Does cultural difference affect investment cash flow sensitivity? Evidence from OECD countries

Kashefi Pour, Eilnaz; Amini, Shima; Uddin, Moshfique; Duxbury, Darren

DOI:
https://doi.org/10.1111/1467-8551.12394

Forthcoming paper, please cite as:
Eilnaz Kashefi Pour, Shima Amini, Darren Duxbury, Moshfique Uddin (forthcoming). Does Cultural Difference Affect Investment Cash flow Sensitivity? Evidence from OECD Countries. *British Journal of Management*.

Does Cultural Difference Affect Investment Cash flow Sensitivity?

Evidence from OECD Countries

Eilnaz Kashefi Pour[1], Shima Amini[2], Darren Duxbury[3], Moshfique Uddin[4]

Abstract

We investigate the influence of national culture on corporate investment-cash flow sensitivity. We conjecture that national culture shapes managerial perceptions of information asymmetry and agency problems, thus impacting the investment-cash flow relationship. We document empirical evidence in support of our claim. By linking the investment-cash flow sensitivity to cultural differences, our findings show that, while collectivism has an attenuating influence, uncertainty avoidance, power distance, and masculinity have a reinforcing effect on the relationship between cash flow and investment. Our results hold for a sample of 205,268 firm-years across 24 OECD countries between 1990 and 2017 and are robust after accounting for alternative statistical approaches, sample compositions, and measures of cultural dimensions, along with controls for institutional and governmental factors. In addition, by decomposing cash flow into uses and sources of funds in a dynamic multi-equation model, where firms make financing and investment decisions jointly subject to the constraint that sources must equal uses of cash, we find that national culture shapes how firms react to changes in cash flow.

JEL classification: G10, G30, G31, Z10

Keywords: National Culture, Investment-Cash Flow Sensitivity, Information Asymmetry, Agency Theory

[1] University of Birmingham, email: e.kashefipour@bham.ac.uk
[2] University of Leeds, email: S.Amini@lubs.leeds.ac.uk
[3] Newcastle University, email: Darren.Duxbury@newcastle.ac.uk
[4] University of Leeds, email: M.M.Uddin@leeds.ac.uk

1. Introduction

In this paper we study the influence of national culture on firms' investment decisions, specifically investment-cash flow sensitivity (ICFS hereafter). The finance literature on corporate investment, starting with Fazzari et al. (1988), traditionally focuses on firm-level characteristics and explains investment distortions from the perspective of agency theory (Jensen and Meckling, 1976) and asymmetric information theory (Myers and Majluf, 1984). However, the debate over the determinants of ICFS continues (e.g., Chowdhury et al., 2016; Moshirian et al, 2017). Most studies to date investigate this relationship from the perspective of a single country, mainly the US. Moshirian et al. (2017), however, suggest using international data to take advantage of a considerable cross-country variation in important firm characteristics. We argue the need to look at the cultural determinants of ICFS and investigate whether this relationship changes when national culture in which firms operate changes. Motivated by the management literature documenting the importance of national culture for corporate decisions (e.g. Chui et al., 2002; Kwok and Tadesse, 2006; Teerikangas and Very, 2006; Han et al., 2010; Shao et al., 2010, 2013) and governance (Griffin et al. 2017), we argue that corporate investment decisions, specifically ICFS, are dependent on the national culture in which corporations operate.

Traditionally, ICFS has been explained using two competing theories (Wei and Zhang, 2008). The first, agency theory, suggests that managers tend to overspend when they have access to internally generated cash reserves (Jensen, 1986; Pawlina and Renneboog, 2005; Hovakimian and Hovakimian, 2009; Derouiche et al., 2018; Danso et al., (forthcoming)). Thus, agency theory (Jensen and Meckling, 1976) focuses on the misalignment of managerial and shareholders' interests, suggesting that managers overinvest to gain private benefits such as perks, large empires, and entrenchment. Free cash in their hands is a temptation for managers

to pursue self-interested investment, which will in turn increase investment distortions (Malmendier and Tate, 2005). The second, information asymmetry, suggests that managers themselves limit external finance if the market demands a high risk premium (Pawlina and Renneboog, 2005). This is because the existence of information asymmetry makes it very costly for providers of external finance to evaluate the quality of the firms' investment opportunities (Fazzari et al., 1988; Pawlina and Renneboog, 2005). Therefore, information asymmetry suggests that internal finance generated through cash flow increases investment. While distinct theories, the importance of considering agency theory and information asymmetry together as opposed to in isolation is well recognized in the literature, both in relation to ICFS (Pawlina and Renneboog, 2005) and more widely (Ataullah et al., 2014; Shah et al., 2019).

While agency theory is associated with self-interest and divergence of goals between principals and agents, Johnson and Droege (2004) argue that culture may help align such goals, thus altering agency theory predictions. Similarly, in the context of information asymmetry, Tan et al. (2003) demonstrate that managers' predisposition to disclose information is contingent upon national culture. Similar to Boubakri and Saffar (2016) in the context of corporate growth, we argue that national culture affects ICFS through its effect on individual decision-making at the firm-level, through both agency and information asymmetry mechanisms.

The objective of this study is to examine the effect of national culture on ICFS. We believe this to be timely and important for several reasons. First, while fundamental economic decision making (via preferences and beliefs) are influenced by national culture (Guiso et al., 2006), the finance literature has paid inadequate attention to the role of national culture in financial decision making (Ahern et al., 2015), thus further examination of the role of national culture in finance, in addition to traditional economic and financial factors, is warranted (Aggarwal

and Goodell, 2014). This paper is a timely response to this call to explore the finance and national culture nexus. Second, Shao et al. (2013) suggest that national culture, being a form of informal institutions, would affect corporate investment. Drawing on bounded rationality arguments (Williamson, 1998), Shao et al. (2013) argue it is not possible to bring all contingencies into contract and so formal institutions might not be sufficient to explain economic outcomes. Thus, they suggest, informal institutions, like culture, play an important role in explaining complex corporate phenomena. Third, Aggarwal et al. (2016) support the inclusion of national culture in finance models, as to do so increases the predictive power of those models, thus helping to understand the integrative reality of finance and management practice.

Using Hofstede's (2001) four cultural dimensions (collectivism, uncertainty avoidance, power distance, and masculinity), and a sample of 205,268 firm-years from 24 OECD countries between 1990 and 2017, we uncover new findings that national culture establishes boundary conditions for the relationship between cash flow and investment when we introduce interaction terms for national culture and cash flow.[1] More specifically, we find that collectivism has a negative effect on ICFS, while uncertainty avoidance, power distance, and masculinity all have positive effects. Our results are robust to alternative measures of national culture (Schwartz, 2006, 2008; House et al., 2004), along with alternative sample specifications, additional control variables, an alternative investment measure, and different empirical estimations. Moreover, both of our static and dynamic models provided strong support for our hypotheses.

Our study contributes to the literature in a number of ways. Firstly, we extend the corporate investment literature by investigating the role of national culture in explaining ICFS. We add to the prior literature such as Jiang et al. (2019) who examine the influence of *corporate* culture

on ICFS in Chinese firms. We investigate the role of *national* culture in explaining ICFS across 24 OECD countries. Secondly, we contribute to the national culture literature. Most importantly, we add to Chen et al. (2015) who examine the relationship between *level* of corporate cash holdings and two cultural dimensions; namely individualism and uncertainty avoidance. They demonstrate that investment intensity (i.e. the *level* of capital expenditure) is influenced by national culture and by cash flow holdings. We extend their study in two ways. First, we show, in addition to the *level* of investment intensity, that the *sensitivity* of the investment-cash flow relation is also impacted by national culture. Second, motivated by Chang and Noorbakhsh (2009), who show that firms hold larger cash and liquid balances when uncertainty avoidance and masculinity are high, we extend the cultural dimensions examined in Chen et al. (2015) to include Hofstede's (2001) power distance and masculinity dimensions. We also add to Shao et al. (2013) who investigate the relationship between individualism and horizons (long-term vs short-term) and types (e.g. cash equivalents, R&D, capital expenditure) of corporate investment. We add to Shao et al. (2013) by extending the range of cultural dimensions beyond individualism-collectivism and by investigating the role of national culture on ICFS. Thirdly, we extend studies examining the investment-cash flow sensitivities of various uses of cash flow in a dynamic system approach (Gatchev et al., 2010; Chang et al., 2014; Lewellen and Lewellen, 2016) to further reveal the importance of national culture.

The rest of the paper proceeds as follows. Section two details relevant literature and develops testable hypotheses. Section three discusses the data and empirical approach employed. Section four presents the main results and robustness tests, while section five concludes.

2. National culture and ICFS

2.1. Collectivism-individualism

Collectivism-individualism captures the degree to which a society stresses the role of group vs. that of individual. In collectivistic societies a person acts according to the interest of the group, while in individualistic societies the emphasis is on self-interest and managers stress leadership (Hofstede, 2001). Several studies propose individualism to be in line with assumptions of self-attribution in the context of agency theory. For example, Johnson and Droege (2004: 328) claim "collectivism aligns the organizational and individual objectives and biases the employment relationship". Collectivism, therefore, tends to have higher levels of goal alignment between principals and agents, hence "agency theory predictions of agent self-interest may not accurately reflect the underlying norms of collectivistic cultures" (Johnson and Droege, 2004: 328). Pindado and De La Torre (2009) show that alignment of interests between managers and owners alleviates ICFS, hence less ICFS is expected in collectivism cultures. Moreover, Davis et al. (1997) suggest managerial entrenchment would be higher in individualistic societies therefore agency cost would be higher. Drawing on the above, we argue that managers in individualistic societies, where entrepreneurial risk seeking is higher than in collectivistic societies (Kreiser et al., 2010), are more likely to invest in risky projects, and, hence, the overinvestment problem is more severe. Therefore, based on this agency theorizing, we suggest that ICFS is higher in individualistic societies and lower in collectivistic societies.

The prediction of lower ICFS and investment in collectivist society is also justified from the context of information asymmetry. In collectivistic societies, organizational success is attributed to sharing information whereas in individualistic societies the success is attributed to withholding information (Hofstede, 2001). Therefore, information asymmetry is expected to

be lower in high collectivistic societies. Consequently, it would be easier in such societies for external finance providers to assess the quality of firms' investments, and, hence, external finance would be expected to be available at lower costs than would be the case in high individualism cultures. Accordingly, ICFS would be lower in such societies.

Based on above arguments, we propose the following:

Hypothesis 1: Ceteris paribus, collectivism attenuates the relationship between cash flow and investment.

