Does Culture Matter in Corporate Cash Holdings?*

Yongning Deng†

July 2021

Abstract

This article identifies national culture as an important factor affecting corporate cash holdings by using China and its national culture, Confucianism, as a setting. We find that firms located in regions with higher levels of Confucian culture hold persistently higher levels of cash. Next, we employ an instrumental variable to establish causality of the culture effect and the IV estimates show a compelling economic magnitude. The culture effect is stronger for more financially-constrained and riskier firms, suggesting precautionary motives as the underlying mechanism. Besides, we find that the culture effect remains intact after controlling for corporate governance heterogeneity, which rules out the agency motives. Further, we provide additional evidence suggesting higher cash holdings is an efficient outcome. Finally, we also show that both the CEO/board chairman's Confucian background and the firm's headquarter cultural environment matter.

JEL Classification: G31, G32, M14
Keywords: Cash Holdings, Culture, Agency Conflicts, China

*We thank Andrew J. Sinclair, Dragon Yongjun TANG, Tse-Chun LIN, Yang YOU, Darrell Duffie, Hong ZOU, and seminar participants from Stanford University for valuable advice and comments.

†Finance Area, Faculty of Business and Economics, The University of Hong Kong, Hong Kong. Email: yndeng@connect.hku.hk.

1 Introduction

Corporate cash holdings are strategically important because they can crucially determine a firm's ability to maintain smooth operation and to realize valuable investment and growth opportunities (Harford 1999; Denis and Sibilkov 2010; Campello et al. 2011; Harford et al. 2014). There is a large literature dating back to Baumol (1952) try to explore the determinants of corporate cash holdings. In the early literature, transaction costs are considered as the major determinants of corporate cash holdings. Firms with higher marginal costs of cash shortfalls are expected to hold higher levels of cash (see, for example, Meltzer 1963; Miller and Orr 1966; Mulligan 1997). Opler et al. (1999) considerably expand the empirical evidence on the determinants of corporate cash holdings, which are consistent with the precautionary motives that firms hold higher levels of cash to deal with adverse shocks when access to capital markets is constrained and costly (see, also, Almeida et al. 2004; Riddick and Whited 2009; Subrahmanyam et al. 2017; Begenau and Palazzo 2021; Favara et al. 2020; among others). Agency motives are also considered as important determinants of corporate cash holdings. As argued by Jensen (1986), entrenched managers would rather hoard cash than increase payouts to shareholders when the firm has poor investment opportunities (see, also, Dittmar et al. 2003; Pinkowitz et al. 2003; Dittmar and Mahrt-Smith 2007; Mansi and Maxwell 2008).

Despite these well documented determinants of corporate cash holdings, some puzzling phenomena are observed that there are huge discrepancies in corporate cash holdings among countries which can not be explained by the theoretical determinants and differences in corporate governance/shareholder rights protection. For instance, in developed economies with both highly developed capital markets and high shareholder rights protection levels, median cash holdings ratios (cash divided by net assets) for the past 20 years (2000-2019) are

0.201 (Hong Kong), 0.187 (Japan) and 0.174 (Singapore), while for western counterparts, they are 0.158 (US)[1], 0.117 (Germany), 0.114 (UK). Interestingly, these three high cash holdings economies are all, more or less, Confucian culture societies. Cultural differences have already been documented to affect an impressive array of financial decisions and outcomes, both on the corporate side and on the investment side (Ahern et al. 2015; Pan et al. 2020; Chui et al. 2010; Eun et al. 2015; among others). For example, Chui et al. (2010) show that persistent significant cross-country differences in momentum strategy profits is due to cultural differences in individualism; Hilary and Hui (2009) find that firms with headquarters located in more religious environment would make more cautious investment decisions. Against these stylized facts, we are motivated by the interest to understand whether national cultures affect corporate cash holdings and try to identify the economic magnitude of the culture effect.

We use China and its dominant national culture, Confucianism, as a setting to identify the national culture effect. Although studying the relationship between national cultures and corporate cash holdings using a cross-sectional samples at the country level provides valuable insights, it faces the potential risks of omitted variables and also is hard to identify the effect of culture from confounding effect of country-level institutions, because culture is documented as a major determinant of institutions and statutory laws (Stulz and Williamson 2003; Stulz 2005; Licht et al. 2005; Doidge et al. 2007; Alesina and Giuliano 2015). By focusing on a single country, we are able to hold constant the institutions and exploit the within-country variances in regional culture density to identify the effect of national culture.

As the dominant national culture in China, Confucianism can be dated back to the Chinese philosopher *Confucius* ($551 - 479$ BC) 2000 years ago. The teachings of *Confucius*

[1]US has already been documented to experience secular growth in cash holdings, more than double from 1980 to 2006 (Bates et al. 2009).

are referred to as Confucian culture or Confucianism. Despite the fact that China has endured radical socioeconomic transformation over the past century, Confucianism retains its far-reaching influence in modern China[2] (Chen et al. 2020), and has shaped broad socioeconomic aspects in many East and Southeast Asian countries[3]. Thus, studying the financial implications of Confucianism is independently significant[4]. The essence of Confucian culture is its core values of *benevolence*, *righteousness*, and *propriety* (*ren*, *yi*, *li*, in Chinese). These core values of Confucianism are perfectly captured by the two cultural dimensions of individualism-collectivism and uncertainty avoidance in Hofstede and Hofstede (1984) and Hofstede (2001). These two cultural dimensions are widely employed by the finance academia to understand an array of financial decision makings and outcomes[5]. This literature document that economic agents in collectivism and uncertainty avoidance culture tend to be more conservative and have lower tolerance for risk-taking. Against these findings, we hypothesize that firms located in regions with stronger Confucian culture would have higher levels of cash holdings due to stronger precautionary motives, because Confucianism is exactly the culture type featured with collectivism and uncertainty avoidance.

In this paper, we use the number of Confucian temples around firm headquarters to measure the regional Confucian culture. These Confucian temples were built from the Tang Dynasty to the Qing Dynasty ($618-1912$ AD) and are extant tourist attractions and cultural

[2]Jack Ma, founder of China's e-commerce giant Alibaba Group, believes that Chinese enterprises can gain fundamental strengths from traditional Chinese culture and he once said that a company knows nothing about the ideological system of Confucianism will have no chance to last in the market. See, `http://www.ce.cn/xwzx/gnsz/gdxw/201610/21/t20161021_17012709.shtml`

[3]See, for example, Rozman 2014; Bell et al. 2003; Morishima 1982.

[4]Beginning from 2004, the Chinese Ministry of Education launched the "Confucius Institute Program" and had established a total of 548 Confucius Institutes in 154 nations and districts around the World by the end of 2018. The main purpose of these Confucius Institutes is to teach the Chinese language and promote Chinese cultures.

[5]See, for example, Ahern et al. 2015; Zheng et al. 2012; Li et al. 2013; Chen et al. 2015; Chui et al. 2010; Anderson et al. 2011; Beugelsdijk and Frijns 2010.

heritage protection units. In Imperial China, Confucian temples served two purposes: a place of worship for Confucius as well as an official academy for teaching Confucianism. These two purposes together make Confucian temples the most important vehicles to propagate Confucianism in Imperial China. As a means of robustness check, we also use other measures to be discussed in Section 3.

Looking at a sample of all Chinese listed firms (excluding financial firms) from $2000-2020$, we find that firms located in regions with stronger Confucian culture hold significantly higher levels of cash. A one-standard-deviation increase in Confucian culture density increase corporate cash holdings by 2.9%-4.8% (compared to the mean) depending on the model specification. The effect of Confucian culture on corporate cash holdings is statistically significant at the 1% level. The magnitude of this culture effect is economically significant as well. The results are robust to a series of robustness checks. Besides, we find that these firms' high cash holdings status are also more persistent.

In order to establish the causal identification of this culture effect, we employ an instrumental variable (IV) from Chen et al. (2020), the shortest river distance of a prefecture to its nearest sites of pine and bamboo—the two key ingredients required for producing ink and paper in woodblock printing in the Ming-Qing period ($1368-1912$ AD). Confucian temples as official schools in Imperial China to teach Confucian classics and prepare students for the civil exam, known as *'keju'* (an exam system in Imperial China to test Confucian orthodoxy and select public officials), and as official libraries (every Confucian temple had a built-in library (known as *'zunjing ge'*, in Chinese)), crucially rely on access to books. Chen et al. (2020) demonstrate that the locations of pine and bamboo forests, as natural habitats, are exogenous. They also show that this IV is orthogonal to a host of measures of historical economic prosperity, agricultural suitability, geography and night-time lights in 2010. Employing the IV to

perform the two-stage least squares (2SLS) estimation, we confirm that higher Confucian culture leads to higher corporate cash holdings, and with a much larger economic magnitude. In the IV estimation, a one-standard-deviation increase in Confucian culture density increase corporate cash holdings by 12% (compared to the mean). This magnitude of culture effect further supports that national culture is indeed an important determinant of corporate cash holdings[6].

We then examine the heterogeneity in this Confucian culture effect to explore more deeply the patterns in the data with the intention to understand the underlying mechanism. We begin by looking at heterogeneity based on firms' risk attributes. We use the cash flow volatility (Opler et al. 1999) and standard deviation of market model residuals (Mikkelson and Partch 2003) to measure firm risk attributes. We find the culture effect is stronger for riskier firms, which is consistent with the predictions of precautionary motives (see, for example, Opler et al. 1999; Han and Qiu 2007; Riddick and Whited 2009). Firms facing larger business uncertainty would hold more precautionary cash to cope with potential adverse shocks. We next present heterogeneity analyses focused on firms' financial constraint levels. We use firm size and age to proxy for financial constraint levels (Hadlock and Pierce 2010) and use bank loans scaled by net assets to proxy for access to bank credits (Chen et al. 2014). We find that the culture effect is stronger for more financially constrained firms, which is also consistent with the predictions of precautionary motives (see, for example, Almeida et al. 2004; Han and Qiu 2007). Firms would keep higher levels of cash when accessing to outside financing is limited and costly. These two sets of heterogeneity analyses together lend strong support for the precautionary motives as the underlying mechanism, which is consistent

[6]Our identified within-country national culture effect also lends strong support for efforts to understand huge corporate cash holdings discrepancies around the world, notwithstanding much more complex confounding elements (e.g. institutions, law environments, government qualities) when taking the study to international settings.

with the nature of Confucianism as a culture featured with collectivism and uncertainty avoidance.

We then conduct heterogeneity analyses focused on assessing whether the Confucian culture effect might result from agency motives. We follow the literature to construct three variables to measure severity of potential agency conflicts, including the ratio of independent directors on the board, the insider share holdings (board and management team members) and total shares (as a percentage of total outstanding shares) held by the second to the fifth largest shareholders (Mikkelson and Partch 2003; Chen et al. 2012). We do not see a significant difference in the culture effect for firms with different agency conflicts severity, which suggest that the agency motives is unlikely to be the underlying mechanism. Moreover, we look at firm operating outcomes to find further evidence. We first document that Chinese listed firms suffer some agency issues of over-investment, as firms with lower investment opportunities (proxy by market-to-book ratio) invest more[7]. We find that Confucian culture helps to alleviate this agency conflicts as firms in higher Confucian culture regions make less and better investments (only invest more when the investment opportunities are high). Consistent with this point, we find that stock market investors evaluate the acquisition events more positively of these firms, measured as the three day cumulative abnormal returns of acquisition event announcements. As a result of more cautious and better investment choices, we find that these firms also have higher profitability (ROA) and lower profit volatility (standard deviation of ROA). Finally, we also find that high Confucian culture firms pay out more cash dividends, which is also contrary to the predictions of agency motives where entrenched management would hoard excess cash and use for their own interests. All these evidence suggest that high cash holdings, to some extent, is actually an efficient outcome of

[7]The empire building phenomenon documented by Jensen (1986); Jensen (1993).

less agency conflicts.

