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National culture and the cost of debt

Andy C. W. Chui
School of Accounting and Finance
Hong Kong Polytechnic University
Hong Kong, China
Tel. (852) 2766-7105
Fax.(852) 2356-9550
E-mail afandy@polyu.edu.hk

Chuck C. Y. Kwok
Department of International Business
The Darla Moore School of Business
University of South Carolina
Columbia, S.C. 29208
Tel. (803) 777-3606
Fax.(803) 777-3609
E-mail ckwok@moore.sc.edu

Gaoguang (Stephen) Zhou
Department of Accountancy and Law
Hong Kong Baptist University
Hong Kong, China
E-mail stephenzhou@hkbu.edu.hk

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Abstract

This study investigates how Schwartz's cultural dimensions of embeddedness and mastery affect the corporate cost of debt through bankruptcy risk and sensitivity to agency activity channels. Using data from 33 countries, we find a strong and robust negative relation between embeddedness and the cost of debt. The estimated relation between mastery and the corporate cost of debt is negative and significant in most of the tests. Further analyses reveal that the development of financial intermediation and the enforcement of insider trading law moderate the relation between culture and the cost of debt. Confirming our hypotheses, we document that embeddedness is negatively related to bankruptcy risk and sensitivity to agency activity. We find that mastery is positively related to bankruptcy risk across countries as well, but this relation is weaker. We also show that mastery is positively related to sensitivity to agency activity among countries with highly leveraged firms.

JEL Classification: F34; G15; G30

Keywords: National culture; Cost of capital; Bankruptcy; Agency cost; Embeddedness; Mastery

1. Introduction

The seminal paper of Giannetti and Yafeh (2012) documents that cultural differences between lenders and borrowers have a positive and significant impact on loan spreads in the international bank loan market. However, their study does not examine the effect of culture on interest rates per se. Our study complements their work by investigating whether culture affects the cost of debt around the world through bankruptcy risk and agency cost channels.[1] In addition, this study provides evidence on the role of these channels. Although the relations between culture and bankruptcy risk as well as a propensity toward agency activities are frequently discussed in prior literature (e.g., Chui, Lloyd, & Kwok 2002; Shao, Kwok, & Guedhami 2010; Li, Griffin, Yue, & Zhao 2011, 2013), these relations have not yet been tested empirically.

Despite numerous studies on the cost of debt in the United States, international studies are rare. Using data from 34 countries, Francis, Khurana, and Pereira (2005) document that the level of disclosure is negatively related to the cost of debt, a finding consistent with the information asymmetry argument. The quality of institution is also an important factor that can explain differences in the cost of borrowing around the world (Demirgüç-Kunt, Laeven, & Levine 2004). Bae and Goyal (2009) argue that stronger legal protection promotes contracting efficiency, which in turn results in a lower cost of debt. Consistent with their hypothesis, they find that both the enforceability of contracts and creditor rights are negatively related to loan spreads. Laeven and Majnoni (2005) also find that judicial efficiency helps improve the protection of creditor rights and hence the cost of credit is lower in countries with greater judicial efficiency. Qi, Roth, and Wald (2010) document that political rights also help reduce bond spreads.[2]

[1] This study used the terms *cost of debt* and *corporate cost of debt* interchangeably.

[2] There is also a strand of literature on the determinants of the cost of equity across countries. Francis et al (2005) document that accounting disclosure reduces the cost of equity. Along the same path, Hail and Leuz (2006) find that a better legal and regulation environment decreases the cost of equity. While Ben-Nasr, Boubakri, and

Besides the aforementioned formal institutions such as disclosure requirement, investor protection, and political rights, does culture, an informal institution, also influence the cost of debt? Culture is defined as a system of values and beliefs that transmits fairly unchanged, from generation to generation (Guiso, Sapienza, & Zingales 2006). Schwartz (1994) classifies individual values and beliefs into six value types that are consolidated into two dimensions: embeddedness and mastery. Culture is defined by these two dimensions.[3] Embeddedness emphasizes attributes such as the preservation of one's public image, security, self-discipline, moderation, forgiveness, and the reciprocation of favors, while mastery emphasizes attributes such as success, independence, capability, and choosing one's own goals. Since the last decade, with better techniques and data, economists have started to systematically investigate how culture affects economic behavior (Guiso et al. 2006).