2.2. Uncertainty avoidance

As Hofstede (1983, 2001) explains, uncertainty avoidance is associated with unpredictability about the future and reflects the extent to which people feel uncomfortable with uncertain, unknown, or unstructured situations. In countries with high uncertainty avoidance, managers are more conservative and less tolerant of risk (Riddle, 1992; Lei et al., 2013), thus they hold more cash as a hedge against undesired states of nature (Ramirez and Tadesse, 2009). Following the risk aversion hypothesis suggested by Hines and Thaler (1995) and Kaplan and Zingales (2000), Bhabra et al. (2018) argue that managerial entrenchment impacts ICFS. If managers are risk averse in the presence of high uncertainty avoidance, they invest only when internal cash flow is sufficiently high, potentially rejecting wealth creating (positive NPV) projects when internal cash flow is limited in favour of accumulating cash in the presence of future uncertainty. Observing such behavior, outside investors would be reluctant to invest, leaving managers to rely more on internal cash flow. Therefore, we expect in high uncertainty avoidance cultures, where managers are more risk averse, ICFS would be higher due to managerial entrenchment.

It is commonly accepted that information asymmetry makes external finance more costly than internal finance (Myers and Majluf, 1984; Ascioglu et al., 2008). Thus, high levels of information asymmetry promote greater use of internal cash flow to finance investment opportunities. Cultures with high uncertainty avoidance follow strict behavioural codes, laws, and rules and therefore limit information sharing (Hofstede, 2011). Furthermore, high uncertainty avoidance cultures have lower tolerance for unstructured situations, uncertainty or ambiguity and are more sceptical about future potential rewards from risky ventures, and, hence require higher returns to compensate risks (Fidrmuc and Jacob, 2010). Therefore, we expect managers in high uncertainty avoidance societies to attempt to limit external finance to avoid high costs and to be more dependent on internal cash flow to finance investment opportunities, thus promoting high ICFS.

Based on above arguments, we propose the following:

Hypothesis 2: Ceteris paribus, uncertainty avoidance reinforces the relationship between cash flow and investment.

2.3. Power distance

Power distance measures the extent to which the less powerful expect and accept that power is distributed unequally. In high-power distance societies, the less powerful exhibit a high tolerance for power imbalances and show fear of disagreeing with the more powerful group, while the powerful are expected to use their powers to pursue privilege and wealth (Hofstede, 2001). Moreover, managers in high power distance cultures are dissatisfied with their career, and, hence, there are many examples of power abuse in the work place. In addition, high power distance cultures are characterized by showing no defence against power abuse by managers and superiors. Therefore, we expect that managers in high-power distance societies are more

likely to pursue self-interested investments, and free cash in their hands enables them to overinvest and increase investment distortions. Hence, we expect to observe higher ICFS in high power distance cultures.

We also argue that informational asymmetry is more severe in higher power distance societies because in such societies inequality is an accepted fact. In these societies everyone has his rightful place and power holders are entitled to privileges (Hofstede, 2001). We argue that superior information is considered as a privilege and there is minimum effort to increase transparency and reduce information asymmetry in high power distance cultures. In the work organization, in high power distance cultures, there is little openness with information; in fact information is constrained by managers (Hofstede, 2001). Furthermore, in high power distance societies there is a basic mistrust between powerful and powerless (Hofstede, 2001). Therefore, lower levels of trust are associated with power distance societies (Zheng et al., 2012), thus prompting information asymmetry. Thus, we expect to observe higher ICFS in high power distance cultures.

Based on above arguments, we propose the following:

Hypothesis 3: Ceteris paribus, power distance reinforces the relationship between cash flow and investment.

2.4. Masculinity

Masculinity focuses on the extent to which male assertiveness (e.g., the importance of showing off, of making money, and of striving for material success) is promoted as dominant values in a society as opposed to ‘‘female nurturance’’. Masculine cultures prefer individual decisions and favour rewards for performance while feminine cultures emphasize on equality of reward and group decisions. Drawing on Hofstede (2001), Zheng et al (2012) argue that in masculine

societies where "status purchases" are likely to be frequent, managers have a tendency to consume perks and build corporate kingdoms to satisfy their sense of achievement. Hence, managers are likely to invest in value-destroying projects in attempts to expropriate private benefits and increase assets under their control, that is, large empires and entrenchment (e.g., Malmendier and Tate, 2005; Zwiebel, 1996). Managers in more masculine cultures may be more likely to pursue high risk investments, thus intensifying overinvestment problems.[2]

According to Hofstede (2001), the masculine manager is assertive, decisive, and aggressive, whereas, the manager in a feminine culture is less visible, intuitive rather than decisive, and accustomed to seek consensus. In societies characterized with masculinity people strive for material success (Zheng et al., 2012). In fact, in such cultures the focus is on material reward, performance, and competition (Hofstede, 2001). Under asymmetric information, it is difficult for providers of external finance to evaluate the quality of firms' investment opportunities and so they impose higher costs. Given the focus of masculine cultures is very much on success, we argue that in such cultures there is more focus on internal finance with its associated lower costs, because it eases the successful implementation of investment opportunities.

Based on above arguments, we propose the following:

Hypothesis 4: Ceteris paribus, masculinity reinforces the relationship between cash flow and investment.

3. Data and empirical approach

3.1. Data

We first collect all firms registered in OECD countries[3] from *DataStream*. We exclude Korea, Czech Republic, Chile, Estonia, Greece, Hungary, Iceland, Slovak Republic, and Slovenia for

lack of or unreliable data. We also exclude financial firms and firms with negative book equity. Our final sample includes 19,573 firms from 24 OECD countries over the sample period 1990 to 2017, resulting in 205,268 firm-year observations. Data for firm-specific variables is collected from *DataStream* and *Thomson One*, while country-level data is collected from several sources specified in Table 1.

[Table 1]

3.2 Empirical approach

Given the multilevel structure of our data, it is important to distinguish effects that take place at the country level from those that take place at the firm level. Following Li et al. (2013), we apply Hierarchical Linear Modelling (HLM) to take account of the multi-level structure of our data, with firms representing the base-level observations and countries the higher-level observations. In the HLM framework, we use a country mean-centred approach to firm-level variables to capture within-country variance in firm-level characteristics, which helps explain why ICFS varies within a country, while the country-mean of firm-level variables and other country-level predictors capture differences in institutional settings across countries, which explains why ICFS varies across countries. HLM simultaneously models regressions at both the firm-level and the country-level, accurately capturing cross-level interactions between the firm- and country-level variables (Li et al., 2013). In addition, the HLM specification allows us to capture the indirect effect of culture through country-mean of firm-level variables, and thus separates out the direct effect of culture on ICFS. This specification also corrects for the distortion introduced by varying sample sizes across countries and avoids the OLS bias as the coefficient on a country-level variable can be spuriously significant simply because of the large sample size at the firm level. Unlike the OLS regression where each firm-level observation receives equal weight, the HLM regression simultaneously models regressions at both the firm-

level and the country-level; with the country-level regression weighted by the precision of the firm-level data, which is inversely related to the sample size within a country (Li et al., 2013). The main benefit of using HLM, for part of the analysis in this paper, is that the approach enables us to isolate the effects of firm-level and country-level variables (see Bryan and Jenkins, 2015).

To this end, we follow the approach in Li et al. (2013) of first mean centring the variables and then employing a hierarchical nested form of the general linear model. We decompose the firm- and country-level variation in ICFS by centring the variables in the following order: 1). For each country-level variable, we centre by its grand mean (average across countries). We add the suffix "*_ctry*" to each transformed county-level variable. 2) For each firm-level independent variable, we centre by its grand mean (average across countries and firms). 3) We continue the process by creating country-level mean values (average within a country) on those grand-mean centred variables at the firm level in the previous step. We add the suffix "*_ctrymean*" to each transformed firm-level variable. 4) Finally, we create within-country residuals by taking the grand-mean adjusted variables in step 2 and subtracting the corresponding within-country means in step 3. We add the suffix "*_firmdev*" which is separated from their corresponding country-level means "*_ctrymean*". Centring the data removes potential concerns surrounding correlation, in particular between firm- and country-level variables and also cross-level interactions, and permits the effect of firm characteristics to be decomposed into firm-level and the country-level effects.

Our HLM specification is presented in Equation (1): [4]

$$I_{i,j} = \beta_0 + \beta_1\, Cultural\ Index\_ctry_{i,j} + \beta_2 CashFlow\_firmdev_{i,j}$$
$$+ \beta_3 CcashFlow\_ctrymean_{i,j} + \beta_4 (Cultural\ Index * CashFlow)\_ctry_j$$
$$+ \sum_{k=1}^{3} \beta_k\ Firm\_level\ CONTROL\_firmdev_{i,j}$$
$$+ \sum_{k=1}^{3} \beta_k\ Firm\_level\ CONTROL\_ctrymean_j$$
$$+ \sum_{k=1}^{4} \beta_k\ Country\_level\ CONTROL\_ctry_j$$
$$+ \varepsilon_{i,j} \qquad (1)$$

Where, for firm *i* from country *j*, *I* is investment measured by firms' capital expenditures and normalized by capital at the beginning of the year, *Cultural Index* is Hofstede's (2001) four cultural dimensions (uncertainty avoidance, collectivism, power distance, and masculinity), and *CashFlow* is cash flow computed as earnings before extraordinary items plus depreciation and is normalized by capital at the beginning of the year. For firm-level variables, we consider firm-level deviations ($\_firmdev$) and country-level means ($\_ctrymean$). For country-level variables, we consider grand-mean centred country-level deviations ($\_ctry$) in which we also consider four interactions to measure the conditioning effects of cash flow on the relationship between cultural values and investment at country level ($Cultural\ Index * C\_ctry$).

We also include a set of control variables, *CONTROL*, based on firms' and countries' characteristics. We follow Malmendier and Tate (2005) to control for firm-level characteristics. The firm-level variables include Tobin's *Q*, which is the market value of assets over book value of assets, and, *Size*, which is measured by natural logarithm of market capitalizations. We also control for industry fixed effects and year fixed effects. Moshirian et al. (2017) document that country-level variables can potentially account for changes in ICFS. They argue that

improvements in investor protection and financial market development lead to a decrease in the cost of external financing which determine changes in the ICFS. Therefore, we control for countries' data to assure that the significant impact of cultural dimensions on investment is not due to national culture picking up the effects of other omitted country-level variables as well as ensuring that the result is robust to institutional and governmental factors. The country-level data include creditor rights index (*CR*) (see, Djankov et al., 2007), the score of anti-self-dealing index to measure investor protections (*InvestorProt*) (see, Djankov et al., 2008), the growth rate of GDP (*GDPgr*) (see Zheng et al., 2012), and a dummy variable equal to 1 if a country's legal origin is common law, and 0 if the legal origin is French, German, or Scandinavian civil law (*Common Law*) (see Zheng et al., 2012).

We examine the hypotheses developed above by testing the null hypothesis that β_4, the coefficient on the interactions of cash flow and cultural index, is equal to zero to test whether culture mediates the effect of cash flow on investment. In robustness checks, we check for consistency using alternative statistical approaches, alternative sample compositions, and alternative measures of cultural dimensions.

