



National culture and corporate cash holdings around the world



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ABSTRACT

This paper examines whether cultural dimensions explain the variation in corporate cash holdings around the world as well as within the United States. We establish four major findings. First, in an international setting, corporate cash holdings are negatively associated with individualism and positively associated with uncertainty-avoidance. Second, individualism and uncertainty avoidance influence the precautionary motive for holding cash. Third, firms in individualistic states in the United States hold less cash than firms in collectivistic states. Fourth, we show that individualism is positively related to the firm's capital expenditures, acquisitions, and repurchases while uncertainty avoidance is negatively related. Our findings remain unchanged after controlling for governance factors, firm attributes, and country characteristics.

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1. Introduction

Bates et al. (2009) document that the average ratio of cash to assets has more than doubled from 10.5 percent in 1980 to 23.2 percent in 2006. The Institute of International Finance estimated that corporations in the United States, Euro Zone, the United Kingdom, and Japan held approximately \$7.75 trillion in cash or cash equivalents.¹ More specifically, corporate cash holdings are \$2.64 trillion in the euro zone and \$1.19 trillion in the United Kingdom. We observe that over the period 1989–2009 the median cash to total assets ratio varies from 2.3 percent for New Zealand, 3.6 percent for Russia, 5.2 percent for Australia, 8 percent for Finland, 10.1 percent for Sweden, 13.7 percent for Singapore, to 16.6 percent for Hong Kong. How can we explain this significant variation in corporate cash holdings around the world?

Although corporate governance plays an important role in explaining the variation in corporate cash holdings, we still observe puzzling reality that the cash to total assets ratio of corporations in some low shareholder rights countries (such as Greece, Thailand, and Mexico) is lower than the median value of all 41 countries in our sample, whereas corporations in some high

shareholder rights countries (such as Brazil, Israel, Japan and Singapore) hold higher cash than the median cash to assets ratio. It is therefore evident that corporate governance alone cannot explain the variation in cash holdings.

In this paper we expand the empirical literature on the determinants of corporate cash holdings by being the first to examine (i) whether national culture explains the variation in corporate cash holdings around the world; (ii) whether there is an association between the individualism–collectivism dimension within the United States (at a state level) and corporate cash holdings; and (iii) what firms around the world and within the United States do with cash holdings? In particular, we employ Hofstede's (1980, 2001) cultural dimensions to investigate whether the degree of a country's individualism and uncertainty-avoidance can explain the variation in corporate cash holdings around the world. We also employ the Vandello and Cohen (1999) individualism–collectivism dimension to address whether there is an association between state-level culture within the United States and corporate cash holdings. To shed light on what firms around the world and within the United States do with cash holdings we examine the firms' capital investments, acquisitions, dividend payments and repurchase decisions.

Our paper is positioned at the union of two lines of research in the literature. The first line of research focuses on corporate cash holdings and the second line of research focuses on cross-cultural

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¹ The Wall Street Journal (March 23, 2012).

psychology and behavioral finance. The majority of the prior research on corporate cash holdings has primarily focused on the United States corporations.² Three exceptions are Dittmar et al. (2003), Pinkowitz et al. (2006), and Kalcheva and Lins (2007). These studies investigate the determinants of cash holdings in an international setting and the central focus of these studies is the association between corporate governance and cash holdings. Dittmar et al. (2003) show that corporations in countries where shareholders enjoy little protection hold twice as much cash as corporations in countries with good shareholder protection. Pinkowitz et al. (2006) document that the relation between cash holdings and firm value is weaker in countries with poor investor protection than in other countries. Kalcheva and Lins (2007) show that outside investors discount the value of cash held by firms with managerial agency problems. That is, value of cash is lower when controlling managers hold more cash.

The second line of research relevant to our paper focuses on cross-cultural psychology and behavioral finance. Studies in this strand have examined the impact of cultural values on economic outcomes, more specifically, corporate decisions (Guiso et al., 2009; Bottazzi et al., 2010; Giannetti and Yafeh, 2012; Ahern et al., forthcoming).

We provide a new and novel angle by examining whether national culture affects the variation in international corporate cash holdings. By studying a diverse group of countries with various forms of governance structures and different stages of financial development we show that cash holding decisions cannot be effectively studied without considering national culture. Our study investigates the association between cultural differences and corporate cash holdings internationally and at the state level within the United States. Although the culture of the United States is highly individualistic we focus on the state-level analysis within the United States as Vandello and Cohen (1999) show that regions of the United States exhibit measurable variation on the individualism–collectivism dimension. The state-level analysis allows us to focus on the association between the two net of various institutional differences across countries.

We hypothesize a negative relation between individualism and the level of cash holdings and a positive relation between uncertainty-avoidance and the level of cash holdings. We posit that managers in individualistic cultures tend to be overconfident about the firm's future earnings ability and are, thus, more likely to spend money when they have excess cash. A positive relation between uncertainty-avoidance and firm cash holdings is hypothesized as managers in high uncertainty avoiding cultures tend to prefer holding cash to hedge against possible cash shortfalls in the future.

Our analyses yield some striking findings. Using data for 27,801 firms across 41 countries for the period 1989–2009, we confirm that individualism is negatively correlated with firm cash holdings and uncertainty avoidance is positively correlated with firm cash holdings. In addition, individualism is negatively correlated with corporate cash holdings at the state level within the United States. Our findings also show that individualism and uncertainty

avoidance influence the precautionary motive for holding cash. Specifically, we find that firms with greater business uncertainty (proxied by cash flow volatility and R&D to sales) are likely to hold higher precautionary cash in low individualism and high uncertainty avoidance cultures. We also show that the effect of national culture on cash holdings is weaker for firms that operate in the global market, suggesting that multinational firms are subject to less influence by the national culture specific to a single country.

We then investigate the implications of cash holdings within the United States and around the world by exploring what firms do with cash holdings. We demonstrate that individualism is positively related to the firm's capital expenditures, acquisitions, and repurchases and uncertainty avoidance is negatively related to the firm's capital expenditures, acquisitions, and repurchases. Our findings are robust to alternative specifications of cash holdings, alternative measures of national culture, and the inclusion of a comprehensive list of country-level control variables.

Our study contributes to the cash holding literature and the cross-cultural psychology literature in four different ways. First, we propose a new motive for firms to hold cash. We call this the “cultural motive” as we provide compelling evidence that national culture is an important determinant of cash holdings. Specifically, we find that even after controlling for governance factors (prior studies have focused on investor protection, shareholders rights and legal origin, etc.) and firm attributes, the cultural factors explain the variation in cash holdings around the world. The “cultural motive” integrates the literature in finance and cross-cultural psychology, while providing compelling evidence that corporate finance decisions are determined not only by an objective judgment of a firm's risks and returns, but also by the manager's subjective beliefs that often hinge on that individual's cultural inheritance.

Second, our study highlights an association between cash holdings and the individualism–collectivism dimension at the state level within the United States. Using the Vandello and Cohen (1999) individualism–collectivism index, we demonstrate that firms in individualistic states within the United States have lower cash holdings than do firms in collectivistic states.

Our third contribution is our analyses of what firms in the United States and around the world do with their cash holdings. We document that a firm's attitude toward capital expenditures, acquisitions and repurchases results in a lower level of cash holdings in individualistic cultures and that firms in high uncertainty-avoidance cultures accumulate cash by reducing their capital expenditures, acquisitions, repurchases and dividends.

The remainder of this paper is organized as follows. The next section of the paper provides a brief review of the literature and develops the testable hypotheses. This is followed by a description of the data, variable construction and the descriptive statistics. Empirical findings on the relation between cash holdings and national culture come next followed by robustness tests. This is followed by the examination of the impact of national culture on investment intensity variables. We then investigate the association between the individualism–collectivism dimension and corporate cash holdings at the state-level within the United States followed by the conclusions.

2. Relevant literature and hypothesis development

2.1. The role of culture in corporate decision-making

A critically important question to address is why firms' policies are dictated by their country's cultural environment. At least two possible channels are envisioned.³ In the first channel, managers' views and preferences are affected by national culture. Prior research

² Prior studies have identified at least seven motives for firms to hold cash. The seven motives include (i) the transaction motive (Baumol, 1952; Meltzer, 1963; Miller and Orr, 1966; Mulligan, 1997); (ii) the precautionary motive (Keynes, 1936; Myers and Majluf, 1984; Opler et al., 1999; Bates et al., 2009); (iii) the agency motive (Jensen, 1986; Dittmar et al., 2003; Mikkelson and Partch, 2003; Pinkowitz et al., 2006; Dittmar and Mahrt-Smith, 2007; Harford et al., 2008; Harford, 1999; Gao et al., 2013); (iv) the financial constraint motive (Almeida et al., 2004; Khurana et al., 2006; Han and Qiu, 2007; Denis and Sibilkov, 2010); (v) the tax motive (Foley et al., 2007); (vi) the diversification motive (Duchin, 2010); and (vii) the product market competitiveness motive (Haushalter et al., 2007; Fresard, 2010; Schroth and Szalay, 2010). In a more recent paper, Dittmar and Duchin (2011) document that firm-level cash holdings in the United States decline each year over the corporate life cycle. The authors show that young firms rebalance their cash holdings toward a target ratio, whereas older firms demonstrate weaker cash rebalancing and market timing behaviors. They further note that while the existing models reflect the cash policies of young firms, they do a poor job of explaining the cash policies of mature firms.

³ We thank an anonymous referee for suggesting that we improve our hypothesis development by looking at the two channel theory.

has used national culture to explain several corporate decisions. Li et al. (2013) document that culture influences corporate risk-taking through its effect on managerial decision-making and through its effect on a country's formal institution. In particular, they show that individualism has a positive and a significant association and uncertainty avoidance has a negative and significant association with corporate risk-taking. They conclude that even in a highly globalized world with sophisticated managers, culture matters. Aherm et al. (forthcoming) document that cultural differences have a substantial impact on multiple aspects of cross-border mergers. Other studies have also documented that cultural differences affect capital structure (Chui et al., 2002), dividend payout policy (Shao et al., 2010), growth and innovation (Gorodnichenko and Roland, 2010), and earnings quality (Kanagaretnam et al., 2011).

The second channel is that investors' views and preferences are related to national culture and hence firm decisions are catered to investors' preferences. Prior research has shown that religion induced gambling preferences influence the portfolio decisions of institutional investors. Kumar et al. (2011) show that religious beliefs impact investors' portfolio choices and stock returns. Shu et al. (2012) report that funds located in low-Protestant or high-Catholic areas exhibit significantly higher fund return volatilities. They also document that local religious beliefs have significant influences on mutual fund behaviors. A highlighted aspect of culture's impact on portfolio decisions is demonstrated by Chui et al. (2010) who demonstrate that individualism is positively associated with trading volume and volatility as well as momentum profits. In particular, they show that people in individualistic cultures are more likely to exhibit overconfidence and self-attribution bias. They document that the momentum effect is substantially stronger in countries with a higher index of individualism.

The two channels discussed above are equally important for studies of culture's impact on economic outcomes, but we believe that the first channel is more appropriate for our study as our focus is on corporate decision making. In this respect, our paper is close to Li et al. (2013) who argue that national culture matters in corporate decisions. Their fundamental proposition is that even in a globalized business environment, national culture operates on corporate risk-taking both directly through managerial decision making and indirectly through firm- and country-level characteristics.

2.2. Individualism and corporate cash holdings

Individualism refers to the degree to which people tend to hold an independent rather than an interdependent self-image or sense of self-esteem (Hofstede, 2001). Cultures strong in individualism emphasize individual freedom, whereas cultures weak in individualism emphasize strong group cohesion (Griffin et al., 2009). In individualistic cultures, one's identity is in the person (De Mooij and Hofstede, 2010), the people are 'I'-conscious and self-actualization is important. In collectivistic cultures, people are 'we'-conscious and avoiding loss of face is important. Furthermore, their identity is based on the social system to which they belong. People in individualistic cultures focus more on how their abilities differentiate from their peers, and hence, they exhibit overconfidence and self-attribution biases.