In this paper, we argue that both bankruptcy risk and sensitivity to agency activity are lower in countries with stronger embeddedness. Consequently, we expect a negative relationship between embeddedness and the cost of debt across countries. On the other hand, the relation between mastery and bankruptcy risk/agency conflicts is uncertain. We do not predict a priori the direction of the relationship between mastery and the cost of debt, leaving it an empirical question. Using data from 33 countries, we document a strong and robust negative relation between embeddedness and the cost of debt. The result is robust to a series of sensitivity tests. Our further analyses reveal that the development of financial intermediation and the enforcement of insider trading law moderate the relationship between culture and the cost of debt. We further confirm that embeddedness is indeed negatively related to bankruptcy risk and sensitivity to agency activity. We also find that mastery is positively related to bankruptcy risk across countries; however, this relation is weaker. In

Cosset (2012) find that government ownership increases the cost of equity, Attig, Guedhami, and Mishra (2008) show that multiple large shareholders help reduce it. Furthermore, Boubakri, Guedhami, Mishra, and Saffar (2012) find that political connections decreases the cost of equity.

[3] Each dimension has two poles. The opposite pole of embeddedness is autonomy and that of mastery is harmony and egalitarian commitment.

addition, we find that mastery is positively related to sensitivity to agency activity among countries with highly leveraged firms.

The rest of this paper is organized as follows. Section 2 provides the theoretical arguments of our hypothesis. Section 3 describes the data. Section 4 reports our main results on the relation between embeddedness/mastery and the cost of debt. Section 5 investigates the relation between embeddedness/mastery and bankruptcy risk/sensitivity to agency activity. Section 6 shows the results from the robustness tests. Section 7 concludes the paper.

2. Hypothesis development

2.1 Embeddedness and the cost of debt

Schwartz (1994) argues that individuals are viewed as entities embedded in a collective society in embeddedness culture. Since people in high-embeddedness countries emphasize the preservation of one's public image and security, managers in these countries tend to choose financial policies that can minimize the bankruptcy risk of their firms. The reason is intuitive. When bankruptcy risk increases, firm security drops. In addition, bankruptcy puts the public image of both managers and owners at risk. Consistent with this argument, Chui et al. (2002) and Li et al. (2011) find that the corporate debt ratio is lower in countries with high embeddedness. Furthermore, people in high-embeddedness countries stress the maintenance of harmonious working relationships.[4] Therefore, managers in high-embeddedness countries care about the benefits of the firms' stakeholders, such as employees and creditors (Chui et al. 2002). They are more concerned with the external costs of bankruptcy. They treasure employee welfare and the long-term commitment of customers and suppliers more than managers in low-embeddedness countries.[5] A firm's bankruptcy jeopardizes all these benefits. Hence, bankruptcy is more costly in high-embeddedness countries and managers in these

[4] The emphasis on moderation, forgiveness, and the reciprocation of favors by embeddedness contributes to a preference for a harmonious working relationship.

[5] Deadweight costs of bankruptcy arise when firms make their bankruptcy decisions without taking into account the external costs of bankruptcy. Unemployment and loss of long-term commitment of customers and suppliers are regarded as typical examples of deadweight costs of bankruptcy (Miller 1977; Opler & Titman 1994).

countries would like to reduce bankruptcy risk.[6] The emphasis on harmonious relationships also affects agency cost. Jensen and Meckling (1976) show that managers tend to invest in risky projects that benefit the shareholders at the expense of the creditors through increasing firm default risk. Myers (1977) document that, where debt is in place, managers may pass up profitable projects that mainly benefit the debtholders. Jensen (1986) argues that managers may spend free cash flow on their own welfare and on unprofitable projects. Since these activities hurt the benefits of both shareholders and creditors, they are threats to harmonious relationships. Therefore, stress on a harmonious stakeholder relationship lessens conflict among managers, shareholders, and debtholders. In other words, an emphasis on harmonious relationships limits the managerial expropriation of shareholders and debtholders.

Furthermore, self-discipline is an important value in high-embeddedness countries. To reduce the incentive to participate in agency behavior, Shao et al. (2010) argue that more self-disciplined managers in high-embeddedness countries tend to hold less free cash. Zheng, El Ghoul, Guedhami, and Kwok (2012) also report that these managers tend to use more short-term debt to alleviate the underinvestment problem. Since managers in high-embeddedness countries tend to avoid agency activities, investors in these countries will worry less about agency activities, resulting in lower agency costs. In summary, bankruptcy risk and investor concerns about agency activities are expected to be lower in countries with higher embeddedness scores, which should lead to a lower cost of debt in these countries. Our hypothesis is, therefore, formulated as follows.