4. Empirical results

4.1. Descriptive statistics

Table 2 presents descriptive statistics. Panel A summarizes by country, while Panel B summarizes for the full sample. The full sample comprises 205,268 firm-year observations out of which Australia accounts for the largest share of observations and Luxembourg for the smallest share of observations. Focusing on cross country differences, Panel A of Table 2 suggests variation across countries for all cultural, firm-level, and country-level variables. For instance, firms' investment varies considerably across countries ranging from 6.7% in Japan to

12.3% in Norway and Belgium. Normalized cash flow also varies noticeably from 12.7% in Japan to 31.2% in New Zealand.

For the full sample, Panel B suggests that masculinity (*MAS*) has the highest average score (65.63), whereas, uncertainty avoidance (*UAI*) average score is in the second place (61.52). Moreover, power distance (*PDI*) and collectivism (*CLT*) average scores are 43.55 and 25.62, respectively. This would suggest that masculinity and uncertainty avoidance are the dominant cultures in the full sample. Panel B shows that the average investment ratio is 8.9% and the median is 7.5%, while the average normalized cash flow is 19.4% and the median is 15%.

[Table 2]

4.2. National culture and ICFS

Table 3 presents our main results on the impact of national culture on ICFS. We regress firm-level investment on variables that capture country-level cultural value, country-level investor protection, and economic/institutional development, along with various firm characteristics variables.[5]

We begin by considering briefly the main effects of *CLT* and *UAI* to corroborate the findings in Chen et al. (2015). The significant, negative coefficient on *CLT* supports the finding in Chen et al. (2015, Table 6, Model 1) that individualism is positively related to the *level* of capital expenditure, while the significant, positive coefficient on *UAI* supports their finding that uncertainty avoidance is positively related to the *level* of capital expenditure.[6] Like Chen et al. (2015), we also find a significant, positive coefficient for *CashFlow*.[7] In light of this corroborating evidence, we have confidence that our results in relation to the interaction of *CashFlow* with the four cultural dimensions, to which we now turn, are genuine and robust.

The coefficient on cash flow measured at both firm-deviation (*CashFlow-dev*) and country-level mean (*CashFlow-ctrymean*) is found to be significantly positive. This finding is consistent with the corporate finance literature arguing two main explanations for the positive relationship between cash flow and firms' investment, namely agency costs and asymmetric information (see Section 1). In line with the agency view, an influx of cash flow enables managers to pursue self-interested investment and increase investment distortions (Chen et al., 2015; Malmendier and Tate, 2005). Hence, cash flow and investment are positively related. Under asymmetric information, external financing is deemed expensive since managers have superior information over outside investors, and hence managers have lower incentives to use external financing. Accordingly, in the case of a shortage of internal funds, managers reject profitable investments to avoid the cost of using external financing leading to underinvestment problems.

The table shows a negative and significant coefficient for the interaction between collectivism and cash flow (*CashFlow*CLT*). More specifically one standard deviation increase in *CashFlow*CLT* reduces investment by 0.46 standard deviation ((-0.479*0.0683)/0.07). This result confirms that firms operating in higher collectivism cultures have lower ICFS, showing that collectivism moderates ICFS. Our results suggest that collectivism reduces the firm's motivations to invest when there is an influx of cash flow, supporting our first hypothesis. From an agency theory perspective, managers in collectivistic societies are less risk-seeking (Kreiser et al., 2010; Li et al., 2013) and hence they are less likely to overinvest to reap their private benefits, implying a negative relationship between cash flow and investment. Moreover, the results can also be interpreted in the context of lower information asymmetry in collectivistic societies (Hofstede, 2001), associated with lower external financing costs thus making investment less dependent on internal cash flow. Consistently, our results show that the positive

relationship between cash flow and investment is less pronounced in cultures high on collectivism.

We find a positive and significant coefficient for the interaction between uncertainty avoidance and cash flow (*CashFlow*UAI*). More specifically one standard deviation increase in *CashFlow*UAI* increases investment by 0.14 standard deviation ((0.069*0.144)/0.07). Consistent with our second hypothesis, firms in countries with higher uncertainty avoidance exhibit higher ICFS. In particular, taking the partial deviation of cash flow, the results show that cash flow is positively related to investment, and the positive effect is more pronounced when uncertainty avoidance is high. In line with an agency theory explanation, in high uncertainty avoidance cultures, where managers would be more risk averse, ICFS would be higher due to managerial entrenchment. Our results can also be interpreted in line with an information asymmetry-based argument, in high uncertainty-avoiding cultures where capital market participants are loath to expose themselves to uncertainty about firm's future prospects, external finance is provided at higher cost (Zheng et al., 2012; Fidrmuc and Jacob, 2010), thus increasing ICFS. Consistently, our results show that the positive relationship between cash flow and investment is more pronounced in cultures high on uncertainty avoidance.

We also find a positive and significant coefficient for the interaction between power distance index and cash flow (*CashFlow*PDI*). More specifically one standard deviation increase in *CashFlow*PDI* increases investment by 0.34 standard deviation ((0.163*0.149)/0.07). Consistent with our third hypothesis, firms in countries with higher power distance exhibit higher ICFS. In higher power distance societies, individuals have a lower distance for privilege differentials and weakly emphasize equality (Fidrmuc and Jacob, 2010). In particular, the less powerful exhibit a high tolerance for power imbalances and show fear of disagreeing with the more powerful group, while, the powerful are expected to use their powers to pursue privilege

and wealth (Hofstede, 2001). Therefore, high power distance could encourage opportunistic behaviour (John, 1984) motivating managers to pursue self-interest investment, which is in line with predictions of agency theory. In addition, in high power distance societies with lower levels of trust (Zheng et al., 2012), information asymmetry is more pronounced and transaction cost is higher in line with Aggarwal and Goodell (2009), who argue that lower trust increases the transaction cost of market involvement. Hence, managers tend to use internal financing to avoid these external costs. Consistently, our results suggest that power distance has a reinforcing influence on the positive relationship between cash flow and investment.

A highly significant positive coefficient is observed for the interaction between masculinity and cash flow (*CashFlow*MAS*). More specifically one standard deviation increase in *CashFlow*MAS* increases investment by 0.13 standard deviation ((0.09*0.104)/0.07). Since the relationship between cash flow and investment is positive when we consider the partial deviation of cash flow, the results suggest that the high ICFS is sturdier for firms in cultures dominated with high masculinity, supporting our fourth hypothesis. Masculine cultures tend to work based on outcome-based contracts due to the emphasize they place on material rewards (Newman and Nollen, 1996), and hence operate more consistently with the prediction of agency theory (Johnson and Droege, 2004). This relationship is also consistent with the asymmetric information hypothesis, as, in masculine societies, managers are assertive, decisive, and aggressive (Hofstede, 2001), people strive for material success (Zheng et al., 2012) and the focus is on competition (Hofstede, 2001), the market is less informed about the firm's or the investment's quality. Therefore, firms demand for external financing will be adversely affected and will need to pay a higher premium to use external financing. In line with these arguments, our results suggest that the positive relationship between cash flow and investment is stronger and more pronounced in those cultures.

Overall, our results show clearly that national culture significantly modifies the extent to which firms exhibit ICFS. Collectivism has a moderating influence, while uncertainty avoidance, power distance, and masculinity have a reinforcing effect on the relationship between cash flow and investment.[8]

[Table 3]

4.3. Alternative measures of national culture

In our main analysis above we use Hofstede's cultural dimensions to proxy for national culture, as these are commonly used in the literature (e.g. Han et al., 2010; Zheng et al., 2010, Frijns et al., 2013). We are cognizant, however, of critiques of Hofstede's cultural classifications urging caution when the units of analysis are either senior managers or indeed firms as the case here (Thompson and Phua, 2005). To avoid such concerns, in this section we replicate our analysis by applying alternative cultural indexes widely examined in the literature, reporting the results in Table 4. In Panel A, we use the GLOBE database constructed by House et al. (2004) to derive GLOBE's institutional collectivism, uncertainty avoidance, gender egalitarianism, and power distance as alternative measures to Hofstede's collectivism, uncertainty avoidance, masculinity, and power distance, respectively. In Panel B, we include cultural dimensions developed by Schwartz (2006; 2008), including intellectual autonomy, harmony, affective autonomy, and mastery.[9]

The results in Table 4 suggest that the effect of culture on ICFS is generally robust to alternative measures of culture. In particular, GLOBE's collectivism, uncertainty avoidance, power distance, and gender egalitarianism significantly impact ICFS, with coefficients of the interaction of cultural values and cash flow maintaining the same sign as those reported in Table 3 for the Hofstede measures. Similar results are obtained using Schwartz cultural values,

with higher ICFS once more observed in cultures high in intellectual autonomy (low collectivism cultures), high in harmony (high uncertainty avoidance), high in mastery (high masculinity), and low in affective autonomy (high power distance). The use of the GLOBE and Schwartz as alternative cultural indexes support the robustness of our main results; namely, the positive relationship between cash flow and investment is more pronounced in cultures with low collectivism and high uncertainty avoidance, power distance, and masculinity.

[Table 4]

4.4. Additional specifications and robustness checks

In this section we further assess the robustness of our results by examining whether they hold under alternative sample specifications, the inclusion of additional control variables, the use of an alternative measure of investment, and also for alternative empirical estimations.

First, although the US is a highly individualistic society, the individualism-collectivism dimension varies across different regions in the US (Vandello and Cohen, 1999). Given this dominant feature of the US culture, we follow Chen et al. (2015) and re-estimate regressions excluding the US to make sure that it does not drive our findings. The results are presented in Table 5, Panel A. Moreover, Japan and Australia have the highest proportion of firm-year observations in our sample accounting for 20.2% and 22.9% of the whole sample, respectively. In order to make sure that our findings are not dominated by either country, we rerun regressions after excluding observations of firms from Japan and Australia (Panels B and C, respectively). As a final check, we exclude US, Japan and Australia jointly (Panel D). In all models, coefficients remain significant and have the same sign as those in Table 3. Hence, the importance of national culture as a determinant of ICFS is not dependent on specific countries in our sample.

[Table 5]

A further concern is the possibility that our findings are driven by omitted country- and firm-level variables. Hence we further test the robustness of our results by jointly introducing additional control variables and separately adopting an alternative measure of investment. First, in line with previous empirical evidence (e.g., Aivazian et al., 2005; Lang et al. 1996) which finds that leverage affects investment negatively, we add leverage as an additional firm-level control, finding a significant and negative relationship with investment. Second, we add the WW index (Whited and Wu, 2006) in recognition of extant literature reporting a relationship between ICFS and financial constraint (e.g., Fazzari et al, 1988; Hoshi et al., 1991; Agca and Mozumdar, 2017; Ek and Wu, 2018). Note, financially constrained firms may have higher information asymmetry (Boubaker et al., 2015) and, therefore, are expected to have lower investment levels (Ascioglu et al., 2008). In line with existing evidence, such as Campello et al. (2010), we find a lower level of investment in firms with higher financial constraints. Third, at the country level, we also control for an additional formal institution, corruption perception index (CPI). Campos et al. (1999) argue corruptions discourage investment. The results from a joint model including all the above additional control variables are reported in Table 6, Panel A.[10] All coefficients on cultural dimensions and their interactions with cash flow are similar in sign and significance to those reported in our main analysis further demonstrating the robustness of our results.[11]

Finally, we test for an alternative measure of investment in Table 6, Panel B.[12] Following Kadapakkam et al. (1998), we measure investment as the ratio of the change in the level of net fixed assets during the year to the net fixed assets at the beginning of the year. Once again, the results are qualitatively similar and did not change significantly. The highly robust nature of

our results allows us to place great faith in the conclusions we drawn in relation to the role of cultural values in ICFS.