Markus and Kitayama (1991) and Heine et al. (1999) argue that people in individualistic cultures actually tend to overestimate their own abilities, and they tend to be overly optimistic about the precision of their predictions (Van den Steen, 2004). The psychology literature characterizes people that act as if they have more ability than they actually possess as overconfident (Yates, 1990; Trivers, 1991; Campbell et al., 2004). In contrast, people from collectivist cultures display higher self-monitoring, which significantly lessens cognitive bias from overconfidence (Biais et al., 2005). The overconfidence bias associated with individualistic

cultures is similar to that widely discussed in the behavioral finance literature.⁴

In addition, Markus and Kitayama (1991) and Kagitcibasi (1997) suggest that the tendency to maintain and promote self-esteem in individualistic cultures results in a pervasive self-attribution bias as well as in overconfidence. Several other studies indicate that self-attribution bias is significantly higher in Western cultures compared to Eastern cultures because a higher degree of individualism is associated with Western cultures, while a higher degree of collectivism is associated with Eastern cultures (Fry and Ghosh, 1980; Chandler et al., 1981; Kashima and Triandis, 1986). Given this background we hypothesize that the demand for and the usage of cash varies between managers in individualistic and collectivistic cultures. This is because managers in individualistic cultures are more confident about the firm's financial situation, and as a result, they tend to underestimate the demand for cash in comparison to managers from collectivistic culture. On the other hand, managers in a collectivistic culture emphasize preserving the public image. Holding a high level of cash is a signal to the public that the firm is well-managed. Because managers in individualistic cultures stress individual success and esteem, and tend to be overconfident, they are more likely to engage in acquisitions and capital expenditures when they have excess cash. In short, our argument is that national culture drives the accumulation and dissipation of cash and this discussion leads to our first hypothesis.

Hypothesis 1. Firms in an individualistic culture hold less cash than firms in a collectivistic culture.

2.3. Uncertainty-avoidance and corporate cash holdings

Hofstede (2001) states that uncertainty avoidance measures the extent to which a culture programs its members to feel either uncomfortable or comfortable in unstructured situations, defined as novel, unknown, surprising, or different from usual. The term "uncertainty-avoidance" was introduced by Cyert and Marsh (1963), who state that people in uncertainty-avoiding cultures emphasize short-run reactions to short-run feedback rather than anticipation of long-run uncertainty and that such people solve pressing problems rather than developing long-run strategies. The opposite holds for people with a high tolerance for uncertainty.

Hofstede (2001) further documents that people in low uncertainty-avoidance cultures often exhibit a low sense of urgency in ambiguous, surprising, or unstructured situations, whereas people in high uncertainty-avoiding cultures feel more anxious in such situations, and therefore tend to take immediate action to reduce the level of ambiguity. Put simply, cultures high in uncertainty-avoidance avoid ambiguous situations and prefer clear rules of conduct, whereas cultures low in uncertainty-avoidance, enjoy novel events and value differences (Griffin et al., 2009). Uncertainty avoidance is also linked to preferences such as rules, stability, uniformity, and especially closely related to psychological characteristics widely discussed in behavioral financial economics such as conservatism and risk aversion. One important point which should be made clear is that uncertainty avoidance is not the same as risk aversion as was pointed out by Hofstede (1980). Only recently, some evidence has been illustrated about the relation between uncertainty

⁴ Several behavioral finance studies define overconfident individuals as the ones who overestimate the precision of their private information, but not of public information (Kyle and Wang, 1997; Daniel et al., 1998; Odean, 1999). In a more recent paper, Titman et al. (2010) employ Hofstede's individualism index to measure cross-country differences in overconfidence. They document that the asset growth effect is significantly stronger in countries with greater access to capital and with more individualistic cultures.

avoidance and risk aversion (Rieger et al., 2014). Rieger et al. (2014) demonstrate that risk attitudes not only depend on economic conditions but also on cultural factors, including individualism and uncertainty avoidance, leaving the behavioral features, risk aversion in gains and risk-loving in losses, captured by prospect theory.⁵ Breuer et al. (2014) show that cash is valued less favorably by ambiguity averse investors of financially constrained firms. They note that ambiguity aversion is connected to the amount of cash holdings only for financially constrained firms, suggesting that managers are not only aware of investors' preferences but also cater to these needs.

Through which channel does uncertainty avoidance cast its influence on cash holding? In a landmark article, Leland (1968) shows that the precautionary demand for saving, instead of consumption, is a positive function of uncertainty. That is, the level of extra saving becomes higher as future income becomes more uncertain about a given expected value. Furthermore, not only uncertainty itself may influence the level of saving, the degree of tolerance for uncertainty also affects the level of individual cash demand. Van Asselt and Vos (2006) state that the precautionary principle is seen as 'tool to compensate' in situations of unavoidable uncertainty. In other words, individuals who are less tolerant are likely to behave in a more precautionary manner. The underlying dimension of uncertainty avoidance is individual tolerance for uncertainty (ambiguity), which in identical situations leads some individuals to feel more pressed for action than others. That is, individuals in high uncertainty-avoiding cultures would feel more anxious about future uncertainty, and as a result, act more cautiously, than those in low uncertainty-avoiding culture, even though the actual level of uncertainty may be exactly the same. For instance, Li and Zahra (2012) state that low uncertainty-avoidance managers are comfortable with the unpredictability and ambiguity inherent in innovative projects whereas high uncertainty-avoidance managers are anxious in the presence of uncertainty and thus will avoid innovative projects or demand a higher discount rate. Li et al. (2013) expect that uncertainty-avoidance is negatively related to corporate risk-taking. Given the above discussion, we expect that uncertainty-avoiding individuals would utilize the precautionary principle (demand for more cash when making financial decisions) as a tool to compensate for bearing ambiguity. Empirical evidence on the importance of precautionary savings motive has been compiled by Bates et al. (2009), and Duchin (2010).

Taken together, we hypothesize that uncertainty-avoidance has an impact on firm cash holdings. Managers from high uncertainty-avoiding cultures would tend to be less tolerant for uncertainty associated with future cash-flows generated by firms, and thus hold more cash to compensate for bearing this uncertainty. On the other hand, managers from low uncertainty-avoidance cultures would tend to be more comfortable with uncertain and ambiguous situations and therefore require less cash to hedge against possible cash shortfalls in the future. This discussion leads to our second hypothesis.

Hypothesis 2. Firms in high uncertainty-avoiding cultures hold more cash than firms in low uncertainty-avoiding cultures.

3. Data and variable construction

This section describes the data collection process and variable construction. The data for this study are obtained from several sources, as summarized in Appendix A. The Hofstede individualism index (IDV) and uncertainty-avoidance index (UAI) are obtained

from the Hofstede psychological survey of IBM employee values, conducted twice (1968 and 1972) in 72 countries.⁶ Of these 72 countries, 40 had more than 50 respondents each. The individualism index, constructed and extended by Hofstede (1980, 2001), is based on country mean scores on 14 questions about IBM employee's attitudes toward their work and their private lives. The higher the individualism index of a country, the higher the individualism in that country, and people who live in high individualistic cultures are likely to be overly optimistic and overconfident (Titman et al., 2010).

The uncertainty-avoidance index is derived from country mean scores or percentages on three survey questions that address rule orientation, employment stability, and stress. The higher the uncertainty-avoidance index of a country, the higher the uncertainty-avoidance in the country. People who live in high uncertainty-avoidance cultures are more risk averse and prefer safe assets rather than risky assets. We obtain financial data for Canadian and United States firms from Compustat North America and, for all other countries, from Compustat Global. Our main variable, the ratio of cash to assets, has been employed extensively in finance literature (e.g., Opler et al., 1999 and Bates et al., 2009). Although financial information on Compustat Global is available from 1987, we begin with 1989, as stock prices required to calculate the market-to-book ratio, an important determinant of firm cash holdings, are available only since 1989. To be included in our analysis, a firm must have non-missing values for all variables. We do not include financial firms with SIC codes 6000–6999 and utility firms with SIC codes 4900–4999 in the sample, as firms in these industries may hold cash for non-economic reasons (e.g., capital requirements or regulation), which, if included, may distort the analysis. To mitigate the effect of outliers, we winsorize observations at the 1st and 99th percentiles. We also require each country to have at least 100 observations. We begin with an initial sample of 36,987 firms from 102 countries, and after applying the above filters our final sample consists of 27,801 firms from 41 countries.

Table 1 presents the summary statistics of the variables across countries. All numbers, with the exception of the number of observations and firms, are country or sample medians. The table shows that the United States, Japan, and the United Kingdom are the countries with the largest representation in the sample. Because United States firms, in particular, account for 42% of the whole sample, we report regression results with and without United States firms included to confirm that our findings are not dictated by United States firms. The median value of our key variable, firm cash holdings is shown in column (3). This column suggests a large cross-country variation in the ratio of cash to assets. The overall median is 0.107 across 41 countries. However, some countries have median cash holdings of less than 0.05 (New Zealand, Portugal, and Russia), while other countries have median cash holdings in excess of 0.15 (Hong Kong).

We also report large variations in the individualism and uncertainty-avoidance indices in columns (4) and (5). The individualism index ranges from 14 (Indonesia and Pakistan) to 91 (the United States) while the uncertainty-avoidance index ranges from 8 (Singapore) to 112 (Greece). The correlation between the two cultural

⁶ Since the Hofstede survey was conducted in the 1980s, one could argue that changes in cultural values that have occurred over the past two decades would weaken the linkage between the variation in corporate cash holdings and cultural values. Many replications of Hofstede's study on different samples have proved that the country ranking in his data remains valid. In the second edition of his book *Culture's Consequences* (2001), Hofstede describes over 200 external comparative studies and replications that have supported his indices. Tung and Verbeke (2010) state that despite the criticisms that have been voiced against Hofstede's work, his influence in the fields of international business and management is undeniable. To confirm the robustness of our main results, we use alternative cultural metrics such as the IDV and UAI indices from the GLOBE Project, Schwartz's cultural dimensions and the Tang and Koveos (2008) cultural indices.

⁵ We would like to thank an anonymous referee for pointing out this issue.

Table 1
Summary statistics.