Besides examining the heterogeneity at corporate levels, we next look at heterogeneity at the prefecture levels to rule out possibilities that our Confucian culture measures are just somehow proxies for local economic and financial conditions. We examine whether local credit market development (proxy by total bank loans scaled by local GDP)[8] and openness (proxy by foreign direct investments scaled by local GDP), have influence on cash holdings and the Confucian culture effect. We do not find any significant effect of local financial and economic conditions on the culture effect. Lastly, we examine how the firm headquarters' regional culture environment interact with the firm's top decision makers' (CEO and board chairman) cultural background. We find that both the firm headquarters' culture environment and the top decision makers' culture background exert an influence on cash holdings. Higher CEO/chairman's Confucian background also leads to higher corporate cash holdings, and corporate headquarters' culture effect remains significant at 1% level, but the economic magnitude becomes marginally weaker as CEO/chairman's cultural background becomes stronger.

Our paper contributes to a number of related literature. First, with regard to the corporate cash holdings literature, our paper is the first to establish causal identification of the national culture effect on cash holdings by employing an instrumental approach in a single country setting. Our identified national culture effect has a rather compelling economic magnitude, contributing to a still small literature that tries to understand huge discrepancies in corporate cash holdings around the world (e.g., Dittmar et al. 2003; Chen et al. 2015; Kalcheva and Lins 2007; Pinkowitz et al. 2016) as well as adding to a large literature on determinants of corporate cash holdings (Opler et al. 1999; Almeida et al.

[8]See, Levine et al. (2000), for this measure of credit market development.

2004; Jensen 1986; Faulkender et al. 2019; Cunha and Pollet 2020; Begenau and Palazzo 2021; among others). Dittmar et al. (2003) and Kalcheva and Lins (2007) try to explain cash holdings discrepancies among countries on the ground of institutions (e.g., shareholder rights protection), but still can not explain some puzzling phenomena that listed firms in some high shareholder rights countries hold high levels of cash. Chen et al. (2015) find collectivism and uncertainty avoidance cultures are associated with higher corporate cash holdings, but their findings are generally correlations due to difficulties to identify the culture effect from confounding country-specific elements (e.g., institutions). Second, our paper contributes to a growing literature that focus on studying how cultural differences affect financial decision makings (Hilary and Hui 2009; Ahern et al. 2015; Chui et al. 2010; Bereskin et al. 2018; Berger et al. 2021; among others). Many of these prior culture literature focus on religion or cultural values of Hofstede and Hofstede (1984). We contribute to this literature by studying a specific type of culture, Confucianism, which has far-reaching influence in the East and Southeast Asian economies[9]. The broad influences of Confucianism makes studying its financial implications independently important. Our study also differs from prior literature that only focus on the cultural background of CEO (e.g., Nguyen et al. 2018; Pan et al. 2020) by focusing on corporate headquarters' regional culture environments[10], and find that both top decision makers' cultural background and firm headquarters' cultural environments matter in corporate decision makings. Last, our study of Chinese listed firms' decision makings from a cultural point of view contributes to the literature on some puzzling Chinese economic and financial phenomena, such as China's high saving rates phenomenon, by providing more insights from a different angle (Song et al. 2011; Wei and Zhang 2011;

[9]Including China, Hong Kong, Taiwan, Japan, South Korea, Singapore, among others.

[10]We follow the same argument as Hilary and Hui (2009) that firm headquarters' regional culture environment would shape firms' corporate culture, and thus influences corporate decisions.

Allen et al. 2005; among others).

The remainder of the paper proceeds as follows. Section 2 describes the institutional background that provides the setting for our analysis and the development of our hypotheses. Section 3 describes the data and main variables construction. Section 4 provides main empirical results about the national culture effect on corporate cash holdings. Section 5 investigates the culture effect heterogeneity and tries to identify the underlying mechanisms. Section 6 concludes the paper.

2 Institutional Background and Hypothesis Development

2.1 The Confucian Virtues

Confucianism has over 2000 years of history in China and originates from the teachings of the Chinese philosopher Confucius (551-479 BC). Confucianism had been endorsed as the only orthodoxy national philosophy since Emperor Wu of Han (known as *han wu di*, 157-87 BC) and became the dominant culture throughout the entire Imperial China. Confucian ethics is characterized by the promotion of virtues, encompassed by the Five Constants (*wu chang*, in Chinese), which are *benevolence*, *righteousness*, *propriety*, *knowledge*, and *integrity* (*ren, yi, li, zhi, xin*, in Chinese). These virtues guide individuals' behaviour in the society. We emphasize on the virtues of benevolence, righteousness, and propriety, which are the core of Confucian ethics.

Benevolence encompasses compassion and altruism. For example, Confucius emphasized that you should treat others as you would like to be treated. Righteousness is often considered as going hand in hand with benevolence and encompasses broad arrays of actions that serve justice in the society. Propriety, advocates that human beings should adhere to a system

of ritual norms and proper behaviour in their daily life. Confucius viewed propriety as an important manner of treating other members of society, covering topics as diverse as learning, tea drinking, worshiping, mourning, and governance.

These three core virtues of Confucianism are perfectly captured by two cultural dimensions of Hofstede and Hofstede (1984) and Hofstede (2001), i.e., the collectivism-individualism dimension as well as the uncertainty avoidance dimension. Benevolence and righteousness, by emphasizing altruism and serving justice for the society as mentioned above, is clearly a type of collectivist culture, which is depicted by Hofstede and Hofstede (1984) as a society where a greater importance is placed on the goals and well-being of the group. With regard to the uncertainty avoidance dimension, Hofstede and Hofstede (1984) define a society being rigid structured and with many societal conventions as a high uncertainty avoidance culture. People in this culture usually have low tolerance for uncertainty, ambiguity and risk-taking.

2.2 Functionalities of Confucian Temples

The construction of Confucian temples can date back to 478 BC, the year after the death of Confucius, when Duke Ai of Lu (*lu ai gong*, in Chinese) built a temple at the site of Confucius' former residence for future generations to worship. Beginning from Emperor Gaozu of Han (*han gao zu*, in Chinese), 195 BC, it became a convention for the emperor to worship Confucius with the highest level of ceremony, and since then, all the scholar officials had to worship Confucius before they could teach Confucianism.

At first, Confucian temples were just sites to worship Confucius. The Emperor Taizong of Tang (*tang tai zong*, in Chinese), 630 AD, however, ordered that all Confucian temples should also serve as official academies to teach Confucianism. From then on, Confucian temples were expanded to include a teaching building (known as, *ming lun tang*, in Chinese)

and a library (known as, *zun jing ge*, in Chinese). Besides, Confucian temples begun to be established all over the country, serving double functionalities as both worship sites and official schools, until the end of Qing Dynasty (1636-1912 AD). Confucian temples were also tightly linked to the civil exam system (known as, *keju*) in Imperial China by teaching and preparing students for the *keju*[11].

Due to their double functionalities as worship sites and official schools, as well as close link to the important *keju* system, Confucian temples were no doubt the most important vehicles in the Imperial China to propagate Confucianism. Thus, we expect that regions with more Confucian temples had stronger Confucian culture in history and this stronger Confucian culture was also more likely to sustain throughout history to current times. Besides the historical importance, we expect Confucian temples are continuing to serve as vehicles to preserve and transmit Confucian culture at current times as they are now preserved as cultural heritage units and cultural attraction sites for tourists. Due to this modern functionality, we expect that regions with more Confucian temples not only have stronger Confucian culture at historical times, but also at current times.

As a means of robustness check, we also use another measure of regional Confucian culture density, i.e., the number of Confucian academies[12] in history. The major difference between these two measures is that almost all the Confucian academies have already been destroyed and no longer exist at current times. Thus, using the number of historical Confucian academies in a region would capture only a region's historical culture density.

[11] *Keju* system was established during the mid-Tang Dynasty (618-907 AD) and had exerted a profound influence on the Chinese society. The exam system was invented to allow the emperors to select talented state bureaucrats. Confucianism was the central subject of the exam. Succeeding in the exam was highly rewarding, allowing the degree holders to gain government positions and enjoy lucrative economic benefits.

[12] The functionalities of Confucian academies coincided with the teaching leg of Confucian temples, including teaching Confucianism as well as collecting and storing books. Since Confucian academies were built officially or privately by individual Confucian scholars, their quantities were much larger than Confucian temples.

2.3 Determinants of Corporate Cash Holdings

The economics and finance literature have identified three motives for firms to hold cash. In this section, we briefly review these theories and evidence on the three motives.

The transaction cost motives. In the early literature dating back to Baumol (1952), transaction costs are considered as the major determinants of corporate cash holdings. When a firm has higher needs to use cash for payments and entails higher costs of converting non-cash financial assets to cash for the payment of transactions, it should optimally hold higher levels of cash (Meltzer 1963; Miller and Orr 1966; Mulligan 1997). In the framework of transaction cost motives, there are economies of scale, suggesting that larger firms could opimally hold lower levels of cash (Mulligan 1997).

The precautionary motives. Firms would hold higher levels of cash to better deal with potential adverse shocks when access to outside financing is limited or costly. Consistent with this prediction, Opler et al. (1999), which was the first study to provide systemic empirical evidence on a large array of determinants of corporate cash holdings, find that firms with riskier cash flows and poor access to external capital hold more cash. Besides, the precautionary motives also suggest that firms with better investment opportunities would hold higher levels of cash, because in case of cash shortfalls, the opportunity costs for these firms are larger. Also consistent with this prediction, Opler et al. (1999) find that firms with higher market-to-book ratios and higher R&D expenditures (both are proxies for investment opportunities) hold more cash. In Almeida et al. (2004), they model the precautionary motives and find that financially constrained firms will save more cash out of cash flows to meet future investment needs, while for unconstrained firms, cash holdings are irrelevant.

Han and Qiu (2007) also theoretically show that increase in cash flow volatility would lead financially constrained firms to hold more cash, but have no effect for unconstrained firms.

The agency motives. Jensen (1986) argue that entrenched managers would rather hoard excess cash than increasing payouts to shareholders even when the firm has poor investment opportunities, and these entrenched managers would usually use the cash for their own interests rather than maximizing shareholder values. These discretionary cash holdings are typically estimated as the excess cash holdings derived from models accounting for transaction cost motives and precautionary motives for holding cash. Dittmar et al. (2003) find cross-country evidence that in countries with poorer shareholder rights protection, and thus worse corporate governance and more severe agency conflicts, firms hold higher levels of cash. Dittmar and Mahrt-Smith (2007) find that cash is valued at lower worth by investors for firms with more severe agency conflicts. Dittmar and Mahrt-Smith (2007) and Mansi and Maxwell (2008) provide evidence to show that entrenched managers are more likely to hold excess cash, but at the same time, spend the excess cash holdings more quickly.

2.4 Hypothesis Development

This section discusses the relationship between regional Confucian culture density and corporate cash holdings based on the discussions of Confucian virtues in Section 2.1 and theoretical determinants of cash holdings in Section 2.3.

We first expect that firms in regions with higher Confucian culture density hold higher levels of cash. As Section 2.1 discuss in detail, Confucianism is a culture type featured with collectivism and high uncertainty avoidance. Prior research has found that economic agents in collectivism and high uncertainty avoidance culture tend to be more conservative and

risk-averse. Firms located in regions with stronger Confucian culture are more likely to form a corporate culture that is also more conservative and risk-averse[13]. We expect that firms with more conservative culture would have stronger precautionary motives to hold higher levels of cash to deal with potential adverse shocks or hold higher levels of cash to better prepare for future investment opportunities.