Hypothesis: A country's corporate cost of debt is negatively related to the country's level of embeddedness.

[6] Verwijmeren and Derwall (2010) find that firms that are more concerned with employee welfare will adopt corporate strategies to reduce their bankruptcy risk.

2.2 *Mastery and the cost of debt*

A high-mastery society places greater emphasis on individual success, an internal locus of control, and independence.[7] Since bankruptcy is regarded as a failure, managers in strong-mastery countries tend to avoid it, which in turn leads to lower bankruptcy risk. On the other hand, bankruptcy risk in high-mastery countries could be higher than in low-mastery countries. Chui et al. (2002) argue that in high-mastery countries, managers tend to adopt aggressive strategies to demonstrate their ability to control their external environment.[8] In addition, such managers prefer independence and hence desire more financial resources under their control to implement their aggressive strategies whenever opportunities arise (Shao et al. 2010). Managers are therefore more likely to take up high-risk projects and overinvest in high-mastery countries. In a recent study, Li et al. (2013) document that firms in high-mastery countries take more risks than firms in other countries. This risk-taking strategy in high-mastery countries should lead to higher bankruptcy risk. Therefore, the relation between mastery and bankruptcy risk is uncertain.

Since firms in high-mastery countries prefer risky strategies, agency costs in these countries are higher and investors should be more concerned with them. On the other hand, shareholders and debtholders in high-mastery countries also share the same values as managers and could be more tolerant of their aggressive strategies (Shao et al. 2010). The relation between mastery and investor's propensity toward agency activities is therefore not definite. In sum, since the relation between mastery and bankruptcy risk/agency costs is uncertain and the cost of debt is positively related to bankruptcy risk and agency costs, the relationship between mastery and the cost of debt is ambiguous.

[7] Locus of control is one of the most important concepts in social psychology. When a person is said to have a high internal locus of control, this person has a strong belief that he or she can control surrounding events. The emphasis on capability and choosing one's own goals by mastery leads to a desire for an internal locus of control.

[8] Apart from embeddedness, Chui et al. (2002) suggest that preference for an internal locus of control makes managers in mastery countries adopt a lower debt ratio, which leads to lower bankruptcy risk. The authors find evidence to indicate that corporate debt ratios are lower in countries with higher mastery scores.

3. Data and preliminary analysis

3.1 Data

This section briefly discusses the data and major variables used in this study. The Appendix defines in detail all the variables, as well as their sources. The scores for Schwartz's cultural dimensions embeddedness (*Embd*) and mastery (*Mast*) are collected from the 2005 release of Schwartz's dataset.[9] Following Siegel, Licht, and Schwartz (2011), we compute the average cultural scores for each country in our sample using survey data collected from over 15,000 teachers from 1988 to 2004. The average cultural scores are reported in Table 1. The advantage of utilizing data from teachers is twofold. First, cultural values remain largely unchanged over time because parents and teachers tend to teach their children and students what they were taught by their parents and teachers (Guiso et al. 2006). Indeed, schools play an important role in transmitting culture over generations (Guiso et al. 2006; Siegel et al. 2011). Second, by focusing on teachers, we can make the cultural scores more comparable across countries (Siegel et al. 2011). Besides, this time-persistent property of culture allows us to regard cultural values as exogenous in our empirical analysis (Guiso et al. 2006). Apart from cultural values, each country in our sample should also have observations on all the economic and institutional variables in our baseline model. Hence, our final sample consists of 33 countries across America, Europe, and Asia.[10] Among them, 24 are developed countries and 9 are developing countries.

[9] We use Schwartz's cultural values instead of Hofstede's for several reasons. First, our theoretical arguments on the effect of culture on the cost of debt are based on Schwartz's cultural dimensions. Second, the survey undertaken by Schwartz was implemented in the early 1990s, while that by Hofstede was implemented in the early 1970s. Since the sample period covered in this study ranges from 1995 to 2012, Schwartz's cultural values would be more suitable. Third, Schwartz's survey is regarded as the "most extensive research project on values so far" (Hofstede, 2001: p. 8). Fourth, this study is related to that of Chui et al. (2002), in which Schwartz's cultural values are used to explain debt ratios worldwide. Moreover, alternative measures of culture are considered in robustness tests.