Country	Number of obs. (1)	Number of firms (2)	IDV (3)	UAI (4)	Cash ratio (5)	Market-to-book (6)	Firm size (7)	Net Working capital (8)	Cash flows (9)	R&D (10)	Cash flow volatility (11)	Leverage (12)
Australia	4700	731	90	51	0.052	1.340	3.207	0.022	0.019	0.000	0.026	0.192
Austria	660	96	55	70	0.071	1.068	4.427	0.071	0.018	0.000	0.018	0.234
Belgium	450	97	75	94	0.073	1.174	4.734	0.037	0.029	0.000	0.019	0.206
Brazil	642	179	38	76	0.130	1.323	5.173	0.028	0.030	0.000	0.024	0.221
Canada	3356	505	80	48	0.093	1.443	4.546	0.001	-0.007	0.000	0.080	0.154
Chile	177	59	23	86	0.051	1.337	4.773	0.065	0.039	0.000	0.018	0.227
China	9232	1700	20	30	0.139	1.655	3.689	-0.063	0.023	0.000	0.033	0.222
Denmark	1210	149	74	23	0.095	1.125	3.319	0.069	0.030	0.000	0.028	0.244
Finland	1242	144	63	59	0.080	1.142	4.686	0.072	0.019	0.006	0.033	0.239
France	1840	505	71	86	0.107	1.223	3.364	0.036	0.024	0.000	0.014	0.200
Germany	4198	613	67	65	0.069	1.175	4.405	0.143	0.016	0.000	0.023	0.182
Greece	623	126	35	112	0.073	1.294	2.989	0.067	0.026	0.000	0.017	0.273
Hong Kong	5020	844	25	29	0.166	1.026	4.129	0.011	0.031	0.000	0.032	0.141
India	4891	1141	48	40	0.052	1.182	3.318	0.100	0.050	0.000	0.022	0.267
Indonesia	1089	205	14	48	0.095	1.058	3.903	0.030	0.026	0.000	0.048	0.305
Ireland	613	65	70	35	0.098	1.234	3.982	0.029	0.038	0.000	0.028	0.248
Israel	258	92	54	81	0.118	1.532	4.526	0.021	0.017	0.000	0.020	0.310
Italy	1100	229	76	75	0.089	1.050	5.144	0.048	0.015	0.000	0.018	0.225
Japan	39,095	3563	46	92	0.139	1.069	5.617	0.007	0.011	0.001	0.020	0.213
Malaysia	5957	858	26	36	0.084	1.066	2.633	0.054	0.028	0.000	0.030	0.173
Mexico	186	61	30	82	0.079	1.094	6.587	0.028	0.043	0.000	0.021	0.148
Netherlands	1696	200	80	53	0.055	1.292	4.412	0.070	0.034	0.000	0.023	0.203
New Zealand	494	88	79	49	0.023	1.262	3.105	0.045	0.017	0.000	0.028	0.251
Nigeria	106	24	20	54	0.100	1.874	3.788	-0.059	0.037	0.000	0.014	0.121
Norway	1146	197	69	50	0.117	1.253	3.718	-0.010	0.021	0.000	0.043	0.253
Pakistan	617	124	14	70	0.070	1.190	2.183	0.008	0.045	0.000	0.031	0.213
Philippines	455	104	32	44	0.095	1.041	2.835	-0.011	0.020	0.000	0.034	0.193
Poland	117	59	60	93	0.081	1.320	3.518	0.123	0.036	0.000	0.020	0.079
Portugal	215	46	27	104	0.041	1.112	4.440	-0.016	0.020	0.000	0.010	0.332
Russia	179	57	39	95	0.036	0.648	5.597	-0.021	0.049	0.000	0.027	0.227
Saudi Arabia	157	48	38	68	0.073	2.080	3.397	0.045	0.035	0.000	0.023	0.184
Singapore	3215	564	20	8	0.137	1.111	3.737	0.027	0.029	0.000	0.030	0.161
South Africa	1313	227	65	49	0.103	1.349	5.457	0.027	0.050	0.000	0.028	0.105
South Korea	3928	676	18	85	0.107	0.894	4.874	-0.034	0.022	0.000	0.020	0.284
Spain	785	126	51	86	0.057	1.238	4.950	0.018	0.026	0.000	0.014	0.196
Sweden	2388	342	71	29	0.101	1.287	3.315	0.067	0.024	0.000	0.035	0.175
Switzerland	1741	201	68	58	0.116	1.185	4.785	0.083	0.032	0.000	0.025	0.215
Thailand	965	260	20	64	0.053	1.129	2.327	0.022	0.027	0.000	0.031	0.271
Turkey	278	76	37	85	0.127	1.360	4.008	0.068	0.038	0.000	0.027	0.121
United Kingdom	14,171	1730	89	35	0.072	1.388	4.154	0.032	0.031	0.000	0.038	0.167
United States	88,531	10,690	91	46	0.099	1.491	4.760	0.069	0.017	0.000	0.074	0.173
Total	209,036	27,801	89	46	0.107	1.279	4.582	0.040	0.019	0.000	0.038	0.191

This table reports summary statistics for all the countries in our sample. All numbers with the exception of number of observations and firms are country or sample medians. IDV is Hofstede's individualism index. UAI is Hofstede's uncertainty-avoidance index. Cash ratio is cash and cash equivalents divided by total assets. Market-to-book is market value of assets divided by total assets. Firm size is the natural logarithm of total assets. Net working capital is working capital net of cash and cash equivalents divided by total assets. Cash flow is operating cash flow divided by total assets. R&D is research and development expenses divided by sales revenue. Cash flow volatility is the standard deviation of cash flows for the previous ten years. Leverage is total debt divided by total assets.

dimensions is -0.323 in our sample. The correlation is not high, suggesting that individualism and uncertainty-avoidance capture different aspects of national culture. Table 1 also reports country medians for the control variables. The sample median for the market-to-book ratio is 1.279, while that of firm size is 4.582. The sample firms report median net working capital to assets of 0.040 and median cash-flow to assets of 0.019. The median value for R&D to sales is zero for most of the countries and for the overall sample, thus suggesting that most firms in our sample have little or no R&D expenditures. Following, Bates et al. (2009), we set the firm's R&D expenditure to zero if it is missing. Further, the median cash flow volatility is 0.038, and the median leverage ratio is 0.191.

4. The impact of national culture on corporate cash holdings

4.1. Baseline regression

In this section, we present the results of our regression analysis on the relation between cash holdings and national culture. Our baseline model is defined as:

$$\text{Cash}_{i,t} = \alpha + \beta_1 \cdot \text{IDV}_{i,t} + \beta_2 \cdot \text{UAI}_{i,t} + \gamma \cdot \text{Controls}_{i,t} + \text{Ind}_{j,t} + \text{Yr}_t + \varepsilon_{i,t} \quad (1)$$

where i and t denote firm and year, respectively, while j denotes industry, Ind (defined at the two-digit SIC code level) and Yr capture industry and year fixed effects, respectively, and ε is the error term. The dependent variable is firm cash holdings, and the independent variables of interest are two cultural factors, individualism (IDV) and uncertainty-avoidance (UAI). We predict a negative sign for β_1 and a positive sign for β_2 . Control variables include market-to-book, firm size, net working capital, cash flows, R&D, cash flow volatility, and leverage. The regression is performed by pooled ordinary least squares (OLS) with the t -statistics computed using standard errors robust to both clustering at the firm level and heteroskedasticity. For ease of interpretation, we scale up the coefficients of IDV and UAI by multiplying the coefficients by 100.

The regression results are presented in Table 2. Column (1) presents the results without control variables, while column (2) presents the results with a full set of control variables. The results reported in column (1) show that firm cash holdings are negatively related to individualism and positively related to uncertainty-avoidance. The coefficient of IDV is statistically significant at the ten-percent level, while the coefficient of UAI is significant at the ten-percent level. It is important to note that the coefficients of IDV and UAI retain their signs and statistical significance after controlling for a number of firm characteristics in column (2). Further, the coefficient of UAI becomes significant at the one-percent level as well. The findings are consistent with our first hypothesis that firms in individualistic culture hold less cash than firms in collectivistic culture, while firms in more uncertainty-avoiding culture hold more cash than firms in less uncertainty-avoiding culture.

The magnitude of the coefficient in column (2) indicates that a one-unit change in individualism leads to a 0.036 percent reduction in firm cash holdings. Other things being equal, moving from the lowest (14) to the highest (91) individualism index will result in a reduction in cash holdings of 2.77 percent of total assets.⁷ We also show that a one-unit change in the uncertainty-avoidance index leads to a 0.062 percent change in firm cash holdings. Other things

being equal, moving from the lowest (8) to the highest (112) uncertainty-avoidance index will result in an increase in cash holdings of over 6.45 percent of total assets.

In columns (3) and (4) of Table 2, we report the regression results for the sample excluding the United States.⁸ Our findings show that even after excluding the United States from the regressions, individualism and uncertainty-avoidance remain negatively and positively associated with firm cash holdings, respectively. The coefficients retain their statistical and economic significance, indicating that the results are not dictated by the United States. The magnitude of the coefficient in column (4) indicates that a one-unit increase in individualism leads to a 0.093 percent reduction in firm cash holdings if we exclude the United States. This figure compares with a 0.036 percent reduction with full sample of 41 countries. Other things being equal, moving from the lowest (14) to the highest (90) individualism index will result in a reduction in cash holdings of 7.07 percent of total assets.⁹ Further, a one-unit change in the uncertainty-avoidance index leads to a 0.045 percent change in firm cash holdings. Other things being equal, moving from the lowest (8) to the highest (112) uncertainty-avoidance index will result in an increase in cash holdings of 4.68 percent of total assets.

Our results for the control variables are generally consistent with prior literature (Opler et al., 1999; Dittmar et al., 2003; Bates et al., 2009, and Dittmar and Duchin, 2011). Specifically, we show that firm cash holdings are positively related to market-to-book, cash flows, R&D and cash flow volatility, while negatively related to size, net working capital, and leverage.

4.2. The interaction with firm risk attributes

In addition to examining the main effects we also analyze the interaction effects between the two national culture dimensions and firm risk attributes. The two firm risk attributes are cash-flow volatility and R&D. We use cash-flow volatility and R&D as firm risk attributes as firms with greater cash flow volatility or R&D are assumed to have greater business uncertainty and thus these firms are expected to hold more precautionary cash. The purpose of this analysis is to examine if certain cultures influence a firm's precautionary motive for holding cash. Specifically, we interact the two national culture dimensions with cash flow volatility and R&D and include these interaction terms in Eq. (1).

We present the results in Table 3. The results are presented in four columns. Columns (1) and (2) present the results for the full sample and columns (3) and (4) present the results for the sample excluding the United States. Column (1) shows that the coefficient of IDV * cash flow volatility is negative but only significant at the ten-percent level, while the coefficient of UAI * cash flow volatility is positive and statistically significant at the one-percent level. Since firms with higher cash flow volatility tend to hold more cash for precautionary purposes, the results suggest that uncertainty avoidance triggers greater incentives for firms to hold cash when cash flow volatility rises. Column (2) shows that the coefficients for IDV * R&D and UAI * R&D are both statistically insignificant.

Columns (3) and (4) present the results for the sample excluding the United States. Column (3) shows that the coefficient for IDV * cash flow volatility is negative and significant at the five-percent level and the coefficient for UAI * cash flow volatility is positive and significant at the one-percent level. This finding indicates that the national culture dimensions influence the precautionary motive for holding cash. Column (4) reports the results for IDV * R&D and UAI * R&D and the results show that

⁷ In column (3) of Table 1 we show that the median cash ratio for our sample is 10.7 percent. When placed in this context the reduction in cash holdings of 2.77 percent of total assets represents approximately 25 percent movement in cash ratio. Put simply, the movement in cash holding from the lowest IDV to the highest IDV is approximately 25 percent relative to the average cash holding of 10.7 percent. As far as uncertainty-avoidance is concerned the movement in cash holding from the lowest uncertainty avoidance to the highest uncertainty avoidance is approximately 60 percent relative to the average cash holding of 10.7 percent.

⁸ As a further test for the robustness of our main results we exclude three countries with the largest number of observations (i.e., United States, Japan, and the United Kingdom). To conserve space we do not report the results but are qualitatively identical to the main results.

⁹ The highest is Australia which is 90 after excluding the United States.

Table 2
Regressions of cash holdings on national culture.