However, high cash holdings in high Confucian culture regions can also be due to the agency motives. Confucianism, as a collectivism culture type, highly emphasizes on family and social ties. Studies have shown that cultural norms that emphasize on family ties can lead to inefficient outcomes, because decision makers usually prioritize family interests at the expense of outsiders (Bertrand and Schoar 2006). Studies using China as setting are often pointing to the collectivism nature of Confucianism as the reason for the prevalence of relational transactions or tunneling activities (Wong et al. 2016; Cheung et al. 2006; Jiang et al. 2010).

Taken together, although the very nature of Confucianism—collectivism and uncertainty avoidance, are expected to lead firms to hold higher levels of cash, but the mechanism underlying high cash holdings remains an empirical question. Even if higher cash holdings is due to stronger precautionary motives, we still can not answer the question of whether stronger precautionary motives is an efficient decision or just an other type of agency conflicts where managers choose to hold excess cash to satisfy their personal preferences instead of maximizing shareholder values, which is also an empirical question to be investigated in this paper.

[13]See Hilary and Hui (2009) for discussions on how local culture environments shape corporate culture.

3 Data and Variables

Our sample consists of all non-financial firms[14] listed on the Shanghai and Shenzhen stock exchanges covering fiscal years from 2000 to 2020[15]. We start with the year of 2000, the first year Chinese-listed firms applied a consistent and unified set of accounting standards. Since our empirical analyses rely heavily on accounting data, we want to make sure the comparability among all observations. We obtain all the financial information on listed firms and economic indicators from CSMAR. We exclude peculiar observations with negative shareholders' equity. Our final sample consists of a maximum number of 31,236 firm-year observations and 3098 unique firms, and the exact number of observations may vary according to model specifications due to missing values on some variables.

The information on Confucian temples are collected from internet search and historical documents, such as local gazetteers, and we finally identify 491 Confucian temples all over the country. We collect information on temple names, locations, historical building time, and cultural heritage protection levels at current times. Information about historical Confucian academies are collected from *Chinese Academies Dictionary* (*Zhongguo Shuyuan Cidian*, in Chinese), which complies information on all Confucian academies built from the Tang Dynasty to the Qing Dynasty (618-1912 AD). We finally identify 7206 Confucian academies all over the country.

We then use Baidu Map Geocoding API to identify the latitude and longitude of the headquarters of all listed firms, Confucian temples and Confucian academies. We measure a region's Confucian culture density as the number of Confucian temples (Confucian academies)

[14]We use the *Shenwan* Industry Classification, the mostly widely used for industry practitioners. Our results hold if we use the China Securities Regulatory Comission (CSRC) Industry Classification.

[15]Since we use a three year window to calculate cash flow volatility, for most of the specifications, the sample periods actually start at 2002.

within 100km radius around firm headquarters, which are our main explanatory variables (raised to the natural log (plus 1)), Confucian100 (ConfuAcademy100). The choice of 100km recognizes the fact that the effect of culture is likely to be local, due to transportation difficulty and lack of cultural exchange in ancient times (Fei 1992). We also check the robustness of our results using a 200km radius.

The main interest of our paper is to identify the national culture effect on corporate cash holdings. The literature employs several alternative definitions of cash ratio, including (1) cash to assets, (2) cash to net assets (net assets equal total assets minus cash), (3) both ratios raised to the natural log. We focus primarily on using cash to assets as the dependent variable, but check the robustness of our main results using other alternative definitions.

Other explanatory variables are motivated by the transaction cost motives and precautionary motives for corporate cash holdings and mainly follow Opler et al. (1999) discussed in Section 2.3. The variables used are as follows:

- Market-to-book, market value of equity plus book value of liabilities, divided by book value of total assets. This ratio is a proxy for investment opportunities, and firms with better investment opportunities would hold more cash since it is more costly for these firms to be financially constrained.

- Size, natural log of book value of assets. There are economies of scale to hold cash.

- Cash flows, earnings before extraordinary items and depreciation minus dividends, divided by net assets. Firms with higher cash flows would accumulate more cash, all else equal.

- Cash flow volatility, standard deviation of cash flows (defined above) over the last three years. Firms with higher cash flow risks would hold more precautionary cash.

- Net working capital, current assets minus current liabilities minus cash, divided by net assets. Net working capital might be substitutes for cash.

- Capital expenditures (Capex), capital expenditures divided by net assets. The relationship between Capex and corporate cash holdings is not clear. Higher Capex can lead firms to save less cash, which would lead to lower level of cash holdings (Riddick and Whited 2009). At the same time, Capex can proxy for financial distress costs, in which case Capex should be positively related to cash holdings.

- Leverage, total debt divided by net assets. The relationship between leverage and corporate cash holdings is also not clear. If debt is sufficiently constraining, firms will use cash to reduce leverage, resulting in a negative relationship. However, based on the hedging argument of Acharya et al. (2007), leverage should be positively correlated with cash holdings.

- Dividend payout, a dummy that equals one if a firm pays cash dividends in a year and zero otherwise. Firms using cash to pay out dividends may decrease the levels of cash holdings.

- R&D, R&D expenditures divided by total sales. This variable is a proxy for growth opportunities. Firms with larger R&D are assumed to have greater costs of financial distress, so would hold higher levels of cash. We follow the literature and set R&D equal to zero when missing.

We winsorize all continuous variables at 1% and 99%. Table 1 tabulates summary statistics for all variables used in the analysis. Our main explanatory variable Confucian100, has mean value of 1.753, and has a large enough standard deviation of 0.752, which makes studying within-country culture density differences across regions viable and meaningful.

4 Empirical Analysis

4.1 The Average Effect of National Culture

Our main analyses explore the relationship between national culture density and corporate cash holdings, including a range of controls for transaction cost motives and precautionary motives for holding cash. Our main specification take the following form:

$$Cash_{it} = \beta_0 + \beta_1 Confucian100_{it} + \Gamma' X_{it} + \varepsilon_{it} \tag{1}$$

where i and t denote firm and year, respectively, while $Cash_{it}$ is the dependent variable, measured as the amount of cash and equivalents as a percentage of total assets, and X_{it} represents a vector of control variables and fixed effects. The main explanatory variable is $Confucian100_{it}$, the number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). The control variables include Market-to-book, Net working capital, Size, Cash flows, Cash flow volatility, R&D, Capex, Leverage, Dividend payout, Industry fixed effect and Year fixed effect. The definitions of these control variables are discussed in Section 3. Standard errors are clustered at firm levels to control for an arbitrary firm-level correlation structure (double clustered at year and firm levels gives very similar results). Unless otherwise noted, all variables are measured on a firm-year basis; we omit the subscripts i and t for notational ease.

Table 2 tabulates results from estimating equation (1). Column (1) is the estimation result without any controls and fixed effects. The result shows a positive relation between regional Confucian culture density and corporate cash holdings (significant at better than 1% level). The coefficient of the main explanatory variable—Confucian100, is 0.01, representing

a 4.8% increase in corporate cash holdings from the sample average if the regional Confucian culture density is one standard deviation higher, which is also economically significant. Column (2) controls industry and year fixed effects, and the coefficient of our main explanatory variable remains significant at better than 1%, but the magnitude becomes smaller at 0.006. In column (3), we control the full set of determinants of corporate cash holdings based on the transaction cost motives and precautionary motives, but do not include Capex, Leverage and Dividend payout. These three variables are likely to be endogenous in the sense that they are jointly determined with corporate cash holdings. Excluding these three variables makes the specification in column (3) a reduced form model (Dittmar et al. 2003). The coefficient of our main explanatory variable remains significant at better than 1% level after adding a range of controls, and the economic magnitude is slightly larger than in column (2). Finally, in column (4), we further control for Capex, Leverage and Dividend payout, and the coefficient of our main explanatory variable remains intact, significant at better than 1% level. The magnitude of the coefficient now stands at 0.006, representing a 2.89% increase in corporate cash holdings from the sample average if the regional Confucian culture density is one standard deviation higher, which is also an economically significant magnitude. The results concerning our main explanatory variable in table 2 are consistent with our prediction that in regions with higher Confucian culture, firms hold higher levels of cash.

As for other control variables, all of them are significant at the 1% level, and the effects are basically consistent with the predictions of theories and prior literature (Opler et al. 1999; Bates et al. 2009). We mainly focus on specification (4) as it has the highest R^2. We find that firms with better investment opportunities (proxy by higher Market-to-book and higher R&D), and higher cash flow risks hold more cash, which is consistent with the prediction of precautionary motives. Firms with higher net working capital hold less cash, which confirms

that net working capital and cash are substitutes. Firms with higher cash flows hold more cash because they can accumulate more cash out of higher cash flows. Firms with larger size hold less cash because of economies of scale. Firms with higher levels of capital expenditures hold less cash, supporting the argument that firms spend more and thus, save less cash as a result of larger capital expenditures. Firms with higher leverage hold more cash, consistent with the hedging argument of Acharya et al. (2007). Somewhat strange is that firms paying out cash dividends in a year ends up with higher cash holdings, which is different from the findings of Opler et al. (1999), but consistent with the findings in Chen et al. (2014), who argue that Chinese listed firms may want to keep sufficient cash to maintain a "sticky" dividend payout.

4.2 Robustness Checks

In this subsection, we perform a variety of tests to make sure our findings are robust. The results are tabulated in Table 3.

4.2.1 Alternative definitions of cash holdings

As discussed in Section 3, the literature use different definitions of corporate cash holdings. We follow the literature and employ these alternative definitions in the regression. The alternative definitions include: cash and equivalents divided by net assets; cash and equivalents divided by total assets and then raised to the natural log; cash and equivalents divided by net assets and then raised to the natural log. The regression results are presented in columns (1) (2) (3) in Table 3. Across these different regressions, the results are largely identical to those obtained using the original cash holdings ratio.

4.2.2 Alternative measures of regional Confucian culture

As argued by Fei (1992), in ancient China, due to transportation difficulties, cultural exchange was limited, so culture was likely to be local, which justifies our choice of 100km radius around corporate headquarters to measure regional culture. As a means of robustness check, we enlarge the range to 200km around the corporate headquarters, and the result is reported in column (4) in Table 3. The coefficient of our main explanatory variable is significant at 5% level. And the coefficient of 0.004 represents a 2.13% increase in corporate cash holdings from the sample average if the regional Confucian culture density is one standard deviation higher, a little smaller than that obtained using the 100km range, but is still economically significant.

Another alternative measure of regional Confucian culture is the number of Confucian academies around the corporate headquarters in historical times, and the regression results are shown in columns (5) (6) in Table 3. The coefficients of our main explanatory variables are both significant at 10% level or better. The coefficient of 0.002 of ConfuAcademy100 represents a 1.58% increase in corporate cash holdings from the sample average if the regional Confucian culture density is one standard deviation higher, which is smaller than that obtained using Confucian100 as the measure (2.89%)[16].

[16]The smaller magnitude of the measure using Confucian academies is consistent with our expectations. As discussed in Section 3, Confucian temples are preserved as cultural heritage protection units and cultural attraction sites for tourists, they are expected to continue to propagate Confucian culture at modern times. Confucian academies, on the other hand, have been destroyed and no longer exist at current times. Thus, using Confucian academies as the cultural density measure would only capture the historical cultural density, but not at modern times, as a result of which, it should have a smaller effect.

