incorporate five typical corporate governance variables in Model (1), including duality (*DUAL*,

Table 10
CEO organizational identification constructed by principal component analysis.

VARIABLE	(1) *Cash*	(2) *INDCash*
OI	−0.0026**	−0.0025**
	(−2.2870)	(−2.1637)
$Cash_{t-1}$	0.6231***	
	(80.6498)	
$INDCash_{t-1}$		0.6206***
		(80.1244)
LEV	−0.1833***	−0.1853***
	(−10.4752)	(−10.5546)
CF	0.1488***	0.1452***
	(5.4148)	(5.2615)
AGE	−0.0007	−0.0052
	(−0.1517)	(−1.1013)
NWC	−0.1540***	−0.1549***
	(−9.9393)	(−9.9567)
CAPEX	−0.1034**	−0.0942**
	(−2.2682)	(−2.0587)
SIZE	−0.0079***	−0.0086***
	(−2.8994)	(−3.1530)
DSD	−0.2203***	−0.2207***
	(−6.3662)	(−6.3539)
CFVOL	0.0022***	0.0019***
	(5.4941)	(4.6012)
BM	0.0040	0.0037
	(1.1322)	(1.0577)
DIV	0.0061	0.0071
	(0.9929)	(1.1525)
LOSS	0.0163**	0.0161**
	(2.2913)	(2.2522)
SOE	0.0152***	0.0163***
	(2.6993)	(2.8724)
FIRST	0.0150	0.0144
	(0.9336)	(0.8877)
IND	YES	YES
YEAR	YES	YES
Constant	0.2774***	0.2533***
	(4.6746)	(4.2679)
F	305.62***	270.88***
Observations	5,081	5,081
Adj-R^2	0.6893	0.6628

Notes: *T* statistics are in parentheses. Significance is indicated at the ***0.01, **0.05, and *0.1 levels.

defined as 1 if the chairman and CEO are the same person, and otherwise 0), board size (*BDSIZE*, defined as the natural logarithm of the number of directors), ratio of independent directors (*INDEPENDENT,* defined as the ratio of the number of independent directors to the number of board directors), management shareholding (*MNGHLD*, defined as 1 if the management holds shares, and otherwise 0), and CEO compensation (*CEO-*

Table 11
Regression results after controlling corporate governance factors.

VARIABLE	(1) *Cash*	(2) *INDCash*
OI	−0.0267**	−0.0401**
	(−2.0946)	(−2.1791)
$Cash_{t-1}$	0.6239***	
	(25.3276)	
$INDCash_{t-1}$		0.6213***
		(24.9537)
LEV	−0.1832***	−0.1859***
	(−8.2295)	(−8.2999)
CF	0.1511***	0.1474***
	(3.4871)	(3.3893)
AGE	−0.0004	−0.0048
	(−0.0584)	(−0.7707)
NWC	−0.1548***	−0.1560***
	(−8.5885)	(−8.6070)
CAPEX	−0.1087*	−0.0977
	(−1.7607)	(−1.5679)
SIZE	−0.0080**	−0.0089**
	(−2.0960)	(−2.3054)
DSD	−0.2168***	−0.2174***
	(−6.2850)	(−6.2898)
CFVOL	0.0022***	0.0019**
	(2.9554)	(2.4784)
BM	0.0040	0.0038
	(1.4373)	(1.3579)
DIV	0.0050	0.0060
	(0.7363)	(0.8922)
LOSS	0.0159**	0.0157**
	(2.3869)	(2.3563)
SOE	0.0154***	0.0169***
	(2.7523)	(3.0482)
FIRST	0.0121	0.0113
	(0.7293)	(0.6843)
DUAL	0.0068	0.0077
	(1.1205)	(1.2562)
BDSIZE	0.0028	0.0040
	(0.2135)	(0.3007)
INDEPENDENT	0.0153	0.0227
	(0.3468)	(0.5148)
MNGHLD	−0.0093*	−0.0086*
	(−1.7941)	(−1.6611)
CEOPAY	0.0027*	0.0028*
	(1.8292)	(1.8675)
IND	YES	YES
YEAR	YES	YES
Constant	0.3268***	0.3435***
	(3.5644)	(3.3335)
F	65.73***	57.85***
Observations	5,049	5,049
Adj-R^2	0.6922	0.6661

Notes: *T* statistics are in parentheses. Significance is indicated at the ***0.01, **0.05, and *0.1 levels.