	Full sample		Sample excluding United States	
	(1)	(2)	(3)	(4)
IDV	−0.045 (−11.171)***	−0.036 (−10.181)***	−0.057 (−13.066)***	−0.093 (−22.315)***
UAI	0.012 (1.717)*	0.062 (15.680)***	0.018 (4.911)***	0.045 (10.898)***
Market-to-book		0.011 (20.492)***		0.009 (10.670)***
Size		−0.004 (−11.376)***		−0.001 (−2.464)**
Net working capital		−0.232 (−49.584)***		−0.174 (−32.669)***
Cash flows		0.054 (9.845)***		0.055 (5.195)***
R&D		0.185 (47.253)***		0.220 (12.142)***
Cash flow volatility		0.211 (19.763)***		0.175 (7.707)***
Leverage		−0.343 (−73.283)***		−0.301 (−53.492)***
Industry and year FE	No	Yes	No	Yes
Obs.	209,036	209,036	120,505	120,505
Adj. R ²	0.004	0.435	0.012	0.284

This table presents the regression results of cash holdings on national culture. The dependent variable is cash ratio, defined as cash and cash equivalents divided by total assets. IDV is Hofstede's individualism index. UAI is Hofstede's uncertainty-avoidance index. Market-to-book is market value of assets divided by total assets. Firm size is the natural logarithm of total assets. Net working capital is working capital net of cash and cash equivalents divided by total assets. Cash flow is operating cash flow divided by total assets. R&D is research and development expenses divided by sales revenue. Cash flow volatility is the standard deviation of cash flows for the previous ten years. Leverage is total debt divided by total assets. We run pooled OLS regressions, with *t*-statistics (in parentheses) computed using standard errors robust to both clustering at the firm level and heteroskedasticity. The full sample results are reported in columns (1) and (2) and the results for the sample excluding the United States are reported in columns (3) and (4). For ease of interpretation, we scale up the coefficients of IDV and UAI by multiplying the coefficients by 100. ***, ** and * denotes significance at the 10%, 5%, and 1% level, respectively.

the coefficient for IDV * R&D is negative and significant at the five-percent level while the coefficient for UAI * R&D is insignificant. This finding suggests that individualism reduces the firm's precautionary motive for holding cash.

4.3. The interaction with global operations

In this section, we analyze the role of global operations in explaining the relation between cash holdings and the two national culture dimensions as we predict that firms with global operations would be less subject to the influence of national cultures.¹⁰

We employ three proxies for global operations: (i) equity market openness of a country; (ii) a firm's inclusion in the S&P 1200 Global Index; and (iii) a firm's ownership by foreign investors. We argue that firms from a highly open equity market, firms included in the S&P 1200 Global Index, and firms with large foreign ownership should exhibit a weaker relation between cash holdings and national culture.

Specifically, we use data on foreign ownership restriction as in Bekaert (1995), Edison and Warnock (2003), and Bekaert et al. (2007) to measure the extent of the equity market openness of a country. This measure is an investability measure, defined as the ratio of market capitalization of the stocks comprising the S&P-IFC Investable Index to the market capitalization of the stocks comprising the S&P-IFC Global Index in each country. We also use the S&P1200 Global index constituents to determine whether each firm in our sample is included in this index. We source the index constituent for our sample period from Compustat database. A dummy variable is assigned a value of 1 if a firm is included in this index during the year and 0 otherwise. In addition, we obtain the data for foreign ownership from S&P Capital IQ database, which contains detailed ownership data for global public firms. We calculate foreign ownership as the sum of the percentage ownership by

all foreign investors of the firm, where foreign investors are defined as investors with different country label as the firm in the database. Since the foreign ownership data in Capital IQ starts in 2004, we restrict this analysis to the period 2004–2009.

We present the results in Table 4. In column (1), we find that the coefficient on IDV * Openness is positive and significant at the 5 percent level while the coefficient for UAI * Openness is negative but significant at the 1 percent level, substantially mitigating the impact of culture dimensions on cash holdings. In column (4), we report the results for the sample excluding the U.S. and our results are similar to the full sample in that both coefficients are significant at the 1 percent level. Thus, there is strong evidence that the effects of IDV and UAI on corporate cash holdings are weaker among firms that come from countries with high equity market openness.

In columns (2) and (5), the coefficients on IDV * S&P Global are positive and significant at the 1 percent level, indicating that the effect of IDV on cash holdings of firms in the S&P 1200 Global Index is significantly weakened. We, however, find no statistically significant evidence that the effect of UAI on cash holdings of firms in the S&P 1200 Global Index is any weaker. Our results in column (3) show that the coefficient on IDV * Foreign Ownership is positive and significant at the 1 percent level. Nevertheless, the coefficient for UAI * Foreign Ownership is statistically insignificant whereas its sign is opposite to that of UAI. These results suggest that the effect of IDV on cash holdings is weaker for firms with greater foreign ownership. We also find that the results for the sample excluding the U.S. in column (6) are similar to the full sample results reported in column (3). Overall, the results in Table 4 suggest that the relation between national culture and cash holdings is generally weaker among firms that operate in the global markets.

5. Robustness tests

We perform various tests to confirm the robustness of our findings. The results are summarized in Panel A of Table 5 for the full

¹⁰ We thank an anonymous referee for suggesting this set of tests.

Table 3
The interaction with firm risk attributes.

	Full sample		Sample excluding United States	
	(1)	(2)	(3)	(4)
IDV	−0.043 (−11.204)***	−0.036 (−10.193)***	−0.099 (−21.207)***	−0.092 (−22.116)***
UAI	0.053 (12.477)***	0.063 (15.459)***	0.034 (7.419)***	0.044 (10.510)***
IDV * cash flow volatility	−0.063 (−1.792)*		−0.123 (−2.031)**	
UAI * cash flow volatility	0.233 (3.837)***		0.361 (5.390)***	
IDV * R&D		−0.009 (−0.113)		−0.259 (−2.305)**
UAI * R&D		−0.008 (−0.127)		0.031 (0.426)
Market-to-book	0.011 (19.905)***	0.011 (20.528)***	0.009 (10.655)***	0.009 (10.776)***
Size	−0.004 (−10.068)***	−0.004 (−11.341)***	−0.001 (−1.925)*	−0.001 (−2.667)***
Net working capital	−0.227 (−48.321)***	−0.232 (−49.554)***	−0.176 (−33.083)***	−0.175 (−32.828)***
Cash flows	0.059 (10.496)***	0.054 (9.883)***	0.055 (5.280)***	0.055 (5.233)***
R&D	0.185 (45.366)***	0.197 (2.780)***	0.216 (11.065)***	0.408 (3.987)***
Cash flow volatility	0.103 (4.690)***	0.211 (19.901)***	−0.083 (−2.444)**	0.176 (7.650)***
Leverage	−0.332 (−70.624)***	−0.343 (−73.257)***	−0.296 (−52.616)***	−0.301 (−53.425)***
Industry and year FE	Yes	Yes	Yes	Yes
Obs.	209,036	209,036	120,505	120,505
Adj. R ²	0.431	0.435	0.283	0.284

This table presents the regression results of the interaction effects between national culture and firm risk attributes. The dependent variable is cash ratio, defined as cash and cash equivalents divided by total assets. IDV is Hofstede's individualism index. UAI is Hofstede's uncertainty-avoidance index. Market-to-book is market value of assets divided by total assets. Firm size is the natural logarithm of total assets. Net working capital is working capital net of cash and cash equivalents divided by total assets. Cash flow is operating cash flow divided by total assets. R&D is research and development expenses divided by sales revenue. Cash flow volatility is the standard deviation of cash flows for the previous ten years. Leverage is total debt divided by total assets. We run pooled OLS regressions, with t-statistics (in parentheses) computed using standard errors robust to both clustering at the firm level and heteroskedasticity. The full sample results are reported in columns (1) and (2) and the results for the sample excluding the United States are reported in columns (3) and (4). For ease of interpretation, we scale up the coefficients of IDV and UAI, as well as their interaction terms, by multiplying the coefficients by 100. ***, ** and * denotes significance at the 10%, 5%, and 1% level, respectively.

sample and Panel B for the sample excluding the United States. For the sake of brevity, we only report the coefficients of IDV and UAI in the table.

5.1. Alternative definitions of cash holdings

We employ alternative definitions of firm cash holdings in the regression. Our alternative definitions are: the natural logarithm of cash ratio (i.e., the ratio of cash and cash equivalents over total assets), the ratio of cash and cash equivalents over total assets net of cash and cash equivalents, and the ratio of cash and cash equivalents over sales revenue. These definitions have been used by Opler et al. (1999), Dittmar et al. (2003), and Bates et al. (2009). The regression results are presented in part (1) in Panels A and B of Table 5 and they are largely identical to those obtained using the original cash ratio.

5.2. Alternative measures of individualism and uncertainty-avoidance

5.2.1. GLOBE project research program

Although Merritt (2000) and Hofstede (2001) demonstrate that Hofstede's cultural indices are stable over time, we follow Chui et al. (2010) to investigate whether our results are affected by the possible changes over time in the scores of individualism of Hofstede (1980, 2001). We collect cultural values from the Global Leadership and Organizational Behavior Effectiveness (GLOBE) project and rerun our main model. The GLOBE project is a network of 170 social scientists and management scholars who focus on

culture and leadership in 61 nations. The GLOBE project classifies national culture into nine dimensions.¹¹ These dimensions include (i) uncertainty-avoidance, (ii) power distance, (iii) institutional collectivism (iv) in-group collectivism (v) gender egalitarianism, (vi) assertiveness, (vii) future orientation, (viii) performance orientation, and (ix) humane orientation. House et al. (2002) document that the first six culture dimensions had their origins in the dimensions of culture identified by Hofstede (1980). Specifically, the first three scales (uncertainty-avoidance, power distance and institutional collectivism) are intended to reflect the same constructs as Hofstede's dimensions labeled uncertainty-avoidance, power distance, and individualism. We collect the country scores for all 41 countries in

¹¹ House et al. (2002) define the nine dimensions as follows. Uncertainty-avoidance is defined as the extent to which members of an organization or society strive to avoid uncertainty by relying on social norms, rituals, and bureaucratic practices to alleviate the unpredictability of future events. Power distance is defined as the degree to which members of an organization or society expect and agree that power should be unequally shared. Institutional collectivism reflects the degree to which organizational and societal institutional practices encourage and reward collective distribution of resources and collective action. In-group collectivism reflects the degree to which individuals express pride, loyalty and cohesiveness in their organizations or families. Gender egalitarianism is the extent to which an organization or a society minimizes gender role differences. Assertiveness is the degree to which individuals in organizations or societies are assertive, confrontational, and aggressive in social relations. Future orientation is the degree to which individuals in organizations or societies engage in future-oriented behaviors such as planning, investing in the future, and delaying gratification. Performance orientation refers to the extent to which an organization or society encourages and rewards group members for performance improvement and excellence and lastly, humane orientation is the degree to which individuals in organizations or societies encourage and reward individuals for being fair, altruistic, friendly, generous, caring, and kind to others.

Table 4
The interaction with global operations.