[10] We have the cultural scores of 56 countries, 43 of which have observations for *Judicial* and *Common* and 38 of which have observations on *Disclosure* and *Creditor*. Only 33 out of the 56 countries have observations for *Rating*.

The financial data for our sample countries are from Compustat Global, a database that represents over 90% of the world's market capitalization. Since our baseline model involves quite a few country-level explanatory variables, we require that there be more than 16 countries in each year. Therefore, our sample period ranges from 1995 to 2012. To be included in our sample, each firm must have sufficient data to compute its cost of debt (*Cod*). Since firms in the financial and utility industries are heavily regulated, these firms' cost of debt is largely influenced by government policies. Therefore, as in previous studies on the cost of debt, financial and utility firms are excluded from our sample. Following the literature on the cost of debt (e.g., Pittman & Fortin 2004; Francis et al. 2005; Zou & Adams 2008; Bliss & Gul 2012), we measure a firm's cost of debt in year *t* as the ratio between its interest expenses and average total debt. A firm's average total debt in year *t* is computed from its total debt in years *t* - 1 and *t*. Our sample contains about 285,000 firm–year observations on the cost of debt across the 33 countries.[11] Each firm in our sample must also have observations on the four firm attributes used in our baseline model and this requirement reduces our sample to 278,000 firm–year observations. To alleviate the effect of outliers, any accounting ratio larger than (less than) its respective 99.5th percentile (0.5th percentile) in each country–year is deleted from our sample for that country–year. This filter further reduces our sample to 260,000 observations. To ensure that the national cost of debt represents that country's average cost of debt, each country is required to have at least 50 firms in each year over our sample period. Hence, our final sample at the firm–year level consists of about 255,000 observations across 33 countries.[12]

[11] Interest expenses recorded by Compustat could include finance costs unrelated to borrowing, such as costs related to seasoned equity offerings. Therefore, the computed cost of debt could occasionally be much larger than 100%. To alleviate this problem, we restrict the cost of debt to within 0–100%. This restriction reduces the sample from about 293,000 to 285,000 observations.

[12] Because of data availability, two countries in our sample have sample periods shorter than 10 years: Peru and Turkey. Our final sample contains about 33,500 firms.

We measure the real cost of debt (*RCod*) as the cost of debt adjusted for inflation.[13] Recent studies also measure the cost of debt using interest rates on syndicated loans (Bae & Goyal 2009; Giannetti & Yafeh 2012). We use interest on syndicated loans as an alternative measure of the cost of debt in a robustness test. There are several advantages to using interest expenses instead of interest rates on syndicated loans to measure the cost of debt.[14] First, since interest expenses are paid for loans borrowed in different years, this ratio captures the cumulative effect of culture on the cost of debt. Second, this ratio includes interest payments to both public and private debtholders. Hence, this measure can better reflect a firm's total cost of debt. Third, we can obtain a much larger sample.[15]

We measure the national cost of debt of country *j* in year *t* (Cod_{jt}) as the cross-sectional simple average of the individual cost of debt in country *j* in that year.[16] The real national cost of debt of country *j* in year *t* ($RCod_{jt}$) and the national average firm attributes are computed the same way. Since the sample periods of 14 countries in our sample are less than 18 years, we have only 488 country–year observations on the national cost of debt and other national average variables. Our empirical tests are based on this sample of 488 country–year observations. Table 1 reports the summary statistics for the national cost of debt for the countries in our sample. We note that the variation of the national cost of debt among developing countries is much larger than that among developed countries. In addition, while the average embeddedness score for developing countries is higher than that for developed countries, the average mastery scores for these two groups of countries are about the same.