[Table 6]

In Table 7, we test the robustness of our results using alternative statistical approaches. First, in Model (1), we use two- stage least squares estimation (2SLS) to address potential endogeneity concerns that may arise if a variable not included in our model is related to our cultural variables. This can be the case as some of the cultural values that we use were measured in the 1970s and any potential cultural changes that have occurred over the past fifty years may have not been captured with the cultural measures that we have used (Li et al, 2013).

To separate the exogenous components of cultural values we use four instrumental variables as the potential determinants of culture, namely religion, ethnical fractionalization, geography, and genetic distance. As a proxy for religion, we use the percentages of the population of each country that belongs to the Roman Catholic, Protestant, and Muslim religious faiths in 1980 from Alesina et al. (2003). To proxy for ethnical fractionalization, we use a measure of the degree of ethnic heterogeneity in a given country from Alesina et al. (2003). Following Kwok and Tadesse (2006) we use the continent of a country as a proxy for geography. Finally following Nash and Patel (2019), we use genetic distance (developed by Spolaore and Wacziarg, 2018), which is a measure of genetic distance between the US and a given country as the US ranks highest in individualism. Higher values of the genetic distance indicate a greater genetic difference between the two countries and therefore, higher collectivism level. We perform standard tests to ensure that our instruments are valid instruments, including the Sargan-Hansen over-identification test for the null hypothesis that our instrumental variables are uncorrelated with the error term; a p-value of 0.2007 suggests our instrumental variables

are exogenous.[13] Controlling for endogeneity, the regression results in Table 7, Model (1) are qualitatively similar to those reported in Table 3.[14]

Moreover to account for the dynamics of the investment policy and to capture the accelerator effect of this corporate decision we include the lag of investment variable (*L.Inv*) in the model (e.g., Aivazian et al., 2005; Dang (2011); Pindado et al., 2011). The speed of adjustment in Model 1, as represented by (1- coefficient (*L.Inv.*), is expected to be positive. We find a speed of adjustment of 0.521(1-0.479), suggesting that more than 50% of the deviation from target investment is closed within a year, consistent with Shao et al. (2013). Overall, the presented results in Model (1) suggest that the four cultural values still have significant modifying effects on the relationship between cash flow and investment.

Second, in Model (2) of Table 7, to further address the concern that the results might be driven by observations from large countries, we employ weighted least squares (WLS) regression. [15] This is to ensure that each country receives equal weight in the estimation. The WLS results remain qualitatively unchanged from our main results, thus further supporting the robustness of the effect of national culture on ICFS. Overall, the results in Table 7 confirm our previous finding that the effect of cash flow on investment is stronger and more pronounced for firms in high uncertainty avoidance, high power distance, and high masculinity cultures and is weaker for firms in high collectivism cultures.

Third, to address the potential simultaneity between cultural values and country-level explanatory variables, we adopt a lead-lag specification where we use lagged time-variant variables (*CashFlow*, *Q*, *Size*, and *GDPgr*). The results presented in Model (3) of Table 7 remain qualitatively similar to those in Table 3 further supporting the robustness of the influence of national culture on ICFS. [16]

[Table 7]

4.5 National culture and ICFS: A dynamic system of equations

In this section we estimate the cash-flow sensitivities of various uses of cash flow. Recent evidence suggests that firms' financial decisions are subject to frictions, and hence static-single equation models can results in omitted variable bias when estimating ICFS (Gatchev et al., 2010; Chang et al., 2014; Lewellen and Lewellen, 2016). Therefore, following this literature, we decompose cash flow into uses of funds and sources of funds. According to Chang et al. (2014), firms may respond to cash flow shortfalls by adjusting other variables besides investments. Therefore, ignoring the fact that sources of funds must equal uses of funds can potentially lead to inefficient coefficient estimates. We apply the Chang et al. (2014) methodology and suggest that the following relation should hold approximately in the data:

$$CF_t \approx Inv_t + \Delta Cash_t + Div_t - \Delta D_t - \Delta E_t \qquad (2)$$

Where the uses of funds include investment ($\boldsymbol{Inv}$), change in cash holding ($\Delta\boldsymbol{Cash}$), and cash dividends ($\boldsymbol{Div}$). The sources of funds are the internally generated cash flow (CF) and external financing, as measured by the change in debt ($\Delta\boldsymbol{D}$) and net equity issuance ($\Delta\boldsymbol{E}$).[17]

In Table 8 we regress various uses and external sources of cash on CF, Tobin's Q (Q) as a proxy for investment opportunities, and control variables (X). We also add firm dummies (f) to control for unobserved heterogeneity and year dummies (y) to control for time effects. Accordingly, the following regressions are estimated:

$$Inv_{it} = \propto^{Inv} CF_{it} + \beta^{Inv} Q_{it-1} + \gamma^{Inv} X_{it-1} + f_i + y_t + \varepsilon_{it}^{Inv} \qquad (3)$$

$$\Delta Cash_{it} = \propto^{\Delta Cash} CF_{it} + \beta^{\Delta Cash} Q_{it-1} + \gamma^{\Delta Cash} X_{it-1} + f_i + y_t + \varepsilon_{it}^{\Delta Cash} \qquad (4)$$

$$Div_{it} = \propto^{Div} CF_{it} + \beta^{Div} Q_{it-1} + \gamma^{Div} X_{it-1} + f_i + y_t + \varepsilon_{it}^{Div} \quad (5)$$

$$\Delta D_{it} = \propto^{\Delta D} CF_{it} + \beta^{\Delta D} Q_{it-1} + \gamma^{\Delta D} X_{it-1} + f_i + y_t + \varepsilon_{it}^{\Delta D} \quad (6)$$

$$\Delta E_{it} = \propto^{\Delta E} CF_{it} + \beta^{\Delta E} Q_{it-1} + \gamma^{\Delta E} X_{it-1} + f_i + y_t + \varepsilon_{it}^{\Delta E} \quad (7)$$

Given the uses of funds must be equal to sources of funds as shown in equation (2), the estimated coefficients in equations (3) to (7) must satisfy the following conditions.

$$\propto^{Inv} + \alpha^{\Delta Cash} + \alpha^{Div} - \alpha^{\Delta D} - \alpha^{\Delta E} = 1 \quad (8)$$

$$\beta^{Inv} + \beta^{\Delta Cash} + \beta^{Div} - \beta^{\Delta D} - \beta^{\Delta E} = 0 \quad (9)$$

$$\gamma^{Inv} + \gamma^{\Delta Cash} + \gamma^{Div} - \gamma^{\Delta D} - \gamma^{\Delta E} = 0 \quad (10)$$

The results presented in Model (1) of Table 8 suggest that in general a one dollar increase in cash flow increases investment by 31 cents, increases cash holdings by 25 cents, increase dividends by 2 percent, reduces the use of debt by 14 cents, and reduces the use of equity by 27 cents (less than $1 due to rounding). In examining the impact of cultural dimensions on this relationship via the interactions of cultural dimensions and cash flow as previously, we note differences in the reaction of firms in different cultures to changes in cash flow. In terms of change in investment, Model (1) suggests that the positive relationship between cash flow and investment is less pronounced in cultures high on collectivism (negative ICFS). However, ICFS is positive in uncertainty avoidance, power distance, and masculinity cultures. The results in Model (2) suggest that an increase in cash flow causes a positive change in cash holdings across different cultures. In terms of the effect of the increase in cash flow on dividend payment, Model (3) documents a positive relationship in collectivism, uncertainty avoidance, and masculinity cultures. However, in high power distance cultures increase in cash flow reduces the dividend payment. Moreover, in terms of the effect of the increase in cash flow on debt

financing, Model (4) suggests that the change in debt financing is positive in collectivism and power distance cultures, negative in uncertainty avoidance cultures and insignificant in masculinity culture. Finally, according to Model (5), the increase in cash flow reduces equity financing in all the four cultures.

Overall, the results in Table 8 support our previous finding that national culture is a significant determinant of firms' investment decisions. We find negative ICFS in collectivist cultures and positive ICFS in uncertainty avoidance, power distance, and masculinity cultures after considering a dynamic multi-equation model where firms make financing and investment decisions jointly subject to the constraint that sources must equal uses of cash (see for example, Gatchev et al., 2010; Chang et al., 2014; Lewellen and Lewellen, 2016).

[Table 8]

5. Conclusions

In this paper we examine the effect of national culture on firms' ICFS using a hierarchical linear modelling approach to isolate the effects of firm-level and country-level variables. In order to capture culture, we use Hofstede's (2001) four cultural dimensions (collectivism, uncertainty avoidance, power distance, and masculinity) in our main analysis. We find robust evidence that culture matters mediating the relationship between cash flow and investment. In particular, while collectivism has a moderating influence, uncertainty avoidance, power distance, and masculinity have a reinforcing influence on the positive relationship between cash flow and investment. Our results are robust to alternative measures of national culture, alternative sample compositions, and alternative estimations techniques.

We contribute to the corporate investment and culture literature by suggesting that national culture shapes the subjective perception of information asymmetry and agency problems, and,

hence, could affect the ICFS in firms. By examining the interaction between national culture and ICFS we contribute to the corporate investment literature in two ways. First, in a similar vein to Jiang et al. (2019) who examine the influence of corporate culture on ICFS, we extend the prior literature documenting strong and robust evidence that national culture significantly affects ICFS in a large sample of firms drawn from 24 OECD countries. Second, we extend studies examining the investment-cash flow sensitivities of various uses of cash flow in a dynamic system approach (Gatchev et al., 2010; Chang et al., 2014; Lewellen and Lewellen, 2016) to further reveal the importance of national culture. By decomposing cash flow into uses of funds and sources of funds in a dynamic multi-equation model where firms make financing and investment decisions jointly subject to the constraint that sources must equal uses of cash, we document that firms in different cultures react differently to changes in cash flow. We also contribute to the national culture literature, first, by extending Chen et al.'s (2015) evidence that *level* of investment intensity is influenced by national culture to show that *sensitivity* of the investment-cash flow relation is impacted too. Second, we extend the range of cultural dimensions beyond individualism-collectivism (Shao et al., 2013) and also uncertainty avoidance (Chen et al., 2015), to also cover Hofstede's (2001) power distance and masculinity cultural dimensions, along with alternative specifications of national cultures such as House et al. (2004) and Schwartz (2006; 2008).