	Full sample			Sample excluding United States		
	(1)	(2)	(3)	(4)	(5)	(6)
IDV	-0.064 (-4.408)***	-0.044 (-9.388)***	-0.112 (-7.540)***	-0.078 (-3.237)***	-0.103 (-21.444)***	-0.128 (-8.367)***
UAI	0.096 (6.900)***	0.058 (14.373)***	0.046 (2.872)***	0.093 (6.586)***	0.046 (10.875)***	0.044 (2.868)***
IDV* Openness	0.034 (2.032)**			0.026 (6.041)***		
UAI* Openness	-0.063 (-2.796)***			-0.099 (-4.335)***		
Openness	0.012 (0.694)			0.103 (1.848)*		
IDV*S&P Global		0.026 (2.892)***			0.022 (3.527)***	
UAI * S&P Global		-0.001 (-0.029)			-0.007 (-0.359)	
S&P Global		0.041 (1.620)			0.017 (0.713)	
IDV * Foreign Ownership			0.051 (6.012)***			0.044 (2.196)**
UAI* foreign ownership			-0.008 (-0.460)			-0.006 (-0.364)
Foreign ownership			-0.065 (-4.486)***			-0.040 (-2.788)***
Market-to-book	0.011 (18.567)***	0.011 (19.774)***	0.012 (10.090)***	0.008 (9.705)***	0.009 (10.453)***	0.008 (5.754)***
Size	-0.005 (-12.002)***	-0.004 (-10.098)***	-0.007 (-12.197)***	-0.003 (-6.360)***	-0.001 (-3.144)***	-0.004 (-7.090)***
Net working capital	-0.225 (-45.329)***	-0.228 (-48.452)***	-0.234 (-29.817)***	-0.177 (-32.440)***	-0.175 (-32.774)***	-0.162 (-20.026)***
Cash flows	0.039 (6.534)***	0.048 (8.789)***	0.003 (0.273)	0.038 (3.614)***	0.039 (3.793)***	0.021 (0.899)
R&D	0.185 (42.284)***	0.185 (45.585)***	0.169 (22.570)***	0.217 (10.596)***	0.220 (11.170)***	0.212 (5.246)***
Cash flow volatility	0.291 (17.486)***	0.271 (17.938)***	0.355 (11.953)***	0.159 (5.159)***	0.146 (4.932)***	0.329 (5.817)***
Leverage	-0.334 (-65.765)***	-0.332 (-70.737)***	-0.331 (-40.905)***	-0.309 (-53.288)***	-0.296 (-52.425)***	-0.322 (-38.120)***
Industry and year FE	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	148,727	209,036	43,704	90,818	120,505	28,580
Adj. R ²	0.443	0.429	0.459	0.294	0.279	0.318

This table presents the regression results of the interaction effects between national culture and global operations. The dependent variable is cash ratio, defined as cash and cash equivalents divided by total assets. IDV is Hofstede's individualism index. UAI is Hofstede's uncertainty-avoidance index. Openness (of the equity market) is the ratio of market capitalization of the stocks comprising the S&P-IFC Investable Index to market capitalization of the stocks comprising the S&P-IFC Global Index in the country. S&P Global is a dummy variable equal to one if the firm is in the S&P 1200 Global index and zero otherwise. Foreign ownership is computed as the sum of the percentage ownership by all foreign investors of the firm, where foreign investors are defined as investors with different country label as the firm in the database. Market-to-book is market value of assets divided by total assets. Firm size is the natural logarithm of total assets. Net working capital is working capital net of cash and cash equivalents divided by total assets. Cash flow is operating cash flow divided by total assets. R&D is research and development expenses divided by sales revenue. Cash flow volatility is the standard deviation of cash flows for the previous ten years. Leverage is total debt divided by total assets. We run pooled OLS regressions, with t-statistics (in parentheses) computed using standard errors robust to both clustering at the firm level and heteroskedasticity. The full sample results are reported in columns (1)–(3) and the results for the sample excluding the United States are reported in columns (4)–(6). For ease of interpretation, we scale up the coefficients of IDV and UAI, as well as their interaction terms, by multiplying the coefficients by 100. ***, ** and * denotes significance at the 10%, 5%, and 1% levels, respectively.

our sample using the GLOBE's institutional collectivism and uncertainty-avoidance dimensions.¹²

The GLOBE's institutional collectivism index reflects the degree of collectivism in each country, i.e., the higher a country's score in this index, the higher its degree of collectivism. Following [Chui et al. \(2010\)](#), and to be consistent with Hofstede's individualism index, we create a GLOBE individualism variable, which is defined as minus one times the GLOBE's institutional collectivism index. We report the results in part 2 of Panels A and B, [Table 5](#). The estimated coefficient of GLOBE individualism variable is negative and significant. With respect to uncertainty-avoidance, the measure

from the GLOBE project is positive and significant. In short, our findings indicate that cash holdings are negatively related to individualism and positively related to uncertainty-avoidance, irrespective of whether we employ the Hofstede or the GLOBE Project Index.

5.2.2. [Tang and Koveos' \(2008\)](#) cultural indices

Although it is well-documented that Hofstede's cultural dimensions have had the most impact than other competing cultural dimensions ([Kluckhohn and Strodtbeck, 1961](#); [Schwartz, 1994](#); [Smith et al., 2002](#)), several studies have questioned the applicability of Hofstede's scores ([Shenkar, 2001](#) and [Smith, 2002](#)). In an important paper, [Tang and Koveos \(2008\)](#) update Hofstede's scores based on the changing economic climate within countries. They argue that cultural values must reflect both the institutional traditions and economic conditions of a country. They document that individualism, power distance, and long-term orientation demonstrate a significant curvilinear relation with GDP per capita and tend to change over time. As far as uncertainty avoidance is concerned [Tang and Koveos \(2008\)](#) document that religion and legal system

¹² For the use of the GLOBE index, please refer to [Javidan and House \(2001\)](#), [Ashkanasy et al. \(2002\)](#), [Bakacsi et al. \(2002\)](#), [Gupta et al. \(2002\)](#), [Jesuino \(2002\)](#), [Kabasakal and Bodur \(2002\)](#) and [Szabo et al. \(2002\)](#). [Ashkanasy et al. \(2002\)](#) examine cultural values in the Anglo cluster; [Bakacsi et al. \(2002\)](#) examine cultural practices in the Eastern European cluster; [Gupta et al. \(2002\)](#) examine cultural values in the Southern Asia cluster; [Jesuino \(2002\)](#) examines cultural values in the Latin Europe cluster; [Kabasakal and Bodur \(2002\)](#) examine the Arabic cluster and [Szabo et al. \(2002\)](#) examine the Germanic Europe cluster.

Table 5
Robustness Tests.

	Coefficient of IDV	Coefficient of UAI
<i>Panel A. Full sample</i>		
(1) Alternative definitions of cash holdings		
Log of cash ratio	−0.854 (−25.489)***	0.627 (17.463)***
Cash and cash equivalents scaled by net assets	−0.020 (−2.072)**	0.181 (12.812)***
Cash and cash equivalents scaled by sales	−0.458 (−17.247)***	0.068 (2.313)**
(2) Alternative measures of IDV and UAI		
GLOBE	−0.052 (−9.155)***	0.055 (12.343)***
Tang and Koveos (2008)	−0.026 (8.445)***	0.089 (17.302)***
Schwartz (1994)	−0.762 (−2.803)***	− −
World Value Survey	−0.016 (−5.624)***	− −
(3) Omitted variable		
Random-effect panel regression	−0.010 (−2.330)**	0.046 (9.632)***
Additional country-level control variables	−0.089 (−13.169)***	0.040 (6.200)***
(4) Other robustness checks		
Fama–MacBeth regression	−0.035 (−13.182)***	0.108 (7.541)***
Weighted least squares regression	−0.036 (−21.727)***	0.063 (31.481)***
Industry regression	−0.071 (−4.012)***	0.132 (5.628)***
Country regression	−0.014 (−6.274)***	0.050 (0.236)
<i>Panel B. Sample excluding United States</i>		
(1) Alternative definitions of cash holdings		
Log of cash ratio	−1.108 (−23.360)***	0.406 (10.392)***
Cash and cash equivalents scaled by net assets	−0.178 (−13.223)***	0.096 (7.287)***
Cash and cash equivalents scaled by sales	−0.426 (−13.197)***	0.040 (1.191)
(2) Alternative measures of IDV and UAI		
GLOBE	−0.013 (−2.400)**	0.011 (2.262)**
Tang and Koveos (2008)	−0.030 (−7.283)***	0.137 (21.191)***
Schwartz (1994)	−2.408 (−6.956)***	− −
World Value Survey	−0.009 (−2.238)**	− −
(3) Omitted variable		
Random-effect panel regression	−0.085 (−17.498)***	0.036 (7.678)***
Additional country-level control variables	−0.088 (−13.348)***	0.015 (2.341)**
(4) Other robustness checks		
Fama–MacBeth regression	−0.068 (−9.306)***	0.060 (16.999)***
Weighted least squares regression	−0.093 (−50.663)***	0.046 (24.741)***
Industry regression	−0.066 (−5.306)***	0.117 (6.649)***
Country regression	−0.015 (−6.243)***	0.050 (0.497)

This table presents the regression results for robustness checks. Other than stated, the dependent variable is cash ratio, defined as cash and cash equivalents divided by book value of assets. IDV is Hofstede's individualism index. UAI is Hofstede's uncertainty-avoidance index. Cash ratio is cash and cash equivalents divided by total assets. Market-to-book is market value of assets divided by total assets. Firm size is the natural logarithm of total assets. Net working capital is working capital net of cash and cash equivalents divided by total assets. Cash flows is operating cash flow divided by total assets. R&D is research and development expenses divided by sales revenue. Cash flow volatility is the standard deviation of cash flows for the previous ten years. Leverage is total debt divided by total assets. GDP growth is the

growth rate of GDP. GDP per capita is GDP per capita. Private credit is private credit divided by GDP. External finance is external capital divided by GNP. Investor protection is the investor protection index from LLSV (1998). Common law is a dummy variable equal to one if the country has common law origin and zero if it has civil law origin. Corruption index is the corruption index developed by Transparency International. Panel A presents the regressions for the full sample and Panel B presents the results for the sample excluding the United States. Other than stated, the regressions are performed using pooled OLS, with *t*-statistics (in parentheses) computed using standard errors robust to both clustering at the firm level and heteroskedasticity. The full sample results are reported in Panel A and the results for the sample excluding the United States are reported in Panel B. For ease of interpretation, we scale up the coefficients of IDV and UAI, as well as their interaction terms, by multiplying the coefficients by 100. ***, ** and * denotes significance at the 10%, 5%, and 1% level, respectively.

have a more statistically significant impact than the GDP per capita. We rerun the regression in Eq. (1) using the Tang and Koveos(2008) indices and present the results in part 2 of Panels A and B, Table 5. The results reported confirm our previous findings in Table 2.

5.2.3. Schwartz's cultural dimensions

Following prior research (Chui et al., 2002; Li et al., 2013; Shao et al., 2010, and Ahern et al., forthcoming), we employ the Schwartz (1994) cultural dimensions. The three dimensions of cultural values defined by Schwartz (1994) are: (a) Embeddedness versus Autonomy, (b) Hierarchy versus Egalitarianism and, (c) Mastery versus Harmony. Since Ahern et al. (forthcoming) document that the embeddedness versus autonomy dimension is similar to the individualism dimension of Hofstede (1980), we employ this dimension as an alternative individualism measure. In terms of the uncertainty avoidance dimension of Hofstede (1980), there is no corresponding dimension in Schwartz (1994) and thus we have only considered the individualism dimension of Hofstede (1980). The regression results are presented in part 2 of Panels A and B, Table 5. We find a negative relation between autonomy and firm cash holdings in both panels, consistent with our main findings where we employ the Hofstede dimension.

5.2.4. World Value Survey

Following prior research (e.g., Ahern et al., forthcoming), we use the World Value Survey on individualism versus collectivism as an alternative measure of individualism. One advantage of using this data is its time-varying measure which mitigates the problem of proxies of culture that may not be time-varying. The World Value Survey covers 97 countries and is carried out in five waves, namely, 1981–1984, 1989–1993, 1994–1998, 1999–2004, and 2005–2008.

We run the same regression as in Eq. (1). Since the World Value Survey index is time-varying, we are able to include country fixed-effects to control for any time-invariant country characteristics. The regression results are presented in part 2 of Panels A and B, Table 5. We find a negative relation between the World Value Survey individualism measure and firm cash holdings. The results confirm the robustness of our findings to time-varying individualism measures which allows for the inclusion of country fixed-effects.¹³

5.3. Omitted variables

One major concern is the possibility that our findings are driven by an omitted variable problem. To address this potential problem, we adopt two approaches. First, we employ the random-effect panel regression estimated by generalized least squares (GLS).¹⁴ The regression results are presented in Part (3) of Panels A and B, Table 5. The results suggest a robust negative relation between

¹³ We thank an anonymous referee for suggesting the World Value Survey individualism measure and the inclusion of country fixed-effects in the regression using the World Value Survey measure.

¹⁴ We are unable to conduct fixed-effects regression as the Hofstede IDV and UAI indices are time-invariant.

individualism and firm cash holdings and positive relation between uncertainty-avoidance and firm cash holdings.