PAY, defined as the natural logarithm of CEO compensation). As shown in Table 11, the coefficient on CEO organizational identification (*OI*) remains significantly negative. It is worth noting that only the coefficients on *MNGHLD* and *CEOPAY* are significant at the 10% level, while the coefficients on other corporate governance variables are insignificant, indicating that when management holds shares, they tend to pay more attention to the firm's long-term development and consequently engage in more investment. Conversely, when he/she has high vested interest, a CEO with higher compensation perhaps lacks the incentive to pay attention to the firm's future development, leading to higher cash holdings, which is partly consistent with the findings in Dittmar et al. (2003) and Xin and Xu (2006). One possible explanation for why the other three corporate governance variables are insignificant is that corporate governance is an integral concept, and different sub-indicators of corporate governance need to be integrated to achieve better corporate governance effects. Another possible explanation is that CEO organizational identification has a certain corporate governance function, and some of the governance effects of sub-indicators are substituted by CEO organizational identification.

One important assumption in this paper is that CEO organizational identification does not change over a short period of time, as this would probably lead to an overestimation of the T-value of *OI*. To exclude the

Table 12
Regression results using only the sample from 2014.

VARIABLE	(1) *Cash*	(2) *INDCash*
OI	−0.0495**	−0.0519**
	(−2.5141)	(−2.1616)
$Cash_{t-1}$	0.5801***	
	(41.6510)	
$INDCash_{t-1}$		0.5780***
		(41.6150)
LEV	−0.0834***	−0.0843***
	(−3.2648)	(−3.3031)
CF	0.3868***	0.3820***
	(9.5109)	(9.4719)
AGE	0.0025	0.0068
	(0.3704)	(1.0121)
NWC	−0.0905***	−0.0908***
	(−3.9849)	(−3.9689)
CAPEX	−0.4084***	−0.4014***
	(−6.1045)	(−6.0442)
SIZE	0.0117***	0.0108***
	(3.0072)	(2.7841)
DSD	0.0061	0.0064
	(0.1220)	(0.1290)
CFVOL	0.1621	−0.0136**
	(1.5659)	(−2.4146)
BM	−0.0142**	−0.0122**
	(−2.4109)	(−2.0816)
DIV	−0.0007	0.0001
	(−0.0801)	(0.0101)
LOSS	0.0161	0.0181*
	(1.5349)	(1.7411)
SOE	0.0033	0.0024
	(0.4082)	(0.2910)
FIRST	−0.0084	−0.0078
	(−0.3593)	(−0.3341)
IND	YES	YES
Constant	−0.0002	−0.0257
	(−0.0022)	(−0.2250)
F	108.16***	76.67***
Observations	1767	1767
Adj-R^2	0.6120	0.5930

Notes: *T* statistics are in parentheses. Significance is indicated at the ***0.01, **0.05, and *0.1 levels.

possible impact of the sample period, we use the sample in 2014 to re-regress Model (1). As shown in Table 12, the coefficient on *OI* is still significantly negative at the 5% level, indicating that the results of our paper are relatively robust.

As there may be endogeneity between CEO organizational identification and firm cash holdings, we apply the instrumental variable method to eliminate endogeneity concerns. According to the principles of econometrics, the instrumental variable should be related to the endogenous variable, and unrelated to the *OLS* regression residual items. Accordingly, we use a dummy variable indicating whether the CEO's first job was with the current firm as the instrumental variable (*FIRSTJOB)*. More specifically, if the CEO's first job was with the current firm, *FIRSTJOB* is defined as 1, and otherwise 0. If the CEO's first job was with the current firm, he/she may have a stronger organizational identification, and the independent variable (*OI*) and instrumental variable (*FIRSTJOB)* are significantly and positively correlated. As shown in Table 13, the coefficients on

Table 13
Endogeneity test.