4.2.3 Alternative estimation methods

In this subsection, we employ several alternative estimation methods to make sure our findings about the Confucian culture effect are not sensitive to the estimation methods that we use in the main results shown at Table 2. First, we re-estimate our preferred specification in column (4) of Table 2 with full set of control variables and double cluster the standard errors at both firm and year levels. The results shown in column (7) of Table 3 are basically identical to the previous findings. Next, we follow Opler et al. (1999) to re-estimate equation (1) using pooled cross-sectional and Fama–Macbeth methods. The pooled cross-sectional estimation results are shown in column (8) of Table 3. The coefficient of our main explanatory variable is significant at better than 1% level, and the economic magnitude becomes larger than in the fixed effect regression in Table 2. Finally, we employ the Fama–Macbeth method (Fama and MacBeth 1973) and report the estimation results in column (9). With this approach, a cross-sectional regression is estimated each year. This method eliminates the problem of serial correlation in the residuals of a time-series cross-sectional regression. The coefficient of our main explanatory variable is significant at better than 1% level, and the economic magnitude also becomes larger, representing a 4.8% increase in corporate cash holdings from the sample average if the regional Confucian culture density is one standard deviation higher.

4.3 Persistence of High Cash Holdings

Now that we have found higher regional Confucian culture leads to higher corporate cash holdings, the next question interests us is whether this high cash holdings status is also more persistent for firms in these regions. In order to study this question, we employ a two steps

regression approach as follows (Opler et al. 1999):

$$1^{st} \text{ Step: } Cash_{it} = \alpha + \Gamma' X_{it} + \varepsilon_{it}, \tag{2}$$

$$2^{nd} \text{ Step: } ExcessCash_{it} = \beta_0 + \beta_1 ExcessCash_{it-1} + \beta_2 Confucian100_{it} \times ExcessCash_{it-1} + \nu_{it}, \tag{3}$$

where i and t denote firm and year, respectively, while $Cash_{it}$ is the 1^{st} Step dependent variable defined the same as in Table 2, and X_{it} represents a vector of control variables the same as in Table 2 (but without fixed effects). $ExcessCash_{it}$ is a dummy that equals one if the residual of the 1^{st} Step regression is larger than zero, and zero otherwise.

The 1^{st} Step regression is intended to determine the excess cash holdings of a firm in a year. Excess cash holdings are defined as the residuals of the 1^{st} Step regression, in the sense that after controlling for the theoretical determinants of corporate cash holdings based on the transaction cost motives and precautionary motives, higher cash holdings are considered as excess cash. The target cash holdings (fitted value of equation (2) in the 1^{st} Step) is obtained each year from a cross-sectional regression, so this target estimate for a given year is obtained without using information from subsequent years. As a means of robustness check, we also use as the target the fitted values from the Fama–Macbeth cross-sectional model. This model is also estimated annually, so that all information required to estimate the target is available in the year in which the target is estimated.

The 2^{nd} Step is a first-order autoregression model, which is employed to find out whether the high cash holdings (excess cash holdings) status is persistent and how they differ cross firms. The 2^{nd} Step estimation results of this exercise is tabulated in Table 4. Column (1) is estimated using cross-sectional regression method in the 1^{st} Step and considers only Size (transaction cost motives) and Cash flow volatility (precautionary motives) as the

determinants of target cash holdings. In column (2), we also employ the cross-sectional regression method in the 1^{st} Step, but with a full set of controls as in Table 2. While in column (3), we employ the Fama–Macbeth method with a full set of controls in the 1^{st} Step. Across all these estimations in the 1^{st} Step, we find that firms show high persistence in high cash holdings status, with the autoregressive coefficient β_1 larger than 0.4, which means that the probability of being at excess cash holdings status is more than 40% higher for firms that hold excess cash a year before. The coefficient of the interaction term is significant at better than 1% level cross three estimations, which means that the persistence of high cash holdings is even stronger for firms in regions with stronger Confucian culture.

4.4 Instrumental Variable Analysis

In our study, the potential for endogeneity being a problem is less of a concern than in a cross-country analysis. As documented by prior literature, national cultures are major determinants of institutions and statutory laws (Stulz and Williamson 2003; Doidge et al. 2007; Alesina and Giuliano 2015), which makes omitted variable bias a serious concern in a pure cross-country study. In our setting of a single country study, we can keep constant the institutions and other country-specific environments. However, it can still be possible that our measure of regional culture density captures other unobserved factors influencing corporate cash holdings. So we employ an instrumental variable approach to further corroborate our findings.

We follow Chen et al. (2020) and use the river distance to the nearest pine and bamboo sites in the Ming-Qing period (1368-1912 AD) of a prefecture as the IV for our measure of regional Confucian culture density. As discussed in Section 2.2, Confucian temples served as official schools in Imperial China to teach Confucian classics and prepare students for the

civil exam (*keju*), and as official libraries to collect and store tons of books. These two facts determined that Confucian temples heavily relied on access to books, so the availability of books in a region would be a major, if not the most important, determinant of the number of Confucian temples in that region. The same reasoning applies for Confucian academies.

However, there were only 19 printing centers at that time and these 19 printing centers accounted for 80% of all printed books across the country, which meant that access to books varied enormously from one prefecture to another in view of prohibitive overland transport costs. To economise on transport costs, major printing centers were more likely located in close proximity to the main ingredients (ingredients for traditional Chinese woodblock printing)—pine and bamboo. Moreover, these main ingredients required for producing ink and paper were mostly shipped along the river at that time. Against these stylised facts, the river distance to the nearest pine and bamboo sites[17] would be a reasonable IV for the number of Confucian temples at a region.

The instrumented results are tabulated in Table 5. In column (1), we first perform a reduced form estimation, and as the results show, river distance is significantly negative with corporate cash holdings as expected. The reasoning is that farther away a prefecture was from pine and bamboo habitats, it would have worse access to books, thus would have fewer Confucian temples (academies) built at ancient times, resulting in weaker regional Confucian culture density. Next, we perform the 2SLS estimation and report the results in columns (2) and (3). The results show that the first-stage IV estimates are significant at better than 1% level for both our Confucian culture density measures, and the F-statistics show that our IV are by no means a weak instrument. The second-stage results show that

[17]A unique advantage of using locations of pine and bamboo habitats as instrument is that their geographic distributions were exogenous given. This IV has also been confirmed orthogonal to a host of measures of historical economic prosperity, agricultural suitability, geography and contemporary economic prosperity (for more detail discussions on the IV, see Chen et al. 2020).

our instrumented Confucian culture density measure are significant at better than 1% level, and the economic magnitude is much larger for the IV estimates. The coefficient of our instrumented Confucian100 is 0.025, representing a 12% increase in corporate cash holdings from the sample average if the regional Confucian culture density is one standard deviation higher. While for our instrumented ConfuAcademy100, the coefficient is 0.016, representing a 12.68% increase in corporate cash holdings from the sample average if the regional Confucian culture density is one standard deviation higher.

Our IV estimation results show an economic magnitude much larger than in the OLS estimate, suggesting that our endogenous Confucian100 measure biases the estimation towards zero and underestimates the actual effect of national culture on corporate cash holdings. The identified national culture effect plays even such an important role in explaining cash holdings cross firms within the same country. We can expect that in countries with entirely different cultural attributes around the world (e.g., collectivism vs individualism, and other cultural dimensions), firms may show large discrepancies in cash holdings.

5 Heterogeneity in the National Culture Effect

Having identified the Confucian culture effect on corporate cash holdings, we now turn to exploring how this culture effect varies with firm characteristics. Our analyses are guided by an interest in better understanding the mechanisms underlying our main results. We thus begin by laying out potential explanations for the Confucian culture effect, and what patterns each may imply in the data.

Confucianism is a culture type featured with collectivism and uncertainty avoidance. As documented in prior literature (Ahern et al. 2015; Chui et al. 2010), economic agents in such

type of cultural environment are more conservative and have lower tolerance for risk-taking. Thus, they may have strong precautionary motives to hold higher levels of cash, due to being more conservative about future earnings prospects or more cautious about potential adverse shocks. This precautionary motives would likely to be stronger for firms with higher risks and being more financially constrained, because adverse shocks are more likely to happen and more costly for them.

Confucianism as a culture type that put much emphasis on family or social ties could also lead to higher corporate cash holdings by exacerbating the agency motives. Literature has documented that cultural norms that emphasize on family ties can lead to inefficient outcomes, because decision makers usually prioritize family interests at the expense of outsiders (Bertrand and Schoar 2006; Jiang et al. 2010). If agency conflicts play the essential role, we expect that the culture effect is stronger for firms with potentially severer agency problems. Besides, we expect to see worse operating outcomes for these firms since managements tend to make investment or other corporate decisions benefiting their personal interests instead of maximizing shareholder values.

5.1 Heterogeneity in Firm Risks

We begin by examine how the culture effect varies as a function of firm risk attributes. To do so, we include two firm risk measures and their interaction terms with the culture density measure. The two risk measures are: cash flow volatility and idiosyncratic risks of the firm's stocks (Opler et al. 1999; Mikkelson and Partch 2003). Cash flow volatility is defined the same as in Table 2 and already included as a determinant of cash holdings, so we only need to add its interaction term with the culture density measure. As for the idiosyncratic risks measure, we calculate it as the standard deviation of the residuals of the market model in

a year. We present these results in Table 6. We see that both the interaction terms are significantly positive (at least at the 10% level), which indicates that for firms of higher risks, the Confucian culture effect is stronger. This result is consistent the precautionary motives. In other words, firms of higher risks in high Confucian culture regions tend to be more cautious about future adverse shocks, and save more precautionary cash. Across these two specifications, the coefficient of our main explanatory variable remains significantly positive (at least at 10% level)[18].

5.2 Heterogeneity in Firm Financial Constraint Levels

We next look at how the culture effect varies as a function of firms' financial constraint levels. To do so, we include three firm financial constraint measures and their interaction terms with the culture density measure. There are numerous financial constraint measures in the finance literature, such as KZ index (Kaplan and Zingales 1997), WW index (Whited and Wu 2006) and others, but also a lot of debates about their validity. Hadlock and Pierce (2010) find that firm size and age are particularly useful predictors of financial constraint levels, and a lot of other firm characteristics are largely proxies for size and age. So we use firm size, defined the same as in Table 2, and age (number of years since IPO) as the financial constraint measures. Larger firm size and older firms are considered as less financially constrained. Besides, we also measure a firm's access to bank credits, BankLoans, defined as short-term and long-term bank loans divided by net assets (Chen et al. 2014). Firms with better access to bank credits are considered as less financially constrained. We present these results in Table 7. We find that all the three interaction terms are negative, which indicates that the Confucian

[18]The negative sign of one of our risk measure, IdioRisk, is somewhat puzzling (a negative sign is also found at Mikkelson and Partch 2003). A possible explanation is that firms with higher idiosyncratic risks, thus higher information asymmetry, have worse access to outside financing, which lowers their ability to accumulate cash.

culture effect is indeed stronger for more financially constrained firms, consistent with the precautionary motives. While the coefficient of the age interaction term is not precisely estimated, the other two are both significant at better than 5% level. The coefficients of our main explanatory variables all remain significant at better than 5% level.

5.3 Heterogeneity in Firm Agency Conflicts Levels

The last two heterogeneity tests lend strong support for the precautionary motives as the underlying mechanism of the Confucian culture effect, however, we can not sure whether agency motives also play a role. In this subsection, we examine how the culture effect varies as a function of potential agency conflicts. To do so, we include three firm agency conflict measures and their interaction terms with the culture density measure. Since we are also interested in finding out whether agency conflicts cause higher cash holdings, we include these three measures alone before adding interaction terms. We follow the literature and construct three agency conflict measures, IndBoard, InsiderHolding and Monitor (Mikkelson and Partch 2003; Chen et al. 2012). IndBoard is defined as the ratio of independent directors in the board, and we expect that outside directors provide more effective oversight of managers. InsiderHolding is defined as ratio of share holdings by insiders (board directors and top management), and we expect that when insiders' interests are more aligned with outsiders (higher InsiderHolding), agency conflicts would be less severe. Monitor is defined as the product of total shares (as a percentage of total shares outstanding) held by the second to the fifth largest shareholders and a Herfindahl index for the concentration of shares among these shareholders. Monitor captures monitoring intensity by large shareholders other than the controlling shareholder, because they have more at stake and have more power to do

so[19].