Second, we follow prior studies (Dittmar et al., 2003; Pinkowitz et al., 2006; Kalcheva and Lins, 2007 and Acharya et al., 2011) and include GDP growth, GDP per capita, private credit, external finance, investor protection, common law, and corruption index as additional control variables in our regression analysis.¹⁵ Our first and second country-level control variables are GDP growth and GDP per capita. We follow Pinkowitz et al. (2006) and Eun et al. (2012) and include GDP growth and GDP per capita as control variables as they proxy for economic development. Acharya et al. (2011) also state that GDP per capita proxies for economic development and control for GDP per capita as developed and developing countries may have different investment opportunity sets. Pinkowitz et al. (2006) show that cash holdings are valued more in countries with higher financial development and higher economic development.

Our third and fourth country-level control variables are private credit and external finance. We follow Dittmar et al. (2003) and include these two control variables as they measure capital market development. Dittmar et al. (2003) document that private credit captures the size of the credit market and external finance is a better measure of the size of the capital markets than the stock market capitalization in countries where shareholdings are highly concentrated.

Our fifth country level variable is the investor protection, as suggested by La Porta et al. (1998).¹⁶ Dittmar et al. (2003) employ the La Porta et al. (1998) shareholder rights measure and show that firms in the high shareholder rights group have lower median cash to net assets than countries with low shareholder rights. Their findings are consistent with the argument that corporate cash holdings are large when shareholder protection is weak.

Our sixth country-level variable is common law. We use common law versus civil law as a control variable, as La Porta et al. (1998) document that laws differ significantly around the world. In particular, countries whose legal rules originate in the common law tradition tend to protect investors significantly better than countries whose laws originate in the civil law or the French civil law tradition. Dittmar et al. (2003) investigate whether firms in the high shareholder rights group have lower median cash to net assets than countries with low shareholder rights when they include a common law dummy in their regression model. They find the coefficient on the common law dummy to be negative and significant, indicating that firms in common law countries hold less cash than those in civil law countries.

Our seventh country-level variable is the corruption index, which measures the level of corruption in a country. We use this variable because Pinkowitz et al. (2006) report that when corruption is high, firms must pay off officials; thus, managers must hold high levels of cash. Pinkowitz et al. (2006), state that paying off functionaries makes the firm profitable and thus it is optimal for firms to hold more cash. They document that in high corruption environment a dollar of cash should be worth at least a dollar to shareholders.

We present the regression results with additional control variables in part (3) of Panels A and B, Table 5. The results confirm the negative impact of individualism on cash holdings and the positive impact of uncertainty avoidance on cash holdings. The results for additional country-level control variables are consistent with prior studies (Dittmar et al., 2003, and Pinkowitz et al., 2006). For instance, we find that firm cash holdings are negatively associated with investor protection, suggesting that firms in countries with

better investor protection hold less cash. This finding is consistent with Dittmar et al. (2003), who document that firms in countries with the lowest level of shareholder protection hold almost 25 percent more cash than firms in countries with the highest level of shareholder protection. Our finding that firms in common law countries hold less cash than civil law countries is consistent with Dittmar et al. (2003), who document that firms in common law countries hold 35 percent less cash than firms in civil law countries.

5.4. Other robustness checks

In addition to alternative measures of firm cash holdings and national culture as well as tests that address the omitted variable problem, we conduct a number of other tests to check the robustness of our findings. First, we adopt the Fama and MacBeth (1973) regression technique and rerun the regression specification in Eq. (1). The methodology is designed to minimize time-series variations while capturing cross-sectional variations. The regression results are presented in part (4) of Panels A and B, Table 5. The results confirm that individualism is negatively associated with firm cash holdings, while uncertainty-avoidance is positively associated with firm cash holdings. Both coefficients are significant at the one percent level.

Second, our sample covers a large number of countries and it is possible that the variance of firm cash holdings varies strongly among some of the countries. This results in a high degree of heteroscedasticity which might bias the regression estimates. To address the concern, we conduct the weighted least squares (WLS) regression. The weight is the inverse of the within-country variance of cash holdings. The regression results are presented in part (4) of Panels A and B, Table 5. The results show that the coefficients of individualism and uncertainty-avoidance retain their sign and statistical significance, suggesting the robustness of our main findings to the potentially high heteroscedasticity problem.

Last, we conduct tests at the industry level and then at the country level. Specifically, we calculate the average value of all the variables in Eq. (1) for each industry in each year. Then, we run the regression on the industry-year observations. Similarly, we calculate the average value of the variables for each country in each year and run the regression on the country-year observations. The regression results are shown in part (4) of Panels A and B, Table 5. In both regressions, the coefficient of individualism remains negative and statistically significant. For uncertainty-avoidance, the coefficient is positive and significant in the industry-level test but is insignificant in the country-level test. Overall, the findings in the two tests are consistent with our main tests reported in Table 2.¹⁷

6. Impact of national culture on investment intensity and payout

Thus far, we have shown that firms tend to hold less cash in countries with a high individualism index or a low uncertainty-avoidance index. The next obvious question is, "What do firms in these cultures do with their cash holdings?" We answer this question by examining the association between firms' capital investments, acquisitions, repurchases and dividend payouts and their corporate cash holdings in an international setting and offer a culture-based explanation for corporate decisions by managers around the world. Malmendier and Tate (2005), Ben-David et al. (2007), and Gervais et al. (2007) have shown that firms that have overconfident executives may invest more intensively than other firms, as these overconfident managers perceive the investment

¹⁵ We obtain the data from the World Bank.

¹⁶ For robustness purposes, we also employ the more recently developed measure of country-level shareholder protection. Specifically, we employ the corrected anti-director rights index of Spamann (2010). To conserve space we do not report the results but they are qualitatively identical to the main results.

¹⁷ We thank an anonymous referee for suggesting the weighted least squares test, as well as the industry- and country-level tests.

projects to be less risky than they really are. Our investment intensity variables are capital expenditure, which we define as capital expenditures scaled by total assets, and acquisitions, which we define as the firm's acquisitions scaled by total assets. Our payout variables are repurchases, which we define as the firm's repurchases scaled by total assets, and dividends, which we define as the firm's dividend payments scaled by total assets.

We introduce the same set of control variables in the cash holdings regression into the investment intensity and payout regressions. Our model takes the following form:

$$\text{CapitalExpenditure/Acquisitions/Repurchase/Dividends}_{i,t} = \alpha + \beta_1 \cdot \text{IDV}_{i,t} + \beta_2 \cdot \text{UAI}_{i,t} + \gamma \cdot \text{Controls}_{i,t} + \text{Ind}_{j,t} + \text{Yr}_t + \varepsilon_{i,t} \quad (2)$$

where we retain *Ind* and *Yr* to capture industry and year fixed-effects in the model, respectively, and ε is the error term. The regression is performed by pooled OLS, with the *t*-statistics computed using standard errors robust to both clustering at the firm level and heteroskedasticity. The results are presented in Table 6. Columns (1)–(4) present the results for the full sample and show that individualism is positively related to the firm's capital expenditure, acquisitions, and repurchases, while negatively related to dividends. As individualism is a proxy for overconfidence and self-attribution bias, it is not surprising to note that firms in individualistic cultures expand their operations aggressively through capital expenditures and acquisitions.

Our results in column (3) show a positive relation between individualism and repurchases and a negative relation between uncertainty avoidance and repurchases. The positive relation between individualism and repurchases indicates that overconfident managers believe that their firms are undervalued and thus they engage in repurchase activities. The negative relation between uncertainty avoidance and repurchases clearly indicate that

managers from uncertainty avoiding culture prefer to hold more cash and they do not engage in repurchase activities. Our finding of a positive relation between individualism and repurchases is also consistent with the undervaluation hypothesis of Dittmar (2000), which is based on the premise that information asymmetry between insiders and shareholders may cause a firm to be mis-valued and that if a stock is undervalued the firm may repurchase shares as a signal to the market or to invest in its own stock by acquiring mispriced shares.

Our results in column (4) show a negative but significant relation between individualism and dividend payout. This is consistent with Gervais et al. (2007) and Ben-David et al. (2007), who document that managerial overconfidence, can affect payout policy. Gervais et al. (2007) find that overconfident managers believe that the available investment opportunities are less risky than they really are, and thus, they overestimate their net present value. Hackbarth (2008) shows that managers divert funds from what would have been paid out to shareholders as dividends to finance these investments. In short, prior research shows that overconfident managers have a lower propensity to payout dividends.

Evidence from the cross-cultural psychology literature also points in this direction. For instance, Kanagaretnam et al. (2011) find that in highly individualistic cultures, managers would adopt a low dividend payout and retain more cash in the firm as higher cash holdings enable the managers to make their own decisions when investment opportunities arise. The authors also show that firms in mastery countries have lower dividend payouts and that mastery shareholders are more tolerant of managers who retain high cash as they trust the manager's ability, and this trust offsets the shareholders concerns about agency problems to a certain extent. The reported results in Table 6 confirm that uncertainty-avoidance is negatively related to the firm's capital expenditures, acquisitions, repurchase, and dividends decisions. As expected,

Table 6
Regressions of capital expenditure, acquisitions, dividends and repurchases on national culture.

	Full Sample				Sample excluding United States			
	(1) Capital expenditure	(2) Acquisitions	(3) Repurchase	(4) Dividends	(5) Capital expenditure	(6) Acquisitions	(7) Repurchase	(8) Dividends
IDV	0.011 (8.799)***	0.034 (51.463)***	0.022 (42.315)***	-0.003 (-4.827)***	0.013 (8.173)***	0.020 (25.150)***	0.003 (14.648)***	-0.006 (-6.558)***
UAI	-0.039 (-26.315)***	-0.018 (-27.910)***	-0.011 (-25.032)***	-0.016 (-20.761)***	-0.039 (-24.273)***	-0.009 (-14.303)***	-0.002 (-13.172)***	-0.014 (-16.506)***
Market-to-book	0.002 (16.076)***	-0.000 (-2.945)***	0.001 (11.201)***	0.002 (17.504)***	0.002 (9.793)***	0.000 (2.434)**	0.000 (1.887)*	0.003 (17.258)***
Size	-0.001 (-5.184)***	0.001 (15.343)***	0.001 (19.511)***	0.000 (3.853)***	-0.000 (-0.315)	0.000 (3.366)***	0.000 (4.624)***	-0.001 (-5.689)***
Net working capital	-0.014 (-9.700)***	0.004 (5.361)***	-0.003 (-6.156)***	-0.000 (-0.499)	-0.000 (-7.556)***	-0.000 (-0.032)	-0.000 (-2.243)**	0.001 (1.028)
Cash flows	0.014 (9.079)***	0.010 (13.035)***	0.010 (17.110)***	0.001 (0.760)	0.046 (13.575)***	0.009 (7.184)***	0.001 (3.005)***	0.015 (6.450)***
R&D	-0.005 (-6.877)***	-0.002 (-6.400)***	-0.001 (-4.916)***	-0.006 (-21.936)***	-0.007 (-3.464)***	0.000 (0.069)	0.000 (0.377)	-0.014 (-11.582)***
Cash flow volatility	-0.002 (-0.608)	0.001 (0.699)	0.004 (3.472)***	-0.036 (-30.325)***	0.024 (2.693)***	-0.003 (-0.944)	0.003 (2.978)***	-0.025 (-6.889)***
Leverage	0.014 (9.176)***	0.023 (26.658)***	-0.005 (-11.606)***	-0.022 (-36.384)***	0.022 (10.608)***	0.011 (14.893)***	-0.000 (-2.042)**	-0.029 (-30.740)***
Industry and year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Obs.	209,036	209,036	209,036	209,036	120,505	120,505	120,505	120,505
Adj. R ²	0.191	0.074	0.086	0.134	0.189	0.054	0.020	0.228

This table presents the regression results of capital investments, acquisitions, payout policy and repurchases on national culture. The dependent variables are capital expenditure, acquisition, dividends and repurchase, respectively. Capital expenditure is defined as capital expenditure scaled by total assets. Acquisition is defined as acquisition expenditure scaled by total assets. Dividend is dividend payments scaled by total assets. Repurchase is repurchases scaled by total assets. IDV is Hofstede's individualism index. UAI is Hofstede's uncertainty-avoidance index. Market-to-book is market value of assets divided by total assets. Firm size is the natural logarithm of total assets. Net working capital is working capital net of cash and cash equivalents divided by total assets. Cash flow is operating cash flow divided by total assets. R&D is research and development expenses divided by sales revenue. Cash flow volatility is the standard deviation of cash flows for the previous ten years. Leverage is total debt divided by total assets. We run pooled OLS regressions, with *t*-statistics (in parentheses) computed using standard errors robust to both clustering at the firm level and heteroskedasticity. The full sample results are reported in columns (1)–(4) and the results for the sample excluding the United States are reported in columns (5)–(8). For ease of interpretation, we scale up the coefficients of IDV and UAI by multiplying the coefficients by 100. ***, ** and * denotes significance at the 10%, 5%, and 1% level, respectively.

the coefficients for the two investment intensity variables (capital expenditures and acquisitions) and the two payout policy variables (repurchases and dividends) are negative and significant at the one percent level. This implies that firms in high uncertainty-avoidance cultures accumulate cash by reducing their capital expenditures, acquisitions, repurchases and dividend payouts.