Our findings have important managerial implications, especially for multinational enterprises (MNEs) facing investment opportunities in a number of different countries. For instance, information asymmetry between firms and suppliers of finance may impose higher costs for the use of external finance in certain countries (high uncertainty avoidance cultures) making investment more sensitive to cash flow in such cultures. Also, agency costs of free cash flow may have different manifestations across cultures. For instance, the agency problem is more

severe in cultures characterized with high power distance (compared to cultures with low power distance), therefore, investment is more sensitive to cash flow in those cultures. Hence, national culture should be considered an important factor when making decisions about multinational expansions and the cash flow management of foreign subsidiaries. Further studies could explore the channel through which national culture impacts ICFS by investigating whether information asymmetry or agency theories better explain ICFS in different cultures.

References:

Agca, S. and A. Mozumdar (2017). 'Investment-cash flow sensitivity: Fact or friction', *Journal of Financial and Quantitative Analysis,* 52, pp. 1111-1141.

Aggarwal, R. and J.W. Goodell (2014). 'Culture, institutions, and financing choices: How and why are related?', *Research in International Business and Finance*, 31, pp. 101-111.

Aggarwal, R., M. Faccio, O. Guedhami, and C. C. Kwok (2016). 'Culture and finance: An introduction', *Journal of Corporate Finance*, 41, pp. 466-474.

Aggarwal, R. and J.W. Goodell (2009). 'Markets and institutions in financial intermediation: National characteristics as determinants', *Journal of Banking and Finance,* 33, pp. 1770-1780.

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

Aivazian, V.A., Y. Ge and J. Qiu (2005). 'The Impact of Leverage on Firm Investment: Canadian Evidence', *Journal of Corporate Finance,* 11, pp. 277-91.

Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat and R. Wacziarg (2003). 'Fractionalization', *Journal of Economic Growth,* 8, pp. 155-194.

Alzahrani, M. and M. Lasfer (2012). 'Investor protection, taxation and dividends', *Journal of Corporate Finance,* 18, pp. 745-762.

Ascioglu, A., S.P. Hegde and J.B. McDermott (2008). 'Information asymmetry and investment–cash flow sensitivity', *Journal of Banking and Finance,* 32, pp. 1036-1048.

Ataullah, A., I. Davidson, H. Le and G. Wood (2014). 'Corporate diversification, information asymmetry and insider trading', *British Journal of Management*, 25, pp. 228-251.

Bae, S.C., K. Chang and E. Kang (2012). 'Culture, corporate governance, and dividend policy: international evidence', *Journal of Financial Research*, 35, pp. 289-316.

Barber, B. M., and T. Odean (2001). 'Boys will be boys: Gender, overconfidence, and common stock investment', *The Qquarterly Journal of Economics*, 116, pp. 261-292.

Bhabra, G.S., P. Kaur and A. Seoungpil (2018). 'Corporate governance and the sensitivity of investment to cash flows', *Accounting and Finance*, 58, pp. 367-396.

Boubakri, N. and W. Saffar (2016). 'Culture and externally financed firm growth', *Journal of Corporate Finance,* 41, pp. 502-520.

Boubaker, S., I. Derouiche and M. Lasfer (2015). 'Geographic location, excess control rights, and cash holdings', *International Review of Financial Analysis*, 42, pp. 24-37.

Bryan, M.L. and S.P. Jenkins (2016). 'Multilevel modelling of country effects: A Cautionary tale', European Sociological Review, 32, pp. 3-22.

Campello, M., J.R. Graham and C.R. Harvey (2010). 'The real effects of financial constraints: Evidence from a financial crisis', *Journal of Financial Economics*, 97, pp. 470-487.

Campos, J.E., D. Lien and S. Pradhan (1999). 'The impact of corruption on investment: Predictability matters', *World Development*, 27, pp. 1059-1067.

Chang, K. and A. Noorbakhsh (2009). 'Does national culture affect international corporate cash holdings?', *Journal of Multinational Financial Management*, 19(5), pp. 323-342.

Chang, X., S. Dasgupta, G. Wong and J. Yao (2014). 'Cash flow sensitivities and the allocation of internal cash flow, *Review of Financial Studies*, 27, pp. 3628-3657.

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

Chowdhury, J., R. Kumar and D. Shome (2016). 'Investment-cash flow sensitivity under changing information asymmetry', *Journal of Banking and Finance*, 62, pp. 28 -40.

Chui, A. C. W., A.E. Lloyd and C.C.Y. Kwok (2002). 'The determination of capital structure: Is national culture a missing piece to the puzzle?', *Journal of International Business Studies*, 33, pp. 99-127.

Dang, V.A., (2011). 'Leverage, debt maturity and firm investment: An empirical analysis', *Journal of Business Finance & Accounting*, 38, pp.225-258.

Danso, A., T. Lartey, J. Amankwah-Amoah, S. Adomako, Q. Lu and M. Uddin (Forthcoming). 'Market sentiment and firm investment decision-making', *International Review of Financial Analysis*, DOI: https://doi.org/10.1016/j.irfa.2019.06.008

Davis, J.H., F.D. Schoorman and L. Donaldson (1997). 'Toward a stewardship theory of management', *The Academy of Management Review*, 22, pp. 20-47.

Derouiche, I., M. Hassan and S. Amdouni (2018). 'Ownership structure and investment-cash flow sensitivity', *Journal of Management & Governance*, 22, pp. 31-54.

Djankov, S., C. McLiesh and A. Shleifer (2007). 'Private credit in 129 countries', *Journal of Financial Economics*, 84, pp. 299-329.

Djankov, S., R. La Porta, F. Lopez-de Silanes and A. Shleifer (2008). 'The law and economics of self-dealing', *Journal of Financial Economics*, 88, pp. 430-465.

Ek, C. and G.L. Wu (2018). 'Investment-cash flow sensitivities and capital misallocation', *Journal of Development Economics*, 133, pp. 220-230.

Fazzari, S., R.G. Hubbard and B. Peterson (1988). 'Financing constraints and corporate investment', *Brookings Papers on Economic Activity*, pp. 141–195.

Fidrmuc, J. and M. Jacob (2010). 'Culture, agency costs and dividends', *Journal of Comparative Economics,* 38, pp. 321-339.

Frijns, B., A.L. Gilbert., T. Lehnert and A. Tourani-Rad (2013). 'Uncertainty avoidance, risk tolerance and corporate takeover decisions', *Journal of Banking and Finance*, 37, pp. 2457-2471.

Gatchev, V. A., T. Pulvino and V. Tarhan (2010). 'The interdependent and intertemporal nature of financial decisions: An application to cash flow sensitivities', *Journal of Finance*, 65, pp. 725-763.

Griffin, D., O. Guedhami, C.C. Kwok, K. Li and L. Shao (2017). 'National culture: The missing country-level determinant of corporate governance', *Journal of International Business Studies*, 48, pp. 740-762.

Guiso, L., Sapienza, P., and L. Zingales (2006). 'Does culture affect economic outcomes?', *Journal of Economic perspectives*, 20, pp. 23-48.

Han, S., T. Kang, S. Salter and Y.K. Yoo (2010). 'A cross-country study on the effects of national culture on earnings discretion', *Journal of International Business Studies*, 41, pp. 123-142.

Hines, J.R. and R.H. Thaler (1995). 'The flypaper effect', *Journal of Economic Perspectives*, 9, 217-226.

Hofstede, G.H. (1983). 'The cultural relativity of organizational practices and theories', *Journal of International Business Studies,* 14, pp. 75-89.

Hofstede, G.H. (2001). '*Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations*', SAGE Publications, Thousand Oaks, CA.

Hofstede, G. (2011). 'Dimensionalizing cultures: The Hofstede model in context'. Online readings in psychology and culture, 2(1), pp. 8.

Hoshi, T., A. Kashyap and D. Scharfstein (1991). 'Corporate structure, liquidity, and investment: evidence from Japanese industrial groups', *Quarterly Journal of Economics,* 106, pp. 33-60.

Hovakimian, A. and G. Hovakimian (2009). 'Cash flow sensitivity of investment', *European Financial Management*, 15, pp. 47-65.

House, R. J., P.J. Hanges, M. Javidan, P.W. Dorfman and V. Gupta (2004). *Culture, leadership, and organizations: The GLOBE study of 62 societies*, Thousand Oaks, CA: Sage.

Imm Ng, S., Anne Lee, J., Soutar, G. N. (2007). 'Are Hofstede's and Schwartz's value frameworks congruent?', *International Marketing Review*, 24, pp.164-180.

Jensen, M.C., (1986). 'Agency costs of free cash flow, corporate finance and takeovers', *American Economic Review,* 76, pp. 323-329.

Jensen, M.C. and W. Meckling (1976). 'The theory of the firm: Managerial behavior, agency costs, and ownership structure', *Journal of Financial Economics,* 3, pp. 305-360.

Jiang, F., K. Kim, Y. Ma and J. Nofsinger (2019). 'Corporate Culture and Investment-Cash Flow Sensitivity', *Journal of Business Ethics,* 154, pp. 425-439.

John, G. (1984). 'An empirical investigation of some antecedents of opportunism in a marketing channel', *Journal of Marketing Research,* 21, pp. 278-289.

Johnson, N.B. and S. Droege (2004). 'Reflections on the generalization of agency theory: Cross-cultural considerations', *Human Resource Management Review,* 14, pp. 325-335.

Kadapakkam, P., P.C. Kumar and L.A. Riddick (1998). 'The impact of cash flows and firm size on investment: The international evidence', *Journal of Banking and Finance,* 22, pp. 293-320.

Kaplan, S. and L. Zingales (2000). 'Investment-cash flow sensitivities are not valid measures of financing constraints', *Quarterly Journal of Economics*, 115, pp. 707-712.

Kaufmann, D., A. Kraay and M. Mastruzzi (2009). Governance matters VIII: Aggregate and individual governance indicators 1996 – 2008: Policy Research Working Paper – 4978: The World Bank.

Kreiser, P.M., L.D. Marino, P. Dickson and K.M. Weaver (2010). 'Cultural influences on entrepreneurial orientation: The impact of national culture on risk taking and proactiveness in SMEs', *Entrepreneurship Theory and Practice,* 34, pp. 959-983.

Kwok, C.C.Y. and S. Tadesse (2006). 'National culture and financial systems', *Journal of International Business Studies,* 37, pp. 227-247.

Lang, L.E., E. Ofek and R. Stulz (1996). 'Leverage, Investment and Firm Growth', *Journal of Financial Economics,* 40, pp. 3-29.

Lewellen, J. and K. Lewellen (2016). 'Investment and cash flow: New evidence', *Journal of Financial and Quantitative Analysis,* 51, pp. 1135-1164.

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

Malmendier, U. and G. Tate (2005). 'CEO overconfidence and corporate investment', *Journal of Finance,* 60, pp. 2661-2700.

Moshirian, F., V. Nanda, A. Vadilyev and B. Zhang (2017). 'What drives investment-cash flow sensitivity around the world? An asset tangibility perspective', *Journal of Banking and Finance,* 77, pp. 1-17.