[Insert Table 1 here]

[13] Suppose that the cost of debt for firm *i* in country *j* in year *t* is Cod_{ijt} and the inflation rate for country *j* in year *t* is π_{jt}. We compute the real cost of debt for firm *i* in country *j* in year *t* ($RCod_{ijt}$) as $[(1 + Cod_{ijt})/(1 + \pi_{jt})] - 1$.
[14] We thank a reviewer for bringing up the first two advantages of using our measure of the cost of debt.
[15] Based on data on syndicated loans, the samples of Bae and Goyal (2009) and Giannetti and Yafeh (2012) contain about 60,000 and 86,000 firm–year observations, respectively. In contrast, our sample using interest expenses consists of about 255,000 firm–year observations.
[16] We prefer using the simple average to compute the national cost of debt rather than the value-weighted average because culture should have a weaker influence on the cost of debt for large firms. Unlike small firms, large firms can borrow funds from the international market. For consistency, unless otherwise specified, we use the simple average to compute the average for the other variables.

A firm's cost of debt is well known to be related to its attributes and culture could affect the cost of debt through its influence on these attributes, such as leverage (Chui et al. 2002). To investigate the direct effect of culture on the variations of the national cost of debt across countries, we need a measure of the national cost of debt that is adjusted for firm characteristics. Following Giannetti and Yafeh (2012), to construct this measure, we use the firm characteristics of size (*Size*), profitability (*Roa*), leverage (*Lev*), and tangibility (*Tang*). The construction of these variables is listed in the Appendix. We use ordinary least squares (OLS) to estimate the following regression model at the firm level in each country–year:

$$Lncod_{ijt} = \alpha_{ojt} + \alpha_{1jt}Size_{ijt-1} + \alpha_{2jt}Roa_{ijt-1} + \alpha_{3jt}Lev_{ijt-1} + \alpha_{4jt}Tang_{ijt-1} + \varepsilon_{ijt}, \quad (1)$$

where the subscripts *i*, *j*, and *t* are the indexes for firm, country, and year, respectively, and *Lncod* is the natural logarithm of a firm's cost of debt. The adjusted national cost of debt of country *j* in year *t* ($AdjCod_{jt}$) is the estimated intercept ($\widehat{\alpha_{ojt}}$). By construction, the adjusted national cost of debt is unrelated to the firm-specific variables in each country–year.[17] Similarly, we compute the adjusted national real cost of debt by using the real cost of debt as the dependent variable in Equation (1).

The national cost of debt is related to country-level determinants. The country-level determinants used in our baseline model are motivated by Laeven and Majnoni (2005) and Giannetti and Yafeh (2012).[18] The definitions of these determinants are listed in the Appendix. Our first set of controls is related to the efficiency of the judicial system. The impact of the judicial efficiency on the cost of debt, however, is ambiguous (Bianco, Jappelli, & Pagano

[17] Given that a firm's characteristics are closely related to this firm's industry, the industry effect on the cost of debt is indirectly controlled for when the adjusted cost of debt is used.

[18] Since we are using data from Compustat Global, we do not include those variables related to loan characteristics, although they are used by Giannetti and Yafeh (2012). However, we include loan characteristics in our robustness test using data on syndicated loans. Besides, Laeven and Majnoni (2005) focus on banking markets and we study the cost of debt in the broader loan markets. Therefore, those variables related specifically to banking markets are not included. This exclusion also helps us build a neat empirical model.

2005).[19] Following these authors, we measure judicial efficiency (*Judicial*) as the average of the property rights index and the law and order index. Furthermore, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) document that common law countries provide better investor protection and a more efficient judiciary system than civil law countries do. We also include a dummy variable for the legal system (*Common*) in our model.

Our second set of country-level determinants is related to the credit market. Using data from international syndicated loans market, Bae and Goyal (2009) and Giannetti and Yafeh (2012) suggest that the cost of debt is negatively related to creditor rights. We obtain the creditor rights index, *Creditor*, from La Porta et al. (1998). Using 414 firm–year observations from 29 countries, Francis et al. (2005) find that the cost of debt is negatively related to disclosure level. Our disclosure index, *Disclosure*, is obtained from La Porta, Lopez-de-Silanes, and Shleifer (2006). Since the rating on sovereign debt is usually the ceiling for the ratings on corporate debt, we also include it as a measure of credit risk in each country. Our rating measure, *Rating*, is the average ratings assigned by Moody's and Fitch Ratings. Following Djankov, McLiesh, and Shleifer (2007) and Giannetti and Yafeh (2012), we use the natural logarithm of the ratio of private credit to the gross domestic product (GDP), *Lncredit*, as a measure of the supply of credit in each country. The cost of debt is expected to be negatively related to *Creditor*, *Rating*, and *Lncredit*. Furthermore, it is expected that the banking sector in a financial system dominated by banks tends to be more efficient in providing loans than in a market-based financial system. Hence, we include a common measure of financial architecture, *Arch*, in our baseline model (Aggarwal & Goodell 2009, 2011; Allen, Gu, & Kowalewski 2012). The measure *Arch* is computed as the ratio between