We present the results in Table 8. We see that across these specifications, the coefficients of our main explanatory variable remain significantly positive, except in the last specification, which is noisily estimated. This suggests that high cash holdings is unlikely due to agency motives. Moreover, all the interaction terms are not significant at the conventional level, and the signs of these coefficients are mixed. This fact suggests that the Confucian culture effect does not vary with agency conflicts levels, arguing against the agency motives as the essential underlying mechanism.

5.4 Firm Operating Outcomes

Having identified the precautionary motives as the primary mechanism underlying the Confucian culture effect, however, we still can not completely rule out the agency motives. Unduly strong precautionary motives is also a type of agency conflict, in the sense that decision makers hoard excess cash to satisfy their personal preferences instead of making the best use of corporate resources, leading to inefficient operating outcomes. In order to shed light on this question, we now turn to examine how firm performance varies with regional culture density.

We present the results of this section's exercise in Table 9. We first look at firms' investment decisions. Capex in column (1) and (2) is defined as capital expenditures divided by net assets. As shown in column (1), Chinese listed firms on average experience some levels of agency issues of over-investment (or empire building), because firms with worse investment opportunities (lower Market-to-book) invest more. Next, we add the culture

[19]On the other hand, large shareholders' monitoring effectiveness will be attenuated if they face free rider problem (Shleifer and Vishny 1986). Thus, we multiply by a Herfindahl index for the concentration of shares among these shareholders.

measure and its interaction with Market-to-book to examine how the culture would affect firms' investment choices. As shown in column (2), firms in high Confucian culture density regions invest less, and they make better investment decisions (a positive interaction term, significant at 1% level). This result suggests that the culture effect attenuates firms' agency issues of empire building. Then we examine firms' payout policies. Dividend in column (3) is defined as cash dividends in a year divided by net assets. Jensen (1986) argue that entrenched management would hoard excess cash for their own benefits instead of paying out when investment opportunities are low. We do not find evidence to support this entrenched management argument, but on the contrary, we find that firms in stronger Confucian culture regions pay out more cash dividends (significant at 5% level) to shareholders.

Having examined firms' decision makings, we next turn to firms' operating outcomes. Since we have shown that firms in stronger Confucian culture regions make better investment decisions, then we should expect to see these firms achieve higher return on assets and lower profit volatility, in the sense that better investment projects are that yield either higher returns or less risky returns. The results shown in columns (4) and (5) confirm our expectations. Firms in stronger Confucian culture regions achieve higher ROA (earnings before extraordinary items and interest expenses, divided by net assets), and lower profit volatility (StdROA, standard deviation of ROA for a five-year window), both of which are significant at 5% level or better. Finally, we provide further evidence from market investors' reactions. If firms in stronger Confucian culture regions indeed make better investment decisions, then market investors should react more positively to these firms' acquisition decisions. We consider the three-day ($t-1$ to $t+1$)[20] market reaction around the announcement day of acquisitions, and calculate the three day cumulative abnormal returns

[20]Using a five day window yields very similar results.

(CAR) based on a market model estimated from a 250-day window ($t-21$ to $t-270$). The results in column (6) show that market investors indeed react more positively to these firms' acquisition announcements (significant at 10% level).

Taken together, the evidence shown in this subsection and the previous three subsections jointly confirm that our identified Confucian culture effect on corporate cash holdings is due to stronger precautionary motives. The stronger precautionary motives is not associated with severer agency conflicts, but on the contrary, we find these firms make better corporate decisions and achieve more efficient outcomes. To some extent, higher cash holdings can also be viewed as an efficient outcome of less agency issues.

5.5 Heterogeneity in Local Conditions

In this subsection, we want to examine how the culture effect varies as a function of firms' local conditions—the economic and financial conditions at the prefecture level. This exercise aims to solve the potential concerns that our identified culture effect is just limited to some prefectures. For instance, in prefectures with under-developed credit markets, firms may have stronger needs to hold more cash, because access to outside financing is limited and costly. Another potential concern is that the culture effect is just limited to cities that are more closed and exposed to very limited external cultural exchanges. To solve these two potential concerns, we include two measures for local credit market development levels and openness levels respectively. More specifically, we define Credit as total bank loans in a prefecture divided by GDP, and define Openness as FDI (foreign direct investment) in a prefecture divided by GDP. The results are presented in Table 10. We see that cross these regressions, the coefficients of our main explanatory variable remain significant at 1% level, and the economic magnitude is almost the same or somewhat larger. The results suggest

that neither higher corporate cash holdings is caused by local economic conditions, nor the identified culture effect is limited to some localities.

5.6 Board Chairman/CEO Culture Background

By now, we have mainly focused on the regional culture environments around firm headquarters, by following the same logic as in Hilary and Hui (2009) that local cultural environments shape corporate cultures, and thus influence corporate decision makings. However, board chairman/CEO as the top decision makers of a firm, exert the most important influence over firm decision makings. Many of the prior culture literature also solely focus on CEO culture background (Nguyen et al. 2018; Pan et al. 2020). So the question of how chairman/CEO's Confucian culture background interacts with the firm headquarters' local culture environments is worthy of further investigation. One obstacle of this exercise is that the birthplace information of chairman/CEO is not mandatory to disclose in China. We hand collect this information from numerous sources, including prospectus, annual reports, news, and internet search. Despite these efforts, we still only identify about one third of all listed firms' chairman/CEO birthplace information, and in many cases, we only identify their birthplace provinces, but not the prefecture levels.

Notwithstanding these drawbacks, we proceed this exercise and present the results in Table 11. We measure chairman/CEO's Confucian culture background as the number of Confucian academies in their birthplace provinces. Since we lost a large portion of observations, the statistical power may be weak, so we perform the estimation with and without fixed effects. We see from columns (1) and (3) that, higher chairman/CEO's Confucian culture background also lead to higher corporate cash holdings (significant at 5% level), and our main explanatory variable remains significantly positive at 1% level, which

suggests that the chairman/CEO's Confucian culture background and firm headquarters' Confucian culture environments jointly exert an influence on corporate cash holdings. The interaction terms are significantly negative at 1% level, suggesting that as the chairman/CEO's cultural background gets stronger, the effect of firm headquarters' cultural environments becomes marginally weaker. This is rather intuitive. Since chairman/CEO are the firms' top decision makers, if their Confucian background is already very strong and shape the corporate culture into very "Confucianism", then the marginal contribution of the firm headquarters' cultural environments would be low. In columns (2) and (4), we estimate with both industry and year fixed effects. The results are basically the same, but the estimation precision is a little lower.

6 Conclusion

In this paper, we identify national culture as an important determinant affecting corporate cash holdings. Using China and its dominant national culture, Confucianism, as setting, we find that firms located in stronger Confucian culture regions hold higher levels of cash, and this high level cash holding status is also more persistent for these firms. We use an instrumental approach to establish the causal identification of the culture effect, and the instrumented results show a rather compelling economic magnitude of the culture effect. The effect represents a 12% increase in corporate cash holdings from the sample average if the regional Confucian culture density is one standard deviation higher. Our paper is the first to identify the national culture effect and shed light on the phenomena that corporate cash holdings see large discrepancies around the world, even for those nations that are all developed economies with highly developed capital markets and high shareholder rights

protection levels.

We then examine heterogeneity in the culture effect, and observe that it is stronger for riskier and more financially constrained firms, which suggests that the culture effect is due to stronger precautionary motives. The fact that we do not find the culture effect varies with agency conflict levels of firms argue against the agency motives. Moreover, we find that stronger Confucian culture leads to better investment decisions and better operating outcomes, which provides further evidence against agency motives, and on the contrary, indicates that high corporate cash holdings is an efficient outcome due to less agency conflicts. Besides, we confirm that the culture effect is universal and not limited to only some regions. Finally, we show that both the top decision makers' cultural background and the firm headquarters' regional culture environment jointly exert an influence on corporate cash holdings.

References

Acharya, V. V., H. Almeida, and M. Campello (2007). Is cash negative debt? a hedging perspective on corporate financial policies. *Journal of financial intermediation 16*(4), 515–554.

Ahern, K. R., D. Daminelli, and C. Fracassi (2015). Lost in translation? the effect of cultural values on mergers around the world. *Journal of Financial Economics 117*(1), 165–189.

Alesina, A. and P. Giuliano (2015). Culture and institutions. *Journal of Economic Literature 53*(4), 898–944.

Allen, F., J. Qian, and M. Qian (2005). Law, finance, and economic growth in china. *Journal of financial economics 77*(1), 57–116.

Almeida, H., M. Campello, and M. S. Weisbach (2004). The cash flow sensitivity of cash. *The journal of finance 59*(4), 1777–1804.

Anderson, C. W., M. Fedenia, M. Hirschey, and H. Skiba (2011). Cultural influences on home bias and international diversification by institutional investors. *Journal of Banking & Finance 35*(4), 916–934.

Bates, T. W., K. M. Kahle, and R. M. Stulz (2009). Why do us firms hold so much more cash than they used to? *The journal of finance 64*(5), 1985–2021.

Baumol, W. J. (1952). The transactions demand for cash: An inventory theoretic approach. *The Quarterly journal of economics*, 545–556.

Begenau, J. and B. Palazzo (2021). Firm selection and corporate cash holdings. *Journal of Financial Economics 139*(3), 697–718.

Bell, D., D. A. Bell, H. Chaibong, et al. (2003). *Confucianism for the modern world*. Cambridge University Press.

Bereskin, F., S. K. Byun, M. S. Officer, and J.-M. Oh (2018). The effect of cultural similarity on mergers and acquisitions: Evidence from corporate social responsibility. *Journal of financial and quantitative analysis 53*(5), 1995–2039.

Berger, A. N., X. Li, C. S. Morris, and R. A. Roman (2021). The effects of cultural values on bank failures around the world. *Journal of Financial and Quantitative Analysis 56*(3), 945–993.

Bertrand, M. and A. Schoar (2006). The role of family in family firms. *Journal of economic perspectives 20*(2), 73–96.

Beugelsdijk, S. and B. Frijns (2010). A cultural explanation of the foreign bias in international asset allocation. *Journal of Banking & Finance 34*(9), 2121–2131.

Campello, M., E. Giambona, J. R. Graham, and C. R. Harvey (2011). Liquidity management and corporate investment during a financial crisis. *The Review of Financial Studies 24*(6), 1944–1979.

Chen, D., S. Li, J. Z. Xiao, and H. Zou (2014). The effect of government quality on corporate cash holdings. *Journal of Corporate Finance 27*, 384–400.

Chen, Q., X. Chen, K. Schipper, Y. Xu, and J. Xue (2012). The sensitivity of corporate cash holdings to corporate governance. *The Review of Financial Studies 25*(12), 3610–3644.

Chen, T., J. K.-s. Kung, and C. Ma (2020). Long live keju! the persistent effects of china's civil examination system. *The economic journal 130*(631), 2030–2064.

Chen, Y., P. Y. Dou, S. G. Rhee, C. Truong, and M. Veeraraghavan (2015). National culture and corporate cash holdings around the world. *Journal of Banking & Finance 50*, 1–18.

Cheung, Y.-L., P. R. Rau, and A. Stouraitis (2006). Tunneling, propping, and expropriation: Evidence from connected party transactions in hong kong. *Journal of Financial economics 82*(2), 343–386.