Myers, S. and N. Majluf (1984). 'Corporate financing and investment decisions when firms have information that investors do not have', *Journal of Financial Economics,* 13, pp. 187-221.

Nash, R. and A. Patel (2019). 'Instrumental variable analysis and the role of national culture in corporate finance', *Financial Management,* Summer, pp. 385-416.

Newman, K. L. and S.D. Nollen (1996). 'Culture and congruence: The fit between management practices and national culture', *Journal of International Business Studies,* 27, pp. 753-779.

Pawlina, G., L. Renneboog (2005). 'Is investment-cash flow sensitivity caused by agency costs or asymmetric information?', *European Financial Management,* 11, pp. 483-513.

Pindado, J., and C. De La Torre (2009). 'Effect of ownership structure on underinvestment and overinvestment: Empirical evidence from Spain', *Accounting and Finance*, 49, pp. 363-383.

Pindado, J., I. Requejo and C. De La Torre (2011). 'Family control and investment–cash flow sensitivity: Empirical evidence from the Euro zone', *Journal of Corporate Finance*, 17, pp. 1389-1409.

Ramirez, A. and S. Tadesse (2009). 'Corporate cash holdings, uncertainty avoidance and the multinationality of firms', *International Business Review,* 18, pp. 387-403.

Riddle, D.I. (1992). 'Leveraging cultural factors in international service delivery', *Advances in Services Marketing and Management,* 1, pp. 297-322.

Schwartz, S.H. (2006). 'A theory of cultural value orientations: Explication and applications', *Comparative Sociology,* 5, pp. 137-182.

Schwartz, S.H. (2008). 'The 7 Schwartz cultural value orientation scores for 80 countries', 10.13140/RG.2.1.3313.3040.

Shah, S. Z. A., S. Akbar, S. Ahmad and A.W. Stark (2019). 'Advertising, Earnings Prediction and Market Value: An Analysis of Persistent UK Advertisers', *British Journal of Management*. Early View.

Shao, L., C.C.Y. Kwok and O. Guedhami (2010). 'National culture and dividend policy', *Journal of International Business Studies,* 41, pp. 1391-1414.

Shao, L., C.C.Y. Kwok and R. Zhang (2013). 'National culture and corporate investment', *Journal of International Business Studies*, 44, pp. 745-763.

Spolaore, E. and R. Wacziarg (2018). 'Ancestry and development: New evidence', *Journal of Applied Econometrics*, 33, pp. 748-762.

Srivastava, A. (2014). 'Selling-price estimates in revenue recognition and the usefulness of financial statements', *Review of Accounting Studies* 19, pp. 661-697.

Tan, B.C.Y., H.J. Smith, M. Keil and R. Montealegre (2003). 'Reporting bad news about software projects: Inpact of organizational climate and information asymmetry in an individualistic and a collectivistic culture', *IEEE Transactions on Engineering Management*, 50, pp. 64 -77.

Teerikangas, S. and P. Very (2006). 'The culture-performance relationship in M&A: From yes/no to how', *British Journal of Management*, 17, pp. S31-S41.

Thompson, E.R. and F.T.T. Phua (2005). 'Are national cultural traits applicable to senior firm managers?', *British Journal of Management*, 16, pp. 59-68.

Vandello, J.A. and D. Cohen (1999). 'Patterns of individualism and collectivism across the United States', *Journal of Personality & Social Psychology*, 77, pp. 279-292.

Wei, K. J., and Y. Zhang (2008). 'Ownership structure, cash flow, and capital investment: Evidence from East Asian economies before the financial crisis', *Journal of Corporate Finance*, 14, pp. 118-132.

Whited, T.M. and G. Wu (2006). 'Financial constraints risk', *The Review of Financial Studies*, 19, pp.531-559.

Williamson, O. E. (1998). 'The institutions of governance', *The American Economic Review*, *88*, pp. 75-79.

Zheng, X.S., S. Ghoul, O. Guedhami and C. Kwok (2012). 'National culture and corporate debt maturity', *Journal of Banking and Finance*, 36, pp. 468-488.

Zwiebel, J. (1996). 'Dynamic capital structure under managerial entrenchment', *The American Economic Review*, 86, pp. 1197-1215.

Table 1: Variables, Definitions, and Data Sources

Variables	Descriptions	Sources
Panel A: Dependent and cultural variables		
Investment	Firm capital expenditures and normalized by capital at the beginning of the year	DataStream & Thomson One
CLT	100 minus Hofstede's cultural index on individualism	Hofstede (2001)
UAI	Hofstede's cultural index on uncertainty avoidance	Hofstede (2001)
PDI	Hofstede's cultural index on masculinity	Hofstede (2001)
MAS	Hofstede's cultural index on power distance	Hofstede (2001)
CLT.GLOBE	House et al.'s cultural index on collectivism (GLOBE Database)	House et al. (2004)
UAI. GLOBE	House et al.'s cultural index on uncertainty avoidance (GLOBE Database)	House et al. (2004)
PDI. GLOBE	House et al.'s cultural index on masculinity (GLOBE Database)	House et al. (2004)
MAS. GLOBE	House et al.'s cultural index on power distance (GLOBE Database)	House et al. (2004)
Intellectual Autonomy	Schwartz's cultural index on intellectual autonomy	Schwartz's (2008)
Harmony	Schwartz's cultural index on harmony	Schwartz's (2008)
Affective Autonomy	Schwartz's cultural index on affective autonomy	Schwartz's (2008)
Mastery	Schwartz's cultural index on mastery	Schwartz's (2008)
Panel B: Firm-level control variables*		
Cash Flow	Earnings before extraordinary items plus depreciation and is normalized by capital at the beginning of the year	DataStream & Thomson One
Q	Market value of equity plus book value of assets minus book value of equity all divided by book value of assets	DataStream & Thomson One
Size	Natural logarithm of market capitalization	DataStream & Thomson One
Panel C: Country-level variables		
CR	Creditor rights index**	Djankov et al. (2007)
InvestorProt	The score of anti-self-dealing index***	Djankov et al. (2008)
GDPgr	The growth rate of GDP	Economic and Social Data Service, International Financial Statistics
Common Law	Dummy variable equal to 1 if a country's legal origin is common law, and 0 if the legal origin is French, German, or Scandinavian civil law	La Porta et al. (1998)
Panel D: Additional variables used in robustness section		
Investment (alternative)	The ratio of the change in the level of net fixed assets during the year to the net fixed assets at the beginning of the year	DataStream & Thomson One
Leverage	Total debt over total assets	DataStream & Thomson One
CPI	Corruption perception index****	Transparency International (http://www.transparency.org)
WGI	Worldwide government indicators. The arithmetic average of six indicators: voice, political stability, government effectiveness, regulatory quality, rule of law, and corruption	Worldbank (http://www.worldbank.org)

WW index	We follow Whited and Wu (2006) and compute WW index as: $-0.091Cash\ Flow - 0.062Div + 0.021LTDTD - 0.044Size - 0.0102ISG - 0.035SG,$ where *WW-Cash Flow* is operating income plus depreciation divided by beginning-of-period total assets. *WW-Div* is an indicator equal to one if the firm pays cash dividend. *WW-LTDTD* is the ratio of long-term debt over total assets. *WW-Size* is the natural logarithm of total assets. *WW-ISG* is the firm's 3-digit industry sales growth. *WW-SG* is firm sales growth.	DataStream & Thomson One

* All variables are in US Dollars. We have winsorized all the firm-level control variables at 5% and 95% levels to control for outliers. These levels are consistent with Srivastava (2014).
**Following Djankov et al. (2007), the creditor rights index, *CR*, varies from 0 (weak creditor rights) to 4 (strong creditor rights). The higher the index score, the higher the level of creditor right.
*** We follow Djankov et al. (2008) and use the anti-self dealing index, *Investor*, to capture corporate governance. The higher the index score, the higher the level of investor protection.
**** Following Fan et al. (2012), we reverse the index which ranges from 0 to 10. Larger values indicating more severe corruption.

Table 2: Descriptive Statistics

		Dependent	Cultural Index				Firm-level variables			Country-level variables			
	N	investment	UAI	CLT	PDI	MAS	CashFlow	Q	Size	CR	Investor Pro.	GDPgr	Common Law
Panel A: Summary statistics by country													
Australia	47,052	0.095	51.000	10.000	36.000	61.000	0.197	1.310	12.577	3.000	0.760	2.946	1.000
Austria	1,599	0.117	70.000	45.000	11.000	79.000	0.265	1.232	12.066	3.000	0.210	2.324	0.000
Belgium	1,579	0.123	94.000	25.000	65.000	54.000	0.246	1.314	12.188	2.000	0.540	2.127	0.000
Canada	17,062	0.104	48.000	20.000	39.000	52.000	0.184	1.136	13.041	1.000	0.640	2.353	1.000
Denmark	1,888	0.099	23.000	26.000	18.000	16.000	0.288	1.292	11.629	3.000	0.460	2.324	0.000
Finland	1,520	0.083	59.000	37.000	33.000	26.000	0.176	1.265	12.096	1.000	0.460	1.735	0.000
France	10,211	0.104	86.000	29.000	68.000	43.000	0.252	1.315	11.776	0.000	0.380	1.979	0.000
Germany	6,562	0.096	65.000	33.000	35.000	66.000	0.182	1.204	11.925	3.000	0.280	1.517	0.000
Ireland	658	0.077	35.000	30.000	28.000	68.000	0.229	1.298	12.728	1.000	0.790	2.584	1.000
Italy	3,291	0.086	75.000	24.000	50.000	70.000	0.194	1.247	12.420	2.000	0.420	2.073	0.000
Japan	41,470	0.067	92.000	54.000	54.000	95.000	0.127	1.063	12.089	2.000	0.500	2.393	0.000
Luxembourg	287	0.093	70.000	40.000	40.000	50.000	0.210	1.275	13.068	1.000	0.280	2.746	0.000
Mexico	1,427	0.083	82.000	70.000	81.000	69.000	0.193	1.187	13.240	0.000	0.170	2.822	0.000
Netherlands	1,288	0.104	53.000	20.000	38.000	14.000	0.264	1.433	13.070	3.000	0.200	2.836	0.000
New Zealand	1,228	0.091	49.000	21.000	22.000	58.000	0.312	1.251	11.853	4.000	0.950	3.514	1.000
Norway	731	0.123	50.000	31.000	31.000	8.000	0.248	1.504	11.883	2.000	0.420	3.351	0.000
Poland	3,859	0.098	93.000	40.000	68.000	64.000	0.179	1.251	11.045	1.000	0.290	3.182	0.000
Portugal	586	0.107	104.000	73.000	63.000	31.000	0.196	1.229	12.473	1.000	0.440	2.890	0.000
Spain	2,021	0.094	86.000	49.000	57.000	42.000	0.224	1.291	12.763	2.000	0.370	2.602	0.000
Sweden	3,959	0.083	29.000	29.000	31.000	5.000	0.234	1.295	11.789	1.000	0.330	2.968	0.000
Switzerland	3,113	0.081	58.000	32.000	34.000	70.000	0.213	1.358	12.593	1.000	0.270	2.651	0.000
Turkey	3,133	0.094	85.000	63.000	66.000	45.000	0.210	1.133	11.559	2.000	0.430	3.699	0.000
United Kingdom	14,990	0.092	35.000	11.000	35.000	66.000	0.235	1.283	11.950	4.000	0.950	2.643	1.000
United States	35,754	0.087	46.000	9.000	40.000	62.000	0.213	1.385	12.100	1.000	0.650	2.490	1.000