[19] On the one hand, greater judicial efficiency improves recovery in the event of default, which leads to a lower interest rate. On the other hand, greater judicial efficiency attracts more low-grade borrowers to the market, which leads to a higher interest rate. Using data from 106 countries, Laeven and Majnoni (2005) find that judicial efficiency lowers bank interest rate spreads.

domestic bank assets and stock market capitalization and is expected to be negatively related to the cost of debt.

Our third set of country-level determinants is related to the economic environment in each country. Similar to Laeven and Majnoni (2005) and Giannetti and Yafeh (2012), we use the natural logarithm of the real GDP per capita, *Lnrgdppc*, as a proxy for economic development.[20] As suggested by Laeven and Majnoni, we use the inflation rate (*Inflation*) as a proxy for macroeconomic instability.[21]

The above variables are updated annually, except for *Embs*, *Mast*, the dummy variable for common law system (*Common*), the disclosure index (*Disclosure*), and the creditor right index (*Creditor*). These five variables vary across countries but are constant across time.

3.2 Preliminary analyses

The results in Table 1 indicate that the cost of debt seems to vary systematically between developed and developing countries. We compute the correlation coefficients of the country-level variables in our baseline model separately for developed and developing countries. Table 2 reports these correlation coefficients. We find that both the natural logarithm of the national cost of debt (*Lncod*) and the real cost of debt (*Rcod*) are negatively correlated with embeddedness (*Embd*) and mastery (*Mast*) among developed countries and these correlation coefficients are statistically significant. The correlation coefficient between *Lncod (Rcod)* and *Embd* is negative and statistically significant among developing countries. However, among them, the correlation coefficient between *Lncod* and *Mast* is negative and insignificant, while the correlation between *Rcod* and *Mast* is close to zero. These findings are consistent with our hypothesis.

[Insert Table 2 here]

[20] The empirical evidence on this relation, however, is not definite. While Giannetti and Yafeh (2012) find a significant negative relation between the real GDP per capita of lenders and loan spreads, Laeven and Majnoni (2005) find that the relation between bank interest spreads and the real GDP per capita is negative but insignificant.

[21] Laeven and Majnoni (2005) find that inflation has a strong positive impact on bank interest spreads.

4. Culture and the cost of debt: The baseline model

The observed relationship between culture and the national cost of debt so far could be driven by other determinants of the cost of debt across countries. To investigate this possibility, we estimate the following baseline model based on annual national data from all countries:

$$Adjcod_{jt} = \beta_t \mathbf{F}_j + \gamma_t \mathbf{A}_{jt-1} + \varepsilon_{jt}, \quad (2)$$

where the subscripts *j* and *t* denote the country and year, respectively. The variable *Adjcod* is the firm characteristic-adjusted national cost of debt, **F** is a vector of time-invariant variables, and **A** is a vector of annual variables of country characteristics. The time-invariant variables are *Embd*, *Mast*, *Common*, *Disclosure*, and *Creditor*. The annual variables of country characteristics include *Judicial*, *Inflation*, *Lnrgdppc*, *Lncredit*, *Arch*, and *Rating*. As in previous international studies on the cost of debt/capital, our cost of debt is expressed in nominal terms (Francis et al. 2005; Hail & Leuz 2006).[22]

Equation (2) is estimated with OLS and we use Petersen's (2009) approach to compute standard errors clustered by country and year. We first look at the results from our baseline regression model, excluding the cultural variables. Consistent with previous findings (Francis et al. 2005; Laeven & Majnoni 2005; Hail & Leuz 2006), the estimated coefficient of *Inflation* is positive and significant.[23] However, we find that the relation between *Judicial* and the cost of debt is flat. The estimated coefficients for *Common* and *Lnrgdppc* are also positive but insignificant. Consistent with Francis et al. (2005), we find a strong negative relation between *Disclosure* and the cost of debt. Similar to Bae and Goyal (2009) and Giannetti and Yafeh (2012), we find that *Creditor* has a negative impact on the cost of debt. Moreover, this

[22] Hail and Leuz (2006) argue that, since the expected inflation rate can only be imperfectly measured, it is better to use the inflation rate as a control variable in the cross-sectional test rather than using an inflation-adjusted dependent variable. This approach allows the data to determine the relation between inflation and the cost of debt. Our conclusion on culture and the cost of debt, however, is not affected, even if the real cost of debt is used as the dependent variable.