Chui, A. C., S. Titman, and K. J. Wei (2010). Individualism and momentum around the world. *The Journal of Finance 65*(1), 361–392.

Cunha, I. and J. Pollet (2020). Why do firms hold cash? evidence from demographic demand shifts. *The Review of Financial Studies 33*(9), 4102–4138.

Denis, D. J. and V. Sibilkov (2010). Financial constraints, investment, and the value of cash holdings. *The Review of Financial Studies 23*(1), 247–269.

Dittmar, A. and J. Mahrt-Smith (2007). Corporate governance and the value of cash holdings. *Journal of financial economics 83*(3), 599–634.

Dittmar, A., J. Mahrt-Smith, and H. Servaes (2003). International corporate governance and corporate cash holdings. *Journal of Financial and Quantitative analysis 38*(1), 111–133.

Doidge, C., G. A. Karolyi, and R. M. Stulz (2007). Why do countries matter so much for corporate governance? *Journal of financial economics 86*(1), 1–39.

Eun, C. S., L. Wang, and S. C. Xiao (2015). Culture and r2. *Journal of Financial Economics 115*(2), 283–303.

Fama, E. F. and J. D. MacBeth (1973). Risk, return, and equilibrium: Empirical tests. *Journal of political economy 81*(3), 607–636.

Faulkender, M. W., K. W. Hankins, and M. A. Petersen (2019). Understanding the rise in corporate cash: Precautionary savings or foreign taxes. *The Review of Financial Studies 32*(9), 3299–3334.

Favara, G., J. Gao, and M. Giannetti (2020). Uncertainty, access to debt, and firm precautionary behavior. *Kelley School of Business Research Paper* (17-64), 17–17.

Fei, X. (1992). *From the soil*. university of California Press.

Hadlock, C. J. and J. R. Pierce (2010). New evidence on measuring financial constraints: Moving beyond the kz index. *The Review of Financial Studies 23*(5), 1909–1940.

Han, S. and J. Qiu (2007). Corporate precautionary cash holdings. *Journal of corporate finance 13*(1), 43–57.

Harford, J. (1999). Corporate cash reserves and acquisitions. *The Journal of Finance 54*(6), 1969–1997.

Harford, J., S. Klasa, and W. F. Maxwell (2014). Refinancing risk and cash holdings. *The Journal of Finance 69*(3), 975–1012.

Hilary, G. and K. W. Hui (2009). Does religion matter in corporate decision making in america? *Journal of financial economics 93*(3), 455–473.

Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Sage publications.

Hofstede, G. and G. H. Hofstede (1984). *Culture's consequences: International differences in work-related values*, Volume 5. sage.

Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review 76*(2), 323–329.

Jensen, M. C. (1993). The modern industrial revolution, exit, and the failure of internal control systems. *the Journal of Finance 48*(3), 831–880.

Jiang, G., C. M. Lee, and H. Yue (2010). Tunneling through intercorporate loans: The china experience. *Journal of financial economics 98*(1), 1–20.

Kalcheva, I. and K. V. Lins (2007). International evidence on cash holdings and expected managerial agency problems. *The review of financial studies 20*(4), 1087–1112.

Kaplan, S. N. and L. Zingales (1997). Do investment-cash flow sensitivities provide useful measures of financing constraints? *The quarterly journal of economics 112*(1), 169–215.

Levine, R., N. Loayza, and T. Beck (2000). Financial intermediation and growth: Causality and causes. *Journal of monetary Economics 46*(1), 31–77.

Li, K., D. Griffin, H. Yue, and L. Zhao (2013). How does culture influence corporate risk-taking? *Journal of Corporate Finance 23*, 1–22.

Licht, A. N., C. Goldschmidt, and S. H. Schwartz (2005). Culture, law, and corporate governance. *International review of law and economics 25*(2), 229–255.

Mansi, S. and W. Maxwell (2008). Corporate governance and firm cash holdings. *Journal of Financial Economics 87*(3), 535–555.

Meltzer, A. H. (1963). The demand for money: A cross-section study of business firms. *The Quarterly Journal of Economics 77*(3), 405–422.

Mikkelson, W. H. and M. M. Partch (2003). Do persistent large cash reserves hinder performance? *Journal of financial and quantitative analysis 38*(2), 275–294.

Miller, M. H. and D. Orr (1966). A model of the demand for money by firms. *The Quarterly journal of economics 80*(3), 413–435.

Morishima, M. (1982). *Why has Japan 'Succeeded'?: Western technology and the Japanese ethos*. Cambridge University Press.

Mulligan, C. B. (1997). Scale economies, the value of time, and the demand for money: Longitudinal evidence from firms. *Journal of Political Economy 105*(5), 1061–1079.

Nguyen, D. D., J. Hagendorff, and A. Eshraghi (2018). Does a ceo's cultural heritage affect performance under competitive pressure? *The Review of Financial Studies 31*(1), 97–141.

Opler, T., L. Pinkowitz, R. Stulz, and R. Williamson (1999). The determinants and implications of corporate cash holdings. *Journal of financial economics 52*(1), 3–46.

Pan, Y., S. Siegel, and T. Yue Wang (2020). The cultural origin of ceos' attitudes toward uncertainty: Evidence from corporate acquisitions. *The Review of Financial Studies 33*(7), 2977–3030.

Pinkowitz, L., R. M. Stulz, and R. Williamson (2003). Do firms in countries with poor protection of investor rights hold more cash?

Pinkowitz, L., R. M. Stulz, and R. Williamson (2016). Do us firms hold more cash than foreign firms do? *The Review of Financial Studies 29*(2), 309–348.

Riddick, L. A. and T. M. Whited (2009). The corporate propensity to save. *The Journal of Finance 64*(4), 1729–1766.

Rozman, G. (2014). *The East Asian region: Confucian heritage and its modern adaptation*, Volume 1179. Princeton University Press.

Shleifer, A. and R. W. Vishny (1986). Large shareholders and corporate control. *Journal of political economy 94*(3, Part 1), 461–488.

Song, Z., K. Storesletten, and F. Zilibotti (2011). Growing like china. *American economic review 101*(1), 196–233.

Stulz, R. M. (2005). The limits of financial globalization. *The journal of finance 60*(4), 1595–1638.

Stulz, R. M. and R. Williamson (2003). Culture, openness, and finance. *Journal of financial Economics 70*(3), 313–349.

Subrahmanyam, M. G., D. Y. Tang, and S. Q. Wang (2017). Credit default swaps, exacting creditors and corporate liquidity management. *Journal of Financial Economics 124*(2), 395–414.

Wei, S.-J. and X. Zhang (2011). The competitive saving motive: Evidence from rising sex ratios and savings rates in china. *Journal of political Economy 119*(3), 511–564.

Whited, T. M. and G. Wu (2006). Financial constraints risk. *The Review of Financial Studies 19*(2), 531–559.

Wong, T. et al. (2016). Corporate governance research on listed firms in china: Institutions, governance and accountability. *Foundations and Trends® in Accounting 9*(4), 259–326.

Zheng, X., S. El Ghoul, O. Guedhami, and C. C. Kwok (2012). National culture and corporate debt maturity. *Journal of Banking & Finance 36*(2), 468–488.

Table 1: **Summary Statistics**

This table reports descriptive statistics for the key variables of our empirical analyses. All variables are defined in Table A1.

	N	Mean	SD	P25	P50	P75
Cash/Assets	31,236	0.156	0.109	0.079	0.130	0.204
Cash/Net Assets	31,236	0.211	0.206	0.086	0.150	0.257
Confucian100	31,236	1.753	0.752	1.386	1.946	2.398
Confucian200	31,236	2.620	0.832	2.565	2.773	3.178
ConfuAcademy100	31,236	4.154	1.237	3.892	4.489	4.963
ConfuAcademy200	31,236	5.262	1.286	4.984	5.756	6.033
SalesGrowth	31,198	0.194	0.617	-0.045	0.097	0.265
Market-to-book	31,150	2.309	1.762	1.254	1.730	2.636
Leverage	31,235	0.570	0.238	0.395	0.570	0.735
Net working capital	31,235	-0.011	0.254	-0.169	-0.009	0.158
Capex	31,228	0.042	0.079	0.005	0.023	0.064
Age	31,236	11.865	5.989	7.000	11.000	16.000
R&D	31,236	0.022	0.050	0.000	0.001	0.033
Size	31,236	22.119	1.362	21.222	21.988	22.884
Cash flows	31,235	0.044	0.080	0.022	0.048	0.080
Cash flow volatility	31,224	0.050	0.062	0.017	0.030	0.056
Dividend payout(0/1)	31,236	0.581	0.493	0.000	1.000	1.000
Dividend	31,235	0.013	0.027	0.000	0.004	0.016
ROA	31,235	0.056	0.092	0.028	0.054	0.091
StdROA	20,271	0.056	0.071	0.017	0.032	0.064
BankLoans	31,235	0.202	0.164	0.057	0.180	0.314
IdioRisk	30,356	0.012	0.004	0.010	0.011	0.013
CEO	9,804	5.417	1.211	5.170	5.759	6.349
Chair	17,114	5.422	1.209	5.231	5.759	6.273
RiverDistance	31,236	1.180	1.171	0.000	0.557	2.433
IndBoard	31,104	0.366	0.061	0.333	0.333	0.400
Monitor	31,233	7.328	2.889	5.517	7.934	9.577
InsiderHolding	30,083	0.054	0.114	0.000	0.000	0.021
Credit	23,434	0.156	0.339	0.087	0.142	0.192
Openness	24,682	0.035	0.040	0.016	0.029	0.045

Table 2: **Confucian Culture on Corporate Cash Holdings**

This table examines the relation between corporate cash holdings and the number of Confucian temples with the following specification:

$$Cash_{it} = \beta_0 + \beta_1 Confucian100_{it} + \Gamma' X_{it} + \varepsilon_{it},$$

where i and t denote firm and year, respectively, while $Cash_{it}$ is the dependent variable, measured as the amount of cash and equivalents as a percentage of total assets, and X_{it} represents a vector of control variables and fixed effects. The main independent variable is Confucian100, the number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). Net assets are total assets minus cash and equivalents. The control variables include Market-to-book, the market value of equity plus the book value of liabilities, divided by the book value of total assets; Net working capital, current assets minus current liabilities minus cash and equivalents, divided by net assets; Size, log of total assets; Cash flows, earnings before extraordinary items and depreciation minus dividends, divided by net assets; Cash flow volatility, standard deviation of cash flows (defined above) over the last three years; R&D, R&D expenditures divided by total sales; Capex, capital expenditures divided by net assets; Leverage, total debt divided by net assets; Dividend payout, a dummy that equals one if a firm pays cash dividends in a year and zero otherwise; Industry fixed effect; Year fixed effect. Standard errors, reported in brackets, are clustered at firm levels. ***, **, and * denote statistical significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)	(3)	(4)
Confucian100	0.010***	0.006***	0.007***	0.006***
	[0.002]	[0.002]	[0.002]	[0.002]
Net working capital			-0.052***	-0.020***
			[0.006]	[0.007]
Market-to-book			0.005***	0.005***
			[0.001]	[0.001]
Cash flows			0.383***	0.377***
			[0.016]	[0.017]
Cash flow volatility			0.213***	0.241***
			[0.022]	[0.022]
Size			-0.005***	-0.010***
			[0.001]	[0.001]
R&D			0.092***	0.114***
			[0.031]	[0.034]
Capex				-0.094***
				[0.010]
Leverage				0.082***
				[0.008]
Dividend payout				0.033***
				[0.002]
Fixed effects	No	Ind, Year	Ind, Year	Ind, Year
Observations	31,236	31,236	31,139	31,133
R-squared	0.005	0.079	0.176	0.209

Table 3: **Confucian Culture on Corporate Cash Holdings: Robustness Checks**

This table performs a battery of robustness checks on the relation between corporate cash holdings and the density of Confucian culture with the following specification:

$$Y_{it} = \beta_0 + \beta_1 Confucian_{it} + \Gamma' X_{it} + \varepsilon_{it},$$

where i and t denote firm and year, respectively, while Y_{it} and $Confucian_{it}$ are dependent variables and main independent variables to be specified below. Cash/Assets is measured as the amount of cash and equivalents as a percentage of total assets. Cash/Net Assets is measured as the amount of cash and equivalents as a percentage of net assets. log(Cash/Assets) is Cash/Assets raised to the natural log (plus 1). log(Cash/Net Assets) is Cash/Net Assets raised to the natural log (plus 1). Confucian100/Confucian200 is the number of Confucian temples within $100km/200km$ radius around the corporate headquarters raised to the natural log (plus 1). ConfuAcademy100/ConfuAcademy200 is the number of Confucian academies within $100km/200km$ radius around the corporate headquarters raised to the natural log (plus 1). X_{it} represents a vector of control variables and fixed effects the same as those in Table 2. Columns (1)-(6) are panel regressions with standard errors clustered at firm levels. In column (7), standard errors are doubled clustered at firm and year levels. In column (8), pooled cross sectional estimation method is employed, with robust standard errors. In column (9), Fama–MacBeth estimation method is employed. Standard errors are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, 10% level, respectively.