Panel B: Summary statistics for full sample

N	205,268	205,268	205,268	205,268	205,268	205,268	205,268	205,268	205,268	205,268	205,268	205,268
Mean	0.089	61.522	25.623	43.555	64.639	0.194	1.248	12.250	-1202.001	2.004	0.599	2.560
SD	0.077	21.044	18.535	11.663	19.351	0.242	0.587	1.890	2624.078	1.074	0.186	1.491
Min	0.006	23.000	9.000	11.000	5.000	-0.091	0.496	9.227	-9606.304	0.000	0.170	0.020
P1	0.006	29.000	9.000	18.000	5.000	-0.091	0.496	9.227	-9606.304	0.000	0.200	0.080
P25	0.026	46.000	10.000	36.000	61.000	0.038	0.864	10.617	-643.641	1.000	0.500	1.240
P50	0.075	51.000	20.000	40.000	62.000	0.150	1.066	12.349	-39.937	2.000	0.640	2.630
P75	0.115	86.000	40.000	54.000	68.000	0.247	1.468	14.371	-0.416	3.000	0.760	3.740
P99	0.252	94.000	63.000	68.000	95.000	0.760	2.475	14.557	-0.198	4.000	0.950	5.330
Max	0.252	104.000	73.000	81.000	95.000	0.760	2.475	14.557	-0.198	4.000	0.950	5.340

This table presents descriptive statistics. Panel A reports the sample distribution by country. Panel B reports summary statistics for all variables used in our regression where the dependent variable is *Investment*. This panel reports number of observations (*N*), mean, standard deviation (*SD*), first percentile (P1), 25th percentile (*P25*), median (*P50*), 75th percentile (*P75*), and 99th percentile (P99) for the main variables. The full sample includes 205,268 firm-year observations for 19,573 unique firms from 24 OECD countries over the period 1990-2017. Definitions and data sources for all variables are defined in Table 1.

Table 3: Impact of National Culture on Investment Cash Flow Sensitivity

	-firmdev	*-countymean*	*-ctry*
CLT			-0.614***
			(-17.352)
CashFlow*CLT			-0.479**
			(-2.368)
UAI			0.566***
			(19.514)
CashFlow*UAI			0.069***
			(2.744)
PDI			0.027*
			(1.747)
CashFlow*PDI			0.163**
			(2.514)
MAS			-0.334***
			(-16.847)
CashFlow*MAS			0.090**
			(2.046)
CR			0.004***
			(10.386)
InvestorProt.			-0.058***
			(-20.851)
GDPgr			0.000***
			(6.245)
Common Law			0.025***
			(17.134)
CashFlow	0.099***	0.249***	
	(11.702)	(6.619)	
Q	0.007***	0.090***	
	(13.891)	(11.767)	
Size	0.006***	-0.000	
	(8.768)	(-0.101)	
Constant			0.095***
			(3.863)
Industry and year dummies			Yes
Observations			205,268

This table presents the results of investment on Hofstede's (2001) four cultural dimensions (collectivism, *CLT*, uncertainty avoidance, *UAI*, power distance, *PDI*, masculinity, *MAS*) and other control variables using the HLM model (Equation 1). The dependent variable is *Investment* which is defined as firm capital expenditures normalized by capital at the beginning of the year. The remaining variables are defined in Table 1. The t-statistics are presented in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively.

Table 4: Alternative Measures of National Cultures

	Panel A: GLOBE				Panel B: Schwartz		
	-firmdev	*-countymean*	*-ctry*		*-firmdev*	*-countymean*	*-ctry*
CL.GLOBE			-0.002**	Intellectual Autonomy			0.044***
			(-2.197)				(16.503)
CashFlow*CLT.GLOBE			-0.025***	CashFlow* Intellectual Autonomy			0.022***
			(-8.667)				(4.116)
UAI.GLOBE			-0.009***	Harmony			0.009***
			(-7.519)				(3.379)
CashFlow*UAI.GLOBE			0.017***	CashFlow*Harmony			0.011**
			(6.638)				(2.383)
PDI.GLOBE			0.004***	Affective Autonomy			-0.021***
			(2.923)				(-12.157)
CashFlow*PDI.GLOBE			0.002	CashFlow* Affective Autonomy			-0.008**
			(0.728)				(-2.126)
MAS.GLOBE			0.003***	Mastery			0.061***
			(2.776)				(11.108)
CashFlow*MAS.GLOBE			0.028***	CashFlow* Mastery			0.014*
			(8.906)				(1.734)
CR			-0.001***	CR			-0.000
			(-3.229)				(-0.917)
InvestorProt.			-0.096***	InvestorProt.			-0.035***
			(-7.017)				(-12.743)
GDPgr			0.000***	GDPgr			0.000***
			(5.273)				(5.562)
Common Law			0.047***	Common Law			0.010***
			(3.842)				(5.466)
CashFlow	0.099***	0.220***		CashFlow	0.100***	0.284***	
	(14.604)	(12.772)			(11.661)	(13.871)	
Q	0.007***	0.129***		Q	0.007***	0.101***	
	(13.974)	(12.460)			(13.591)	(13.779)	
Size	0.006***	-0.023***		Size	0.006***	0.004***	
	(8.728)	(-7.565)			(6.227)	(2.763)	
Constant			0.095***	Constant			0.097***
			(270.566)				(11.734)
Industry and year dummies			Yes	Industry and year dummies			Yes
Observations			202,671	Observations			203,753

This table presents the results for alternative measure of national culture. Panel A presents the results of investment on the GLOBE database four cultural dimensions (CLT.GLOBE, UAI.GLOBE, PDI.GLOBE, MAS.GLOBE) constructed by House et al. (2004). Data for Belgium, Luxemburg, and Norway is not covered in the survey of House et al. (2004)). Panel B presents the results of investment on Schwartz (2008) cultural dimension (intellectual autonomy, harmony, affective autonomy, and mastery). Data for Norway and New Zealand is not covered in the interviews conducted by Schwartz (2008). The results of both panels are based on the HLM model (Equation 1). The dependent variable is *Investment* which is defined as firm capital expenditures normalized by capital at the beginning of the year. The remaining variables are defined in Table 1. The t-statistics are presented in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively.

Table 5: Sample Compositions

	Excluding US			Excluding Japan			Excluding Australia			Excluding all three		
	-firmdev	*-countymean*	*-ctry*	*-firmdev*	*-countymean*	*-ctry*	*-firmdev*	*-countymean*	*-ctry*	*-firmdev*	*-countymean*	*-ctry*
CLT			-0.500***			-0.573***			-0.860***			-0.659***
			(-9.729)			(-11.234)			(-6.904)			(-12.412)
CashFlow*CLT			-0.493***			-0.445***			-0.102*			-0.099**
			(-6.162)			(-4.019)			(-1.904)			(-2.458)
UAI			0.492***			0.404***			0.623***			0.575***
			(10.538)			(8.285)			(12.492)			(11.274)
CashFlow*UAI			0.381***			0.849***			0.307**			0.391**
			(3.320)			(8.435)			(2.003)			(2.428)
PDI			-0.084*			0.002**			0.073**			0.058**
			(-1.707)			(2.039)			(2.382)			(2.058)
CashFlow*PDI			0.391***			1.030***			0.478***			0.543***
			(2.767)			(8.801)			(2.791)			(3.027)
MAS			0.252***			0.246***			0.530***			0.418***
			(9.391)			(8.570)			(7.974)			(3.617)
CashFlow*MAS			0.216***			0.065*			0.179***			0.121**
			(3.613)			(1.817)			(3.002)			(2.378)
CR			0.000			0.001***			0.008***			0.008***
			(0.409)			(2.817)			(15.333)			(15.565)
InvestorProt.			-0.058***			-0.046***			-0.085***			-0.061***
			(-13.920)			(-9.736)			(-18.092)			(-12.266)
GDPgr			0.000***			0.000***			0.000			0.000
			(6.685)			(7.601)			(0.511)			(1.025)
Common Law			0.033***			0.020***			0.036***			0.023***
			(16.214)			(9.231)			(17.724)			(10.312)
CashFlow	0.082***	0.276***		0.082***	0.266***		0.079***	0.203***		0.081***	0.095***	
	(97.230)	(22.537)		(56.393)	(19.535)		(92.267)	(14.200)		(53.529)	(4.389)	
Q	0.007***	0.099***		0.006***	0.146***		0.009***	0.155***		0.009***	0.172***	
	(24.306)	(11.910)		(25.915)	(24.675)		(27.798)	(25.801)		(27.863)	(27.724)	
Size	0.003***	0.009***		0.004***	0.009***		0.005***	0.003**		0.005***	-0.014***	
	(29.076)	(9.198)		(41.470)	(8.128)		(42.170)	(2.301)		(40.950)	(-9.369)	

Constant	0.084***	0.094***	0.095***	0.115***
	(118.687)	(125.170)	(117.422)	(96.577)
Industry and year dummies	Yes	Yes	Yes	Yes
Observations	169,514	163,798	158,216	116,746

This table presents robustness results of investment on Hofstede's (2001) four cultural dimensions (collectivism, *CLT*, uncertainty avoidance, *UAI*, power distance, *PDI*, masculinity, *MAS*) and other control variables. Panels A, B, C, and D report the results for different samples that exclude US, Japan, and Australia, and the three countries, (US, Japan, and Australia as a whole) from the whole sample, respectively. The results of all panels are based on the HLM model (Equation 1). The dependent variable is *Investment* which is defined as firm capital expenditures normalized by capital at the beginning of the year. The remaining variables are defined in Table 1. The t-statistics are presented in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively.