As far as the economic significance is concerned, the magnitude of the coefficients indicate that a one unit increase in individualism leads to a 0.011 percent rise in capital expenditure, a 0.034 percent rise in acquisition, a 0.022 percent rise in repurchases, and a 0.003 percent reduction in dividends. Other things being equal, moving from the lowest (14) to the highest (91) individualism index will result in a change in capital expenditure, acquisition, repurchases and dividends by 0.85 percent, 2.62 percent, 1.69 percent, and 0.23 percent of total assets, respectively. Further, a one-unit increase in the uncertainty-avoidance index leads to a reduction of 0.039 percent in capital expenditure, 0.018 percent in acquisition, 0.011 percent in repurchases, and 0.016 percent in dividends. Other things being equal, moving from the lowest (8) to the highest (112) uncertainty-avoidance index will result in a change in capital expenditure, acquisition, repurchase and dividends and by 4.06 percent, 1.87 percent, 1.14 percent, and 1.66 percent of total assets, respectively. The results for the sample excluding the United States are presented in columns (5)–(8) and are qualitatively the same as those for the full sample.

7. An analysis of cultural effects at the state level in the United States

7.1. Culture and cash holdings at the state-level

Although the culture of the United States is individualistic (Hofstede, 1980 and Triandis, 1994), Vandello and Cohen (1999) argue that regions of the United States exhibit measurable variations on this dimension. They state that by studying the intra-nation variations, one may learn more about the individualism–collectivism dimension in general. To test their predictions, Vandello and Cohen (1999) create an eight-item index ranking states in the United States in terms of individualist versus collectivistic tendencies. The first three items of their eight-item index are related to family structure and living arrangements and the rest of the items are related to social, political, religious and economic practices. In their eight-item index, higher scores reflect greater collectivism, and lower scores reflect greater individualism. We define the state-level individualism index (state IDV) is as minus one times the collectivism index so that higher state IDV indicates higher individualism.

Our task in this section is to investigate the association between the individualism–collectivism dimension and corporate cash holdings at the state level in the United States. Prior research on the individualism–collectivism dimension involved comparing Asian economies with the United States or European countries. Our paper compares the individualism–collectivism dimension solely within the context of the United States. In Table 7, we report the summary statistics of the state level sample. All numbers, with the exception of the number of observations and firms, are state or sample medians. The table shows that California, Texas and New York are the states with the largest representation in the sample. The median of our key variable, firm cash holdings is shown in column (3). The column suggests a large state level variation in the ratio of cash to assets. The overall median is 0.099 across the 50 states. However, some states have median cash holdings of less than 0.05 (Alaska, Arkansas, Iowa, Kansas, Kentucky, Louisiana, Mississippi, Missouri, Ohio, Oklahoma, South Carolina, South Dakota, Tennessee, and Wisconsin), while some states have

median cash holdings in excess of 0.20 (California, Maine, Massachusetts, and Washington).

We also report a significant variation in state IDV in column (4) of Table 7, which ranges from –31 for Montana to –91 for Hawaii. Since our state-level analysis is based on a single country, one potential concern is that the variation in state IDV is not large enough to yield statistically meaningful test results. To address this concern, we divide the sample into 100 equal groups by cash ratio and conduct an ANOVA test. The F-statistics suggest that the between-group variation of state IDV is significantly greater than its within-group variation, suggesting sufficient between-state variation in state IDV.¹⁸

Table 7 also reports sample medians for the control variables. The sample median for the market-to-book ratio is 1.491, while that of firm size is 4.76. The sample firms also have median net working capital to assets of 0.069 and median cash flow to assets of 0.017. The median value for R&D to sales is zero for most of the states and zero for the overall sample, suggesting that the majority of firms in our sample have little or no R&D expenditures. The median cash flow volatility is 0.074, and the median leverage ratio is 0.173.

The regression results are reported in Table 8. For ease of interpretation, we scale up the coefficients of state IDV by multiplying the coefficient by 100 as well. We show that state IDV is negatively and significantly related to firm cash holdings in columns (1) and (2). The magnitude of the coefficient in column (2) indicates that a one unit increase in state IDV leads to a 0.053 percent reduction in firm cash holdings. Other things being equal, moving from the highest (–31) to the lowest (–91) state IDV will result in a change in cash holdings of 3.18 percent of the book value of assets. Our results clearly establish the link between the individualism–collectivism index of Vandello and Cohen (1999) and cash holdings at the state level. With regards to the control variables, we find that market-to-book, cash flows, R&D and cash-flow volatility are positively related to cash holdings, while size and net working capital are negatively related to cash holdings. Our findings for control variables are consistent with the results summarized in Table 2 and those of Bates et al. (2009). Overall, our results provide compelling evidence that firms in individualistic states within the United States hold less cash than firms in collectivistic states.¹⁹

We also investigate the interaction effects between state IDV and firm risk attributes. To be consistent with our prior analysis in the international setting, we use cash flow volatility and R&D as our firm risk attributes. We report the results in columns (3) and (4). Column (3) shows that the coefficient for the interaction term state IDV * cash flow volatility is negative and significant suggesting that individualism significantly reduces the firm's precautionary motive for holding cash when its cash flow volatility is high. The coefficient for the interaction between state IDV and R&D reported in column (4) is negative and insignificant.

7.2. Impact of individualism–collectivism on investment intensity and payout policy

In the previous section, we documented a negative relation between individualism at a state-level and corporate cash

¹⁸ We thank an anonymous referee for suggesting this test.

¹⁹ In unreported tests, we also use industry adjusted cash holdings, calculated as the difference between firm cash holdings and the current year median cash holdings of the firm's two-digit SIC industry, as the dependent variable. The purpose of using industry adjusted cash holdings is to address the concern that there can be some clustering of industries by state and thus the link between firm cash holdings and individualism is driven by industry differences in cash holdings. The regression results show that the coefficient for state IDV is negative and significant suggesting that our findings are not driven by industry clustering.

Table 7
Summary statistics of state-level collectivism index in the United States.

State	# of obs.	# of firms	Cash	State IDV	Market-to-book	Size	Net working capital	Cash flows	R&D	Cash flow volatility	Leverage
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Alabama	459	44	0.056	-57	1.354	5.160	0.144	0.027	0.000	0.061	0.199
Alaska	38	3	0.031	-48	1.210	6.469	-0.006	0.004	0.000	0.057	0.556
Arizona	1286	165	0.112	-49	1.490	4.375	0.046	0.016	0.000	0.091	0.177
Arkansas	370	29	0.022	-54	1.405	6.159	0.032	0.032	0.000	0.039	0.304
California	15,577	2083	0.261	-60	1.762	4.458	0.043	-0.004	0.086	0.119	0.063
Connecticut	2103	247	0.073	-50	1.462	5.085	0.096	0.020	0.008	0.069	0.230
Delaware	274	31	0.086	-55	1.366	4.872	0.028	0.010	0.006	0.052	0.237
Florida	4215	567	0.071	-54	1.417	4.124	0.080	0.011	0.000	0.091	0.216
Georgia	2465	301	0.071	-60	1.477	5.143	0.058	0.017	0.000	0.077	0.233
Hawaii	128	11	0.051	-91	1.276	4.338	0.003	0.005	0.000	0.100	0.183
Idaho	196	24	0.100	-42	1.385	5.858	0.053	0.011	0.000	0.111	0.183
Illinois	3611	401	0.053	-52	1.457	5.563	0.106	0.026	0.000	0.048	0.233
Indiana	863	93	0.054	-57	1.248	5.174	0.150	0.033	0.000	0.060	0.203
Iowa	416	39	0.047	-39	1.428	5.398	0.099	0.040	0.000	0.057	0.206
Kansas	517	62	0.047	-38	1.275	4.870	0.043	0.020	0.000	0.064	0.209
Kentucky	427	38	0.043	-53	1.247	5.754	0.118	0.033	0.000	0.040	0.263
Louisiana	526	60	0.031	-72	1.308	5.490	0.029	0.020	0.000	0.068	0.284
Maine	86	9	0.293	-45	1.645	3.566	0.125	0.051	0.068	0.056	0.052
Maryland	1514	195	0.141	-63	1.592	4.196	0.045	0.001	0.018	0.086	0.146
Massachusetts	5371	602	0.268	-46	1.714	4.438	0.062	0.004	0.079	0.103	0.061
Michigan	1611	161	0.051	-46	1.320	5.054	0.114	0.024	0.004	0.063	0.206
Minnesota	3090	328	0.129	-41	1.614	4.055	0.118	0.030	0.023	0.079	0.110
Mississippi	219	27	0.040	-64	1.301	5.365	0.048	0.018	0.000	0.078	0.344
Missouri	1260	129	0.039	-46	1.474	5.876	0.115	0.036	0.000	0.045	0.248
Montana	68	10	0.149	-31	1.697	5.004	0.050	0.011	0.000	0.074	0.065
Nebraska	299	29	0.055	-35	1.585	5.555	0.081	0.035	0.000	0.039	0.203
Nevada	744	99	0.118	-52	1.468	4.768	-0.025	0.005	0.000	0.071	0.330
New Hampshire	395	47	0.114	-43	1.583	4.521	0.117	0.029	0.033	0.077	0.157
New Jersey	4286	507	0.115	-59	1.566	3.994	0.066	0.004	0.011	0.092	0.162
New Mexico	114	19	0.086	-51	1.521	3.006	0.077	0.006	0.000	0.107	0.307
New York	7451	982	0.095	-53	1.388	4.443	0.088	0.012	0.000	0.070	0.182
North Carolina	1524	175	0.063	-56	1.356	5.269	0.116	0.023	0.000	0.059	0.232
North Dakota	31	4	0.056	-37	1.039	2.543	-0.015	0.020	0.000	0.112	0.220
Ohio	2909	276	0.037	-45	1.322	5.793	0.137	0.030	0.000	0.049	0.245
Oklahoma	768	111	0.033	-42	1.398	4.305	0.011	0.025	0.000	0.076	0.269
Oregon	918	96	0.112	-33	1.421	4.606	0.122	0.025	0.009	0.079	0.143
Pennsylvania	3590	395	0.076	-52	1.477	5.132	0.101	0.024	0.005	0.055	0.192
Rhode Island	250	31	0.124	-48	1.690	5.075	0.149	0.037	0.015	0.056	0.149
South Carolina	401	50	0.025	-70	1.332	5.104	0.139	0.033	0.000	0.055	0.217
South Dakota	85	8	0.043	-36	1.616	4.826	0.204	0.056	0.004	0.043	0.158
Tennessee	1275	138	0.044	-56	1.448	5.667	0.047	0.037	0.000	0.047	0.287
Texas	8406	1013	0.058	-58	1.382	5.168	0.035	0.020	0.000	0.069	0.230
Utah	729	97	0.134	-61	1.739	3.712	0.067	0.013	0.015	0.120	0.157
Vermont	109	11	0.070	-42	1.483	3.337	0.119	0.027	0.000	0.077	0.244
Virginia	2068	255	0.067	-60	1.404	5.125	0.080	0.019	0.000	0.065	0.201
Washington	1613	208	0.241	-37	1.707	4.746	0.009	-0.011	0.038	0.091	0.061
West Virginia	102	12	0.071	-48	1.055	4.602	0.004	0.030	0.000	0.057	0.248
Wisconsin	1221	109	0.039	-46	1.373	5.520	0.156	0.035	0.009	0.039	0.196
Wyoming	25	7	0.013	-35	1.008	4.287	-0.044	-0.023	0.000	0.104	0.314
Total	88,531	10,690	0.099	-54	1.491	4.760	0.069	0.017	0.000	0.074	0.173