	(1) Cash/Net Assets	(2) log(Cash/Assets)	(3) log(Cash/Net Assets)	(4) Cash/Assets	(5) Cash/Assets	(6) Cash/Assets	(7) Cash/Assets (double clustered S.E.)	(8) Cash/Assets (pooled cross-sectional)	(9) Cash/Assets (Fama–Macbeth)
Confucian100	0.008**	0.005***	0.007***				0.006***	0.009***	0.010***
	[0.003]	[0.001]	[0.002]				[0.002]	[0.001]	[0.001]
Confucian200				0.004**					
				[0.002]					
ConfuAcademy100					0.002*				
					[0.001]				
ConfuAcademy200						0.002**			
						[0.001]			
Net working capital	-0.060***	-0.014**	-0.035***	-0.020***	-0.020***	-0.020***	-0.020**	-0.009***	-0.015***
	[0.013]	[0.006]	[0.009]	[0.007]	[0.007]	[0.007]	[0.007]	[0.003]	[0.004]
Market-to-book	0.011***	0.004***	0.008***	0.005***	0.005***	0.005***	0.005***	0.007***	0.005***
	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
Cash flows	0.698***	0.310***	0.505***	0.376***	0.377***	0.376***	0.377***	0.363***	0.414***
	[0.036]	[0.013]	[0.024]	[0.017]	[0.017]	[0.017]	[0.029]	[0.011]	[0.025]
Cash flow volatility	0.523***	0.188***	0.349***	0.240***	0.239***	0.240***	0.241***	0.259***	0.218***
	[0.047]	[0.018]	[0.032]	[0.022]	[0.022]	[0.022]	[0.029]	[0.015]	[0.023]
Size	-0.019***	-0.009***	-0.014***	-0.010***	-0.010***	-0.010***	-0.010***	-0.009***	-0.011***
	[0.003]	[0.001]	[0.002]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]	[0.001]
R&D	0.199***	0.095***	0.148***	0.115***	0.116***	0.116***	0.114***	0.221***	0.284***
	[0.067]	[0.027]	[0.046]	[0.034]	[0.034]	[0.034]	[0.035]	[0.040]	[0.063]
Capex	-0.184***	-0.076***	-0.130***	-0.095***	-0.095***	-0.095***	-0.094***	-0.130***	-0.131***
	[0.019]	[0.008]	[0.013]	[0.010]	[0.010]	[0.010]	[0.008]	[0.008]	[0.005]
Leverage	0.140***	0.069***	0.106***	0.082***	0.082***	0.082***	0.082***	0.083***	0.093***
	[0.016]	[0.007]	[0.011]	[0.008]	[0.008]	[0.008]	[0.009]	[0.004]	[0.006]
Dividend payout	0.056***	0.028***	0.043***	0.033***	0.033***	0.033***	0.033***	0.033***	0.033***
	[0.004]	[0.002]	[0.003]	[0.002]	[0.002]	[0.002]	[0.002]	[0.001]	[0.001]
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Observations	31,133	31,133	31,133	31,133	31,133	31,133	31,133	31,133	31,133
R-squared	0.199	0.209	0.206	0.208	0.208	0.208	0.209	0.155	0.173

Table 4: **Time Series Analysis of Corporate Cash Holdings**

This table examines whether firms consistently hold excess cash, or vice versa. Two steps of regression analyses are performed as follows, and only the 2^{nd} Step results are reported.

$$1^{st} \text{ Step: } Cash_{it} = \alpha + \Gamma^{'} X_{it} + \varepsilon_{it},$$

$$2^{nd} \text{ Step: } ExcessCash_{it} = \beta_0 + \beta_1 ExcessCash_{it-1} + \beta_2 Confucian100_{it} \times ExcessCash_{it-1} + \nu_{it},$$

where i and t denote firm and year, respectively, while $Cash_{it}$ is the 1^{st} Step dependent variable, and X_{it} represents a vector of control variables. Cash is measured as cash and equivalents as a percentage of total assets. Confucian100 is the number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). ExcessCash is a dummy that equals one if the residual of the 1^{st} Step regression is larger than zero and zero otherwise. Net assets are total assets minus cash and equivalents. The control variables in the 1^{st} Step include Market-to-book, the market value of equity plus the book value of liabilities, divided by the book value of total assets; Net working capital, current assets minus current liabilities minus cash and equivalents, divided by net assets; Size, log of total assets; Cash flows, earnings before extraordinary items and depreciation minus dividends, divided by net assets; Cash flow volatility, standard deviation of cash flows (defined above) over the last three years; R&D, R&D expenditures divided by total sales; Capex, capital expenditures divided by net assets; Leverage, total debt divided by net assets; Dividend payout, a dummy that equals one if a firm pays cash dividends in a year and zero otherwise. In column (1), residuals from the 1^{st} Step regression is obtained each year from a cross-sectional regression of cash holdings on Size and Cash flow volatility. In column (2), residuals from the 1^{st} Step regression is obtained each year from a cross-sectional regression of cash holdings on full sets of controls. In column (3), residuals from the 1^{st} Step regression is obtained each year from Fama-Macbeth regression of cash holdings on full sets of controls. Robust standard errors are reported in brackets. ***, **, and * denote statistical significance at the 1%, 5%, 10% level, respectively.

	(1) Size & Cash flow volatility	(2) Full sets of controls	(3) Full sets of controls (Fama-Macbeth)
Excess_{t-1}	0.449***	0.429***	0.414***
	[0.012]	[0.012]	[0.011]
$\text{Confucian100} \times \text{Excess}_{t-1}$	0.029***	0.021***	0.027***
	[0.006]	[0.006]	[0.006]
Intercept	0.200***	0.220***	0.227***
	[0.003]	[0.003]	[0.003]
Observations	31,219	31,077	31,077
R-squared	0.253	0.218	0.215

Table 5: **Confucian Culture on Corporate Cash Holdings: Instrumented Results**

This table examines the relation between corporate cash holdings and the number of Confucian temples (academies) using two-stage least square regressions (2SLS). The regression model is

$$1^{st} \text{ Step: } Confucian_{it} = \delta_0 + \delta_1 RiverDistance_{it} + \Delta^{'} X_{it} + \eta_{it},$$

$$2^{nd} \text{ Step: } Cash_{it} = \beta_0 + \beta_1 \widehat{Confucian}_{it} + \Gamma^{'} X_{it} + \varepsilon_{it},$$

where i and t denote firm and year, respectively. $Cash_{it}$ is the dependent variable, measured as the amount of cash and equivalents as a percentage of total assets. $RiverDistance_{it}$ is the instrumental variable, measured as the corporate headquarter prefecture's river distance to its nearest bamboo and pine habitats in the Ming-Qing period, raised to the natural log (plus 1). X_{it} represents a vector of control variables and fixed effects the same as those in table 2. $Confucian100_{it}$ is the number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). $ConfuAcademy100_{it}$ is the number of Confucian academies within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). In column (1), a reduced form estimation is performed and reported. In column (2), the 2SLS estimation is performed and Confucian100 is instrumented. In column (3), the 2SLS estimation is performed and ConfuAcademy100 is instrumented. Standard errors, reported in brackets, are clustered at firm levels. ***, **, and * denote statistical significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)	(3)
	Reduced form	2SLS(Confucian100)	2SLS(ConfuAcademy100)
Confucian100		0.025***	
		[0.004]	
ConfuAcademy100			0.016***
			[0.003]
RiverDistance	-0.007***	-0.271***(first stage)	-0.438***(first stage)
	[0.001]	[0.013]	[0.023]
First stage F-stat		405.62	373.22
Controls	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes
Observations	31,133	31,133	31,133
R-squared	0.212	0.191	0.185

Table 6: **Confucian Culture on Corporate Cash Holdings by Risk Characteristics**

This table examines the relation between corporate cash holdings and the number of Confucian temples and its interaction with firm risk characteristics with the following specification:

$$Cash_{it} = \beta_0 + \beta_1 Confucian100_{it} + \beta_2 Risk_{it} + \beta_3 Confucian100_{it} \times Risk_{it} + \Gamma' X_{it} + \varepsilon_{it},$$

where i and t denote firm and year, respectively, while $Cash_{it}$ is the dependent variable, measured as the amount of cash and equivalents as a percentage of total assets, $Risk_{it}$ is firm's risk characteristics to be specified below, and X_{it} represents a vector of control variables and fixed effects the same as those in table 2. The main independent variable is Confucian100, the number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). In column (1), Cash flow volatility is used to measure firm risks. In column (2), idiosyncratic risks of the firm's stock returns calculated as the standard deviation of the residuals of the market model in a year. Standard errors, reported in brackets, are clustered at firm levels. ***, **, and * denote statistical significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)
Confucian100	0.003*	0.026**
	[0.002]	[0.011]
Cash flow volatility	0.166***	
	[0.049]	
Confucian100×Cash flow volatility	0.045*	
	[0.026]	
IdioRisk		-0.063***
		[0.009]
Confucian100×IdioRisk		0.005**
		[0.002]
Controls	Yes	Yes
Fixed effects	Yes	Yes
Observations	31,133	30,344
R-squared	0.209	0.216

Table 7: **Confucian Culture on Corporate Cash Holdings by Financial Constraint**

This table examines the relation between corporate cash holdings and the number of Confucian temples and its interaction with firm financial constrained characteristics with the following specification:

$$Cash_{it} = \beta_0 + \beta_1 Confucian100_{it} + \beta_2 FinConstraint_{it} + \beta_3 Confucian100_{it} \times FinConstraint_{it} + \Gamma' X_{it} + \varepsilon_{it},$$

where i and t denote firm and year, respectively, while $Cash_{it}$ is the dependent variable, measured as the amount of cash and equivalents as a percentage of total assets, $FinConstraint_{it}$ is firm's financial constrained characteristics to be specified below, and X_{it} represents a vector of control variables and fixed effects the same as those in table 2. The main independent variable is Confucian100, the number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). Size is measured as log of total assets. Age is measured as number of years since IPO raised to the natural log. BankLoans is measured as sum of short-term and long-term loans borrowed from banks divided by net assets. Size, Age, and BankLoans are used to represent $FinConstraint_{it}$ in columns (1), (2), (3) respectively. Standard errors, reported in brackets, are clustered at firm levels. ***, **, and * denote statistical significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)	(3)
Confucian100	0.089***	0.014**	0.010***
	[0.029]	[0.006]	[0.003]
Size	-0.001		
	[0.003]		
Confucian100×Size	-0.004***		
	[0.001]		
Age		-0.002	
		[0.006]	
Confucian100×Age		-0.003	
		[0.003]	
BankLoans			-0.134***
			[0.020]
Confucian100×BankLoans			-0.020**
			[0.010]
Controls	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes
Observations	31,133	31,132	31,133
R-squared	0.194	0.194	0.243