[23] Consistent with previous studies, the magnitude of the estimated coefficient on inflation is less than one.

coefficient is statistically insignificant. The estimated relation between *Rating* and the cost of debt is weak. In contrast to Giannetti and Yafeh, we find a strong negative relation between *Lncredit/Arch* and the cost of debt and this result is consistent with our expectations. Table 3 reports these findings.

[Insert Table 3 here]

Table 3 also shows the findings from our baseline model that includes the cultural variables. We find that the estimated coefficients of *Embd* and *Mast* are negative and significant in all model specifications. These results are consistent with our hypothesis. We also note that some results for the control variables change when cultural values are included in the model. While the positive coefficient of *Common* becomes statistically significant, the coefficient of *Rating* becomes significantly negative.

We also examine if our results are sensitive to our choice of measuring the adjusted cost of debt based on nominal terms. We re-estimate our baseline model by replacing the dependent variable, the adjusted cost of debt, with the adjusted real cost of debt, the real cost of debt, and the natural logarithm of the national cost of debt in nominal terms. We include the average firm characteristics *Size*, *Roa*, *Lev*, and *Tang* as additional controls in the regression model when the dependent variables are not adjusted for firm characteristics.[24] Regardless of how the cost of debt is measured, the estimated coefficients of the cultural values are always negative and significant.[25] We note that the results for the control variables change notably when the natural logarithm of the nominal national cost of debt is used as the dependent variable. While the estimated coefficient of *Inflation* becomes insignificant, the

[24] The measure $Size_{jt}$ is the simple average of the sizes of the firms in country *j* in year *t*. Similar definitions are used for other firm characteristics.

[25] Since cultural values only vary across countries but remain constant over time, as a robustness test, we use OLS to estimate the baseline model using the time-series mean of each variable. This test involves 33 observations. Consistent with our previous findings, the estimates of *Embd* and *Mast* are significantly negative. For brevity, this finding is not tabulated.

estimated coefficient of *Judicial* becomes significantly positive and that of *Lnrgdppc* becomes significantly negative. These findings are reported in Table 3.

5. Culture, bankruptcy risk, and sensitivity to agency activity

Before we investigate further the relation between culture and the cost of debt, we investigate the channels through which culture affects the cost of debt. Our arguments suggest that culture influences the cost of debt through bankruptcy risk and sensitivity to agency activity. Though the theoretical arguments between embeddedness/mastery and bankruptcy risk/agency cost are discussed by Chui et al. (2002) and Li et al. (2011, 2013), such relations have not been empirically tested. We intend to provide empirical evidence in this paper.

5.1 Bankruptcy risk

We argue that *Embd* has a negative relation with bankruptcy and the relation between *Mast* and bankruptcy should be determined empirically. Following Claessens and Klapper (2005), we measure bankruptcy risk (*Bankruptcy*) as the ratio between the total number of bankruptcy filings and the total number of firms. To examine the relationship between cultural values and bankruptcy risk, we estimate the following regression model:

$$\begin{aligned} Bankruptcy_{jt} = {} & \alpha + \beta_1 Embd_j + \beta_2 Mast_j + \gamma_1 Lnrgdppc_{jt-1} + \gamma_2 Growth_{jt-1} \\ & + \gamma_3 Crisis_{jt-1} + \gamma_4 \,\mathrm{Re}al\ \mathrm{int}erest\ rate_{jt-1} + \gamma_5 Rule_j + \gamma_6 Creditor_{jt-1} \\ & + \gamma_7 Market_j + \gamma_8 SME_j + \varepsilon_{jt}, \end{aligned} \tag{3}$$

where the subscripts *j* and *t* represent for, respectively, country *j* and year *t*. We include those variables suggested by Claessens and Klapper as possible determinants of bankruptcy risk across countries:[26] namely, the natural logarithm of the real GDP per capita (*Lnrgdppc*), growth in the real GDP per capita (*Growth*), a dummy variable for the systemic banking crisis

[26] We thank Luc Laeven for providing us with the bankruptcy data used by Claessens and Klapper (2005). Claessens and Klapper collected bankruptcy data from 35 countries from 1990 to 1999. However, only 30 of these countries have scores for cultural values and, among them, we only have data on the real interest rate for 24 countries from the World Development Indicators. The sample of this test therefore consists of 24 countries and spans from 1990 to 1999.