Table 6: Additional Robustness Checks

	Panel A: Additional control variables			Panel B: Definition of dependant variable		
	-firmdev	*-countymean*	*-ctry*	*-firmdev*	*-countymean*	*-ctry*
CLT			-0.106**			-0.731***
			(-2.106)			(-5.869)
CashFlow*CLT			-0.065***			-0.099***
			(-3.916)			(-3.390)
UAI			0.357***			0.068
			(10.830)			(0.669)
CashFlow*UAI			0.063***			0.390**
			(2.677)			(2.185)
PDI			0.159***			0.117
			(3.336)			(0.929)
CashFlow*PDI			0.155**			0.440**
			(2.444)			(3.164)
MAS			0.054*			0.224***
			(1.647)			(3.213)
CashFlow*MAS			0.110**			0.235
			(2.505)			(1.517)
CR			0.006***			0.012
			(14.679)			(0.096)
InvestorProt.			-0.013***			-6.756***
			(-3.027)			(-6.901)
GDPgr			0.001***			0.002
			(7.714)			(0.101)
Common Law			0.009***			4.362***
			(3.310)			(8.395)
CPI			0.005**			
			(2.015)			
CashFlow	0.098***	0.201***		0.059***	-3.637***	
	(13.798)	(10.113)		(10.242)	(-12.010)	
Q	0.008***	0.032***		0.493***	3.835***	
	(9.081)	(3.565)		(5.047)	(2.621)	
Size	0.005***	0.010***		5.221***	5.875***	
	(9.416)	(8.769)		(11.004)	(6.893)	
WWindex	-0.010***	-0.008***		-0.001***	-0.005***	

	(-3.563)	(-7.294)	(-7.592)	(-13.381)
Leverage	-0.014***	-0.129***		
	(-12.439)	(-15.291)		
Constant	0.096***		11.578***	
	(12.535)		(10.402)	
Industry and year dummies	Yes		Yes	
Observations	205,268		204,977	

This table presents robustness results using additional control variables and an alternative measure of independent variable. In Panel A, we add leverage, WW index, and corruption perception index (CPI) as additional control variables. In this panel, the dependent variable is *Investment* which is defined as firm capital expenditures normalized by capital at the beginning of the year. Panel B reports the results for a different measure of the dependent variable (*Investment*) which is the ratio of the change in the level of net fixed assets during the year to the net fixed assets at the beginning of the year. The results of both panels are based on the HLM model (Equation 1). The remaining variables are defined in Table 1. The t-statistics are presented in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively.

Table 7: Alternative Statistical Approaches

	(1) 2SLS	(2) WLS	(3) Lead-lag
CLT	-0.058***	-0.189***	-0.019***
	(-4.325)	(-7.814)	(-7.560)
CashFlow*CLT	-0.184***	-0.068***	-0.028***
	(-8.733)	(-5.059)	(-4.142)
UAI	0.026	0.374***	0.044***
	(0.812)	(3.131)	(3.660)
CashFlow*UAI	0.114***	0.173**	0.021**
	(8.691)	(2.016)	(2.389)
PDI	0.141***	0.014	-0.005**
	(5.284)	(0.386)	(-2.176)
CashFlow*PDI	0.196***	0.125**	0.007**
	(9.008)	(2.266)	(2.653)
MAS	-0.060***	-0.354***	-0.044***
	(18.905)	(-3.546)	(-7.845)
CashFlow*MAS	0.050***	0.087**	0.014***
	(8.721)	(2.164)	(3.364)
CR	0.306***	0.004***	0.447***
	(5.599)	(7.085)	(7.824)
InvestorProt.	-2.548***	-0.034***	-4.350***
	(-5.828)	(-4.986)	(-8.092)
GDPgr	0.001***	0.000***	0.001***
	(8.593)	(8.904)	(7.492)
Common Law	0.892***	0.018***	2.768***
	(4.520)	(6.892)	(5.050)
CashFlow	3.842***	0.093***	2.762***
	(5.081)	(3.053)	(8.803)
L.Inv.	0.479***		
	(8.24)		
Q	0.737***	0.008***	1.662***
	(8.956)	(3.271)	(6.976)
Size	0.587***	0.006***	-0.091***
	(8.955)	(5.301)	(-6.566)
Constant	6.979***	-0.010***	8.058***
	(5.322)	(-6.064)	(4.437)
Industry and year dummies	Yes	Yes	Yes
Observations	205,268	205,268	205,268
Adj R-squared	0.119	0.143	0.163
Sargan p-value	0.200		
F test:		2541	915.5

This table presents robustness results using alternative statistical approaches. In model 1, we adopt 2SLS instrumental variable approach. For this purpose, we need to identify the instruments for the endogenous variables in our model. We employ four instrumental variables: religion, ethnical fractionalization, geography, and genetic distance (between the US and a given country) for cultural values. The results of the first stage are not reported for brevity. However, we perform standard tests to ensure that our instruments are valid instruments. P-value of Sargan-Hansen over-identification is reported. In model 2, we use a weighted regression model, where the weight of each observation is the inverse of the number of observations in each country so that each country receives equal weight in the estimation. In model 3, we apply a lead-lag specification where we use lagged time-variant variables (CashFlow, Q, Size, and GDPgr). In each specification, the dependent variable is *Investment* which is defined as firm capital expenditures normalized by capital at the beginning of the year. In Model (1) we also include L.Inv which is the lag of *Investment*. The remaining variables are defined in Table 1. The t-statistics are presented in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively.

Table 8: Dynamic System of Equations

	(1) Inv	(2) $\Delta Cash$	(3) Div	(4) ΔD	(5) ΔE
CLT	-0.117***	0.001***	-0.047***	-0.002*	-0.161**
	(-3.920)	(3.762)	(-7.035)	(-1.812)	(-2.054)
CashFlow*CLT	-0.076***	0.005***	0.119***	0.000***	-0.948*
	(-2.948)	(2.879)	(6.702)	(5.628)	(-1.982)
UAI	0.486***	0.000***	-0.065***	0.000**	0.421**
	(12.837)	(2.633)	(-7.704)	(2.445)	(2.212)
CashFlow*UAI	0.404***	0.000***	0.139***	-0.000***	-0.457*
	(3.820)	(2.343)	(5.950)	(-3.265)	(-1.941)
PDI	0.061	0.000***	0.010	-0.001**	0.072**
	(1.374)	(6.241)	(1.035)	(2.190)	(2.362)
CashFlow*PDI	0.061***	0.000	-0.120***	0.000***	-0.91***
	(2.512)	(0.619)	(-4.548)	(3.141)	(-3.458)
MAS	-0.419	0.001***	-0.080***	-0.001***	-0.497
	(-0.992)	(10.049)	(-9.805)	(-3.889)	(-1.567)
CashFlow*MAS	0.137***	0.001***	0.047***	0.000	-0.815*
	(2.821)	(5.431)	(4.388)	(0.623)	(-1.854)
CR	0.555***	0.000***	0.140**	0.000***	0.695***
	(8.882)	(11.321)	(2.483)	(5.050)	(4.636)
InvestorProt.	-3.971***	0.000*	1.853***	0.000***	-2.118**
	(-4.636)	(-1.879)	(3.861)	(-3.861)	(-1.975)
L.GDPgr	0.001***	0.000***	0.000	0.000***	0.001***
	(6.541)	(10.210)	(0.269)	(3.139)	(3.881)
Common Law	2.334***	-0.000	-1.282***	0.000***	1.052*
	(7.921)	(-0.415)	(-4.493)	(4.839)	(1.887)
CashFlow	0.317***	0.250	0.021***	-0.140**	-0.272**
	(3.395)	(0.904)	(8.877)	(-2.934)	(-2.436)
L.Q	1.970***	0.000**	0.159***	0.000***	2.129***
	(3.149)	(2.315)	(3.049)	(2.689)	(3.824)
L.Size	0.056***	0.000***	0.115***	0.000***	0.171*
	(4.758)	(-2.805)	(4.538)	(-5.881)	(1.836)
Firm and year dummies	Yes	Yes	Yes	Yes	Yes
Observations	162,302	162,302	162,302	162,302	162,478
Adj R-squared	0.194	0.127	0.159	0.0126	0.215

In this table we decompose cash flow into uses of funds and sources of funds. The dependent variables are three uses of fund, namely, investment (*Inv*) in Model 1, change in cash holding ($\Delta \boldsymbol{Cash}$) in Model 2, and cash dividends ($\boldsymbol{Div}$) in Model 3, and two sources of funds that comprised of change in debt ($\Delta \boldsymbol{D}$) in Model 4 and net equity issuance ($\Delta \boldsymbol{E}$) in Model 5. The variables are defined in Table 1. The t-statistics are presented in parentheses. *, **, and *** indicate significance at 10%, 5%, and 1% levels, respectively.

[1] Our examination of interaction effects is similar to the empirical approach in Jiang et al. (2019) in the context of *corporate* culture.

[2] A complementary channel through which ICFS might increase is overconfidence. The fact that men are more overconfident and take more risks than women is well recognized in the finance literature (Barber and Odean, 2001). Hence, in a masculine culture, overconfidence is expected to also promote increased ICFS (Malmendier and Tate, 2005).

[3] The need to ensure availability, reliability, and comparability of accounting data across countries in terms of accounting standards (Alzahrani and Lasfer, 2012) motivates our focus on the 24 OECD countries.

[4] We model ICFS following Malmendier and Tate (2005), where investment is the dependent variable and cash flow plus interactions of cash flow with variables of interest are independent variables.

[5] High correlations between cultural indexes are documented in the literature (Hofstede, 1983; Zheng et al., 2012), hence multicollinearity might be a concern. To rule this out, we check our findings by including each of the cultural dimensions separately. The untabulated results do not change significantly. Here, and throughout, untabulated results are due to brevity constraints and are available on request.

[6] Chen et al. (2015) include Hofstede's (2001) individualism index as the variable (IDV) in their models. Here we compute CLT = 100 – IDV. Thus, despite the different coefficient signs on our CLT variable and their IDV variable, our results corroborate those in Chen et al. (2015).

[7] Given our methodology we measure cash flow both at firm level deviation and country level, finding positive coefficients in both cases.

[8] While space constraints limit our discussion of firm-level and country-level control variables, we note that coefficients in our models are statistically significant with the expected signs as suggested by relevant prior literature (see Section 3.2).

[9] Imm Ng et al. (2007) show that Hofstede's collectivism is negatively correlated with intellectual autonomy, uncertainty avoidance is positively correlated with harmony, power distance is negatively correlated with affective autonomy, and masculinity is positively correlated with mastery.

[10] See Table 1 for variable definitions and sources.

[11] In untabulated results, following Kaufmann et al. (2009), we add worldwide governance indicators (WGI, refer to Table 1) to further control for governmental and institutional settings. Again, we find similar results but do not report these since the data is only available from 1996.

[12] In untabulated results, we examine an alternative measure of cash flow looking at free cash flow normalized by capital at the beginning of the year. Our results remain qualitatively unchanged with the alternative measure.

[13] In untabulated results, we test for the relevance of the instrument (i.e., correlation with the endogenous variable). The F-statistic on the first stage regression is high (390.208) rejecting the null hypothesis that the endogenous variable is weakly identified.

[14] In untabulated results, we repeat our analysis using the two-step system GMM (see Shao et al., 2013), with similar results.

[15] In Table 5 we address this concern by excluding US, Japan and Australia, however, one might argue that this may not be sufficient, hence we also employ WLS.

[16] Given our sample includes the financial crisis starting at the end of 2007, we rerun regressions separately for the periods 1990-2006 and 2009-2017. The split-sample results remain

qualitatively unchanged, with culture significantly affecting ICFS irrespective of the financial crisis.

[17] We measure net equity issuance as the change in total equity minus the change in retained earnings (Lewellen and Lewelen, 2016).