This table reports the summary statistics for all the states in our sample. All numbers with the exception of number of observations and firms are state or sample medians. State IDV is the minus one times the individualism–collectivism index of [Vandello and Cohen \(1999\)](#). Cash ratio is cash and cash equivalents divided by total assets. IDV is Hofstede's individualism index. UAI is Hofstede's uncertainty-avoidance index. Market-to-book is market value of assets divided by total assets. Firm size is the natural logarithm of total assets. Net working capital is working capital net of cash and cash equivalents divided by total assets. Cash flow is operating cash flow divided by total assets. R&D is research and development expenses divided by sales revenue. Cash flow volatility is the standard deviation of cash flows for the previous ten years. Leverage is total debt divided by total assets.

holdings. In this section, we explore whether cultural differences within the United States can explain what firms do with cash holdings. Specifically, we examine the association between firms' capital investments, acquisitions, repurchases and dividend payouts and their corporate cash holdings. Our study examines this association at a state level in the United States.

We report the regression results in [Table 9](#). With respect to two investment intensity variables, their coefficients are positive and significant. This finding implies that firms in individualistic states expand their operations through capital expenditures and acquisitions. With respect to the payout variables, we find that

the coefficient for repurchases is positive and significant, while the coefficient for dividends is insignificant. The magnitude of the coefficient indicates that a one-unit increase in individualism leads to a 0.03 percent rise in capital expenditure, a 0.008 percent rise in acquisitions, and a 0.008 percent rise in repurchases. Other things being equal, moving from the highest (-31) to the lowest (-91) state IDV will result in a change in capital expenditure, acquisitions, and repurchases by 1.8 percent, 0.48 percent, and 0.48 percent of total assets, respectively. Taken together, our findings reported in [Table 9](#) are largely consistent with our findings for our international sample reported in [Table 6](#).

Table 8
Regressions of cash holdings on the state-level individualism–collectivism dimension in the United States.

	(1)	(2)	(3)	(4)
State IDV	−0.159 (−5.241)***	−0.053 (−2.986)***	−0.036 (−2.033)**	−0.053 (−2.910)***
State IDV * cash flow volatility			−0.146 (−3.038)***	
State IDV * R&D				−0.000 (−0.003)
Market-to-book		0.012 (17.668)***	0.012 (17.249)***	0.012 (17.665)***
Size		−0.013 (−17.072)***	−0.012 (−15.818)***	−0.013 (−17.071)***
Net working capital		−0.295 (−37.075)***	−0.285 (−35.373)***	−0.295 (−37.069)***
Cash flows		0.076 (12.132)***	0.080 (12.230)***	0.076 (12.132)***
R&D		0.162 (37.613)***	0.164 (36.830)***	0.162 (7.485)***
Cash flow volatility		0.128 (10.555)***	0.089 (4.765)***	0.128 (10.555)***
Leverage		−0.374 (−51.295)***	−0.361 (−49.146)***	−0.374 (−51.296)***
Industry and year FE	No	Yes	Yes	Yes
Obs.	88,531	88,531	88,531	88,531
Adj. R ²	0.003	0.518	0.514	0.518

This table presents the regression results of cash holdings on regional culture in the United States. The dependent variable is Cash ratio, defined as cash and cash equivalents divided by total assets. State IDV is the minus one times the individualism–collectivism index of [Vandello and Cohen \(1999\)](#). Market-to-book is market value of assets divided by total assets. Firm size is the natural logarithm of total assets. Net working capital is working capital net of cash and cash equivalents divided by total assets. Cash flow is operating cash flow divided by total assets. R&D is research and development expenses divided by sales revenue. Cash flow volatility is the standard deviation of cash flows for the previous ten years. Leverage is total debt divided by total assets. We run pooled OLS regressions, with *t*-statistics (in parentheses) computed using standard errors robust to both clustering at the firm level and heteroskedasticity. For ease of interpretation, we scale up the coefficient of State IDV by multiplying the coefficient by 100. ***, ** and * denotes significance at the 10%, 5%, and 1% level, respectively.

Table 9
Regressions of capital investments, acquisitions, dividends and repurchases on the state-level individualism–collectivism dimension in the United States.

	(1) Capital expenditure	(2) Acquisitions	(3) Repurchase	(4) Dividends
State IDV	0.030 (4.733)***	0.008 (2.401)**	0.008 (3.878)***	0.002 (0.873)
Market-to-book	0.003 (14.098)***	−0.001 (−7.752)***	0.001 (10.756)***	0.001 (8.953)***
Size	0.001 (4.122)***	0.003 (17.227)***	0.002 (19.645)***	0.002 (19.190)***
Net working capital	−0.022 (−9.787)***	0.002 (1.491)	−0.008 (−8.840)***	0.003 (3.715)***
Cash flows	0.001 (0.470)	0.008 (7.367)***	0.010 (14.029)***	−0.007 (−11.887)***
R&D	−0.004 (−4.959)***	−0.002 (−4.687)***	−0.002 (−7.643)***	−0.004 (−15.193)***
Cash flow volatility	−0.009 (−2.605)***	−0.001 (−0.494)	−0.004 (−2.816)***	−0.011 (−10.349)***
Leverage	−0.002 (−0.716)	0.029 (20.009)***	−0.012 (−16.151)***	−0.012 (−17.193)***
Industry and year FE	Yes	Yes	Yes	Yes
Obs.	88,531	88,531	88,531	88,531
Adj. R ²	0.257	0.061	0.088	0.120

This table presents the regression results of capital investments, acquisitions, payout policy and repurchases on regional culture in the United States. The dependent variables are capital expenditure, acquisition, dividends and repurchase, respectively. Capital expenditure is defined as capital expenditure scaled by total assets. Acquisition is defined as acquisition expenditure scaled by total assets. Dividend is dividend payments scaled by total assets. Repurchase is repurchases scaled by total assets. State IDV is the minus one times the individualism–collectivism index of [Vandello and Cohen \(1999\)](#). Market-to-book is market value of assets divided by total assets. Firm size is the natural logarithm of total assets. Net working capital is working capital net of cash and cash equivalents divided by total assets. Cash flow is operating cash flow divided by total assets. R&D is research and development expenses divided by sales revenue. Cash flow volatility is the standard deviation of cash flows for the previous ten years. Leverage is total debt divided by total assets. We run pooled OLS regressions, with *t*-statistics (in parentheses) computed using standard errors robust to both clustering at the firm level and heteroskedasticity. For ease of interpretation, we scale up the coefficient of State IDV by multiplying the coefficient by 100. ***, ** and * denotes significance at the 10%, 5%, and 1% level, respectively.

8. Conclusion

This paper is the first to examine whether cultural differences can explain the variations in corporate cash holdings around the world. This paper is also the first to examine the association between corporate cash holdings and the individualism–collectivism dimension of [Vandello and Cohen \(1999\)](#) at a state level in the

United States. Using proxies for national culture from [Hofstede \(1980\)](#), we hypothesize a negative relation between individualism and corporate cash holdings and a positive relation between uncertainty-avoidance and corporate cash holdings. Using data for 27,801 firms across 41 countries from 1989 to 2009, we find that individualism is significantly negatively correlated with corporate cash holdings and uncertainty-avoidance is positively correlated

with corporate cash holdings. We also document that individualism and uncertainty avoidance influence the precautionary motive for holding cash. Our state-level analyses also show that firms in individualistic states in the United States hold less cash than firms in collectivistic states.

We then ask “What do firms in individualistic and uncertainty-avoidance cultures do with their cash holdings?” We address the accumulation and dissipation of cash by examining the association between firms’ capital investments, acquisitions, dividend payouts and repurchases and their corporate cash holdings. We show that for the 41 countries investigated in this paper, individualism is positively and significantly related to the firm’s capital expenditures, acquisitions, and repurchases and negatively related to the firm’s payout, while uncertainty-avoidance is negatively related to the firm’s capital expenditures, acquisitions, payout and repurchases. We report similar findings at the state-level within the United States.

Our findings are robust to alternative specifications of cash holdings, alternative measures of national culture and a comprehensive set of control variables, and thus, they provide strong support for the importance of the cultural effect in determining corporate cash holdings. In sum, we show that the cultural

differences in markets around the world and within the United States affect corporate financial decisions.

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Appendix A.

Variables, data sources and definitions

Variable	Source	Definition
Acquisition	Compustat	Acquisitions expenditure/total assets
Capital expenditure	Compustat	Capital expenditures/total assets
Cash ratio	Compustat	Cash and short-term investments/total assets
Cash flows	Compustat	(Income before extraordinary items – common dividends)/total assets
Cash flow volatility	Compustat	Standard deviation of cash flows for the previous ten years, requiring at least three observations
Common law	La Porta et al. (1998)	Dummy variable equal to one if the country has common law origin and zero if it has civil law origin
Corruption index	Transparency International	A higher score indicates a higher level of country corruption risk
Dividends	Compustat	Common dividends/total assets
External finance	World Bank Databank	External finance/GNP
Firm size	Compustat	Natural logarithm of total assets
Foreign ownership	Capital IQ	Sum of the percentage ownership by all foreign investors of the firm, where foreign investors are defined as investors with different country label as the firm in the database
GDP growth	World Bank Databank	The annual growth rate of GDP
GDP per capita	World Bank Databank	GDP per capita
Individualism (IDV)	Hofstede (1980, 2001)	A higher score indicates a higher degree of individualism
Investor protection	La Porta et al. (1998)	A higher score indicates a higher level of investor protection
Leverage	Compustat	(Long-term debt + debt in current liabilities)/total assets
Market-to-book	Compustat	(Stock price * shares outstanding + book assets – book equity)/total assets
Net working capital	Compustat	(Working capital – cash and short-term investments)/total assets
Openness	S&P/IFCI	Ratio of market capitalization of the stocks comprising the S&P-IFC Investable Index over market capitalization of the stocks comprising the S&P-IFC Global Index in the country
Private credit	World Bank Databank	Private credit/GDP
R&D	Compustat	R&D expense/sales
Repurchase	Compustat	Repurchases of common stock/total assets
Uncertainty-avoidance (UAI)	Hofstede (1980, 2001)	A higher score indicates a higher degree of uncertainty-avoidance
S&P 1200	Compustat	Dummy variable equal to one if the firm is in the S&P 1200 Global index and zero otherwise
State individualism (State IDV)	Vandello and Cohen (1999)	Minus one times the collectivism–individualism index of Vandello and Cohen (1999). A higher score indicates a higher degree of individualism

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