Table 8: **Confucian Culture on Corporate Cash Holdings by Agency Conflicts**

This table examines the relation between corporate cash holdings and the number of Confucian temples and its interaction with potential agency conflicts with the following specification:

$$Cash_{it} = \beta_0 + \beta_1 Confucian100_{it} + \beta_2 Agency_{it} + \beta_3 Confucian100_{it} \times Agency_{it} + \Gamma' X_{it} + \varepsilon_{it},$$

where i and t denote firm and year, respectively, while $Cash_{it}$ is the dependent variable, measured as the amount of cash and equivalents as a percentage of total assets, $Agency_{it}$ is firm's potential agency conflicts measures to be specified below, and X_{it} represents a vector of control variables and fixed effects the same as those in table 2. The main independent variable is Confucian100, the number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). IndBoard is as the number of independent board directors divided by total number of directors . InsiderHolding is the ratio of shares held by the board and management teams to total shares. Monitor is the product of total shares (as a percentage of total shares outstanding) held by the second to the fifth largest shareholders and a Herfindahl index for the concentration of shares among these shareholders. IndBoard, InsiderHolding, and Monitor are used to represent $Agency_{it}$ in columns (1)&(2), (3)&(4), (5)&(6) respectively. Standard errors, reported in brackets, are clustered at firm levels. ***, **, and * denote statistical significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Confucian100	0.006***	0.017*	0.006***	0.006***	0.006***	0.006
	[0.002]	[0.009]	[0.002]	[0.002]	[0.002]	[0.004]
IndBoard	-0.000	0.055				
	[0.018]	[0.053]				
Confucian100×IndBoard		-0.031				
		[0.026]				
InsiderHolding			-0.022**	-0.040		
			[0.011]	[0.026]		
Confucian100×InsiderHolding				0.010		
				[0.013]		
Monitor					-0.000	0.000
					[0.000]	[0.001]
Confucian100×Monitor						-0.000
						[0.000]
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	31,010	31,010	29,986	29,986	31,131	31,131
R-squared	0.207	0.208	0.210	0.210	0.209	0.209

Table 9: **Confucian Culture and Firm Operating Outcomes**

This table examines the relation between firm operating outcomes and the number of Confucian temples with the following specification:

$$Y_{it} = \beta_0 + \beta_1 Confucian100_{it} + \Gamma^{'} X_{it} + \varepsilon_{it},$$

where i and t denote firm and year, respectively, while Y_{it} is dependent variables to be specified below, and X_{it} represents a vector of control variables and fixed effects. The main independent variable is Confucian100, the number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). Net assets are total assets minus cash and equivalents. The control variables include Market-to-book, the market value of equity plus the book value of liabilities, divided by the book value of total assets; Cash flows, earnings before extraordinary items and depreciation minus dividends, divided by net assets; SalesGrowth, growth rate of total sales; Industry fixed effect; Year fixed effect. Capex is measured as capital expenditures divided by net assets. Dividend is measured as cash dividends payout divided by net assets. AquiReturn is a three-day window (one day before the acquisition announcement to one day after the acquisition announcement) cumulative abnormal returns for an acquisition event based on a market model estimated from a 250-days window. ROA is calculated as earnings before extraordinary items and interest expenses divided by net assets. StdROA is the standard deviation of ROA for a five-year window. Standard errors, reported in brackets, are clustered at firm levels. ***, **, and * denote statistical significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	Capex	Capex	Dividend	ROA	StdROA	AquiReturn
Confucian100		-0.003**	0.001**	0.001**	-0.005***	0.012*
		[0.001]	[0.000]	[0.000]	[0.001]	[0.007]
Cash flows	0.131***	0.131***	0.109***	1.003***	-0.227***	0.057*
	[0.007]	[0.007]	[0.004]	[0.009]	[0.015]	[0.034]
SalesGrowth	0.020***	0.020***	-0.002***	0.001***	0.002**	0.001
	[0.001]	[0.001]	[0.000]	[0.001]	[0.001]	[0.001]
Market-to-book	-0.005***	-0.007***	0.002***	0.004***	0.011***	0.008
	[0.000]	[0.001]	[0.000]	[0.000]	[0.001]	[0.005]
Confucian100×Market-to-book		0.002***				
		[0.000]				
Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	31,122	31,122	31,122	31,122	20,183	4631
R-squared	0.117	0.118	0.161	0.785	0.157	0.009

Table 10: **Confucian Culture on Corporate Cash Holdings by Local Conditions**

This table examines the relation between corporate cash holdings and the number of Confucian temples with additional control variables proxy for local credit market development and openness:

$$Cash_{it} = \beta_0 + \beta_1 Confucian100_{it} + \beta_2 Credit_{it} + \beta_3 Confucian100_{it} \times Credit_{it} + \Gamma' X_{it} + \varepsilon_{it},$$

$$Cash_{it} = \beta_0 + \beta_1 Confucian100_{it} + \beta_2 Openness_{it} + \beta_3 Confucian100_{it} \times Openness_{it} + \Gamma' X_{it} + \varepsilon_{it},$$

where i and t denote firm and year, respectively, while $Cash_{it}$ is the dependent variable, measured as the amount of cash and equivalents as a percentage of total assets, and X_{it} represents a vector of control variables and fixed effects the same as those in table 2. The main independent variable is Confucian100, the number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). Credit is a proxy for local credit market development, measured as total bank loans divided by GDP at the prefecture level. Openness is a proxy for local openness, measured as total FDI (foreign direct investment) divided by GDP at the prefecture level. Standard errors, reported in brackets, are clustered at firm levels. ***, **, and * denote statistical significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)	(3)	(4)
Confucian100	0.006***	0.006***	0.007***	0.007***
	[0.002]	[0.002]	[0.002]	[0.002]
Credit	0.002	0.009		
	[0.002]	[0.015]		
Confucian100×Credit		-0.003		
		[0.007]		
Openness			0.035*	0.059
			[0.021]	[0.081]
Confucian100×Openness				-0.013
				[0.041]
Controls	Yes	Yes	Yes	Yes
Fixed effects	Yes	Yes	Yes	Yes
Observations	23,340	23,340	24,589	24,589
R-squared	0.224	0.224	0.219	0.219

Table 11: **Board Chairman/CEO Confucian Culture Background**

This table examines the relation between corporate cash holdings and the number of Confucian temples with additional control variables proxy for board chairman and CEO birthplace Confucian culture density:

$$Cash_{it} = \beta_0 + \beta_1 Confucian100_{it} + \beta_2 Chair_{it} + \beta_3 Confucian100_{it} \times Chair_{it} + \Gamma' X_{it} + \varepsilon_{it},$$

$$Cash_{it} = \beta_0 + \beta_1 Confucian100_{it} + \beta_2 CEO_{it} + \beta_3 Confucian100_{it} \times CEO_{it} + \Gamma' X_{it} + \varepsilon_{it},$$

where i and t denote firm and year, respectively, while $Cash_{it}$ is the dependent variable, measured as the amount of cash and equivalents as a percentage of total assets, and X_{it} represents a vector of control variables and fixed effects the same as those in table 2. The main independent variable is Confucian100, the number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). Chair/CEO is a proxy for board chairman/CEO's birthplace Confucian culture, measured as the total number of Confucian academies in birthplace provinces raised to the natural log. Standard errors, reported in brackets, are clustered at firm levels. ***, **, and * denote statistical significance at the 1%, 5%, 10% level, respectively.

	(1)	(2)	(3)	(4)
Confucian100	0.019***	0.013***	0.023***	0.015***
	[0.004]	[0.004]	[0.006]	[0.006]
Chair	0.003**	0.002*		
	[0.001]	[0.001]		
Confucian100×Chair	-0.003***	-0.002***		
	[0.001]	[0.001]		
CEO			0.004**	0.001
			[0.002]	[0.002]
Confucian100×CEO			-0.003***	-0.002**
			[0.001]	[0.001]
Controls	Yes	Yes	Yes	Yes
Fixed effects	No	Yes	No	Yes
Observations	17,071	17,071	9,763	9,763
R-squared	0.168	0.215	0.159	0.208

Table A1: **Variable Definitions**

Variable Name	Description
$Confucian100$	The number of Confucian temples within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). Source: See Section 3.
$ConfuAcademy100$	The number of Confucian academies within $100km$ radius around the corporate headquarters raised to the natural log (plus 1). Source: See Section 3.
$Market-to-book$	The market value of equity plus the book value of liabilities, divided by the book value of total assets. Source: CSMAR.
$Net\,working\,capital$	Current assets minus current liabilities minus cash and equivalents, divided by net assets. Source: CSMAR.
$Size$	Log of total assets. Source: CSMAR.
$Cash\,flows$	Earnings before extraordinary items and depreciation minus dividends, divided by net assets. Source: CSMAR.
$Cash\,flow\,volatility$	Standard deviation of cash flows (defined above) over the last three years. Source: CSMAR.
$R\&D$	R&D expenditures divided by total sales. Source: CSMAR.
$Capex$	Capital expenditures divided by net assets. Source: CSMAR.
$Leverage$	Total debt divided by net assets. Source: CSMAR.
$Dividend\,payout$	A dummy that equals one if a firm pays cash dividends in a year and zero otherwise. Source: CSMAR.
$RiverDistance$	The corporate headquarter prefecture's river distance to its nearest bamboo and pine habitats in the Ming-Qing period, raised to the natural log (plus 1). Source: Chen et al. (2020).
$IdioRisk$	The standard deviation of the residuals of the market model in a year. Source: CSMAR.
Age	The number of years since IPO. Source: CSMAR.
$BankLoans$	The sum of short-term and long-term loans borrowed from banks divided by net assets. Source: CSMAR.
$IndBoard$	The number of independent board directors divided by total number of directors. Source: CSMAR.
$InsiderHolding$	The ratio of shares held by the board and management teams to total shares. Source: CSMAR.
$Monitor$	The product of total shares (as a percentage of total shares outstanding) held by the second to the fifth largest shareholders and a Herfindahl index for the concentration of shares among these shareholders. Source: CSMAR.
ROA	Earnings before extraordinary items and interest expenses divided by net assets. Source: CSMAR.
$StdROA$	The standard deviation of ROA for a five-year window. Source: CSMAR.
$SalesGrowth$	The growth rate of total sales. Source: CSMAR.
$Dividend$	The cash dividends payout divided by net assets. Source: CSMAR.
$AquiReturn$	The three-day window (one day before the acquisition announcement to one day after the acquisition announcement) cumulative abnormal returns for an acquisition event based on a market model estimated from a 250-days window. Source: CSMAR.
$Credit$	Total bank loans divided by GDP at the prefecture level. Source: CSMAR.
$Openness$	Total FDI (foreign direct investment) divided by GDP at the prefecture level. Source: CSMAR.
$Chair$	The total number of Confucian academies in board chair' birthplace provinces raised to the natural log. Source: Hand-collect.
CEO	The total number of Confucian academies in CEO's birthplace provinces raised to the natural log. Source: Hand-collect.