VARIABLES	(1) *OI*	(2) *Cash*	(3) *OI*	(4) *INDCash*
OI (IV = FIRSTJOB)		−0.5609*		−0.5696*
		(−1.8614)		(−1.8441)
$Cash_{t-1}$	0.0005	0.4653***		
	(0.0739)	(31.6500)		
$INDCash_{t-1}$			−0.0007	0.4958***
			(−0.1232)	(30.5536)
LEV	−0.0458***	−0.2064***	−0.0466	−0.2150***
	(−3.0558)	(−8.3103)	(−3.2486)	(−8.1604)
CF	−0.0033	0.1193***	−0.0030	0.1295***
	(−0.1351)	(3.4806)	(−0.1291)	(3.6318)
AGE	−0.0039	−0.0105*	−0.0040	−0.0153***
	(−1.0035)	(−1.9143)	(−1.0439)	(−2.6681)
NWC	−0.0197	−0.1088***	−0.0201	−0.1366***
	(−1.5154)	(−6.3568)	(−1.5809)	(−7.5709)
CAPEX	0.0107	−0.0197	0.0109	−0.0329
	(0.2805)	(−0.4001)	(0.2873)	(−0.6281)
SIZE	0.0007	−0.0072**	0.0007	−0.0085***
	(0.2875)	(−2.4037)	(0.2879)	(−2.7548)
DSD	0.0184	−0.1692***	0.0188	−0.1972***
	(0.6310)	(−4.7479)	(0.6541)	(−5.3422)
CFVOL	0.0002	0.0007	0.0002	0.0008
	(0.6394)	(1.2842)	(0.7036)	(1.2602)
BM	0.0032	0.0003	0.0032	0.0039
	(1.0719)	(0.1050)	(1.1325)	(1.2960)
DIV	−0.0063	0.0070	−0.0063	0.0066
	(−1.1984)	(1.1177)	(−1.2312)	(1.0162)
LOSS	−0.0078	0.0126*	−0.0078	0.0137**
	(−1.3384)	(1.8611)	(−1.3216)	(1.9709)
SOE	−0.0002	0.0204***	−0.0002	0.0195***
	(−0.0443)	(4.0421)	(−0.0428)	(3.7731)
FIRST	−0.0205	0.0117	−0.0203	0.0112
	(−1.5438)	(0.7616)	(−1.5249)	(0.7083)
FIRSTJOB	0.0133***		0.0133***	
	(3.2674)		(3.1993)	
IND	YES	YES	YES	YES
YEAR	YES	YES	YES	YES
Constant	3.2691	2.1428**	3.2676	2.1422**
	(63.4038)	(2.1801)	(69.3832)	(2.1267)
F	2.63***	133.20***	2.39***	125.59***
Observations	5,081	5,081	5,081	5,081
Adj-R^2	0.0073	0.5743	0.0073	0.5562

Notes: *T* statistics are in parentheses. Significance is indicated at the ***0.01, **0.05, and *0.1 levels.

OI are significantly negative at the 10% level, indicating that CEO organizational identification is still significantly negatively associated with cash holdings after using the instrumental variable to eliminate endogeneity concerns.

8. Conclusion

Executives' psychological characteristics have a crucial impact on firms' financial decision-making behavior. Using survey data from listed firms in China, this paper investigates the association between CEO organizational identification and firm cash holdings. The empirical results show that CEO organizational identification is significantly negatively associated with cash holdings, suggesting that it can mitigate the agency problem. We then examine two different factors, financial development and economic policy uncertainty. We find that financial development strengthens the negative association between CEO organizational identification and firm cash holdings, greater financial development makes it more convenient for the firm to obtain financing, and CEOs with higher organizational identification are more likely to make long-term plans for the firm, increasing its investments and thus holding less cash. Therefore, in regions with higher financial development, CEOs with stronger organizational identification hold less cash. In contrast, economic policy uncertainty mitigates the negative association between CEO organizational identification and firm cash holdings, demonstrating the defensive incentive effect of cash holdings. Under higher economic policy uncertainty, CEOs tend to increase their cash holdings to avoid problems such as financial distress. Further analysis reveals a significant positive association between CEO organizational identification and R&D investment and capital expenditure, which indirectly supports our main conclusion that the decrease in cash holding may be caused by greater spending on investments. In addition, we find that CEO organizational identification promotes the value of cash holdings. In a robustness test, because the CFO will also exert a major impact on the firm's financial decisions, we add CFO organizational identification to the regression model, and the results remain unchanged. Principal component analysis is also applied to construct CEO organizational identification, and the results still remain unchanged. We also incorporate typical corporate governance variables in our model, and the results remain the same. Our research demonstrates the effect of executive psychological characteristics on corporate financial decision-making behaviors.

This paper has several critical policy implications. According to the theory of organizational identification, when the characteristics of individuals' self-concept are similar to the organizational characteristics, a sense of organizational identification is reinforced. Therefore, when a firm hires a new CEO, it can check the consistency of his or her work methods, goals, beliefs, and values with the organization's, and inquire about his/her views on the organization's culture. In addition, firms can enhance executives and employees' awareness of the firm's mission and vision, and promote their sense of ownership and corporate identification in various ways, including staff training and promoting the unique culture of the organization. However, one shortcoming of this paper is that the cost of investigating the most important variable, CEO organizational identification, is very high, and a second similar investigation cannot be conducted. Thus, this paper can only use cross-sectional data for an empirical test but cannot test the causal inference that is prevalent in the financial field.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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