(*Crisis*), the real lending interest rate (*Real interest rate*), the rule of law (*Rule*), creditor rights, a dummy variable for being a market-oriented country (*Market*), and the percentage of total employment in the small and medium enterprise sector (*SME*). The links between these variables and bankruptcy risk are explained by Claessens and Klapper. The definitions and sources of these variables are listed in the Appendix.

Following Claessens and Klapper (2005), we use OLS to estimate Equation (2). Since bankruptcy risk is likely to be strongly persistent, we use Petersen's (2009) method to compute the robust standard errors of estimates clustered by country and year. Table 4 reports the findings. We first replicate the findings of Claessens and Klapper. Our results for all the independent variables are consistent with their findings, except for *Creditor*. While Claessens and Klapper find that the estimated coefficient of *Creditor* is negative but insignificant, we find it to be significantly negative.

Next, we add *Embd* and *Mast* to the regression model. Consistent with our expectation, the estimated coefficients of *Embd* and *Mast* are negative and significant. The adjusted R^2 has increased from 0.58 to 0.67. This finding indicates that culture does matter for bankruptcy risk, which is lower in countries with high scores for embeddedness and mastery. Our finding suggests that a one standard deviation increase in *Embd* (*Mast*) decreases the average bankruptcy risk by -0.6% (-0.36%), which is roughly the difference in bankruptcy risk between Hong Kong China and Spain (Germany and Italy).[27] The findings for the other explanatory variables, except *Rule,* are similar to those reported earlier. When cultural values are included in the model, the estimated coefficient of *Rule* becomes insignificant. Table 4 reports the findings.

[Insert Table 4 here]

[27] A change of 0.6% (0.36%) in average bankruptcy risk is about 34% (20%) of the standard deviation of the average bankruptcy risk across countries.

In the above analysis, we use the actual bankruptcy ratio as a measure of bankruptcy risk. As a robustness test, we use the perceived bankruptcy probability as a measure of bankruptcy risk. Following the bankruptcy literature, we compute the national bankruptcy ratio based on Ohlson's O-scores or Altman's Z-scores on firms. We compute the O-score using the parameter estimates reported by Ohlson (1980) and compute the Z-scores based on Altman's (1968) parameter estimates. The formulas of these computations are listed in the Appendix. The advantage of using these scores is that we can extend the end of our sample period from 1999 to 2012. The disadvantage is that these parameter estimates are likely not the same across countries. Therefore, we cannot directly compare these scores across countries. However, within a country, a higher O-score (lower Z-score) should indicate a higher bankruptcy probability. For each country–year, we compute the fraction of firms with their O-scores (Z-scores) that are higher (lower) than the mean O-scores (Z-score) by one standard deviation.[28] In other words, we use the ratio of bankruptcy-prone firms as a measure for *Bankruptcy* in Equation (3). If the distributions of bankruptcy risk are identical across countries, then the fraction of firms crossing the threshold will be the same.[29] Our argument, however, suggests that the distribution of bankruptcy risk is influenced by culture and hence the fraction of firms passing the threshold depends on cultural values. When the bankruptcy ratio is based on the O-score, the estimated coefficients of *Embd* and *Mast* are negative. Moreover, only the estimated coefficient of *Embd* is statistically significant. For the control variables, the estimated coefficients of *Rule* and *Market* become significantly negative, while that of *Creditor* becomes significantly positive. We obtain similar findings if bankruptcy ratio is based on the Z-score.

[28] If we use the mean score as the threshold, then a large number of firms can surpass this threshold and a significant portion of them are not deemed to be risky. On the other hand, if a two standard deviation difference from the mean is used as the threshold, then too few firms can surpass this threshold and our measure excludes quite a number of firms that are deemed to be risky. One standard deviation seems to be a reasonable choice.

[29] The country average of the fraction of firms surpassing the O-score (Z-score) threshold ranges from 0.050 (0.000) to 0.159 (0.105), with a standard deviation of 0.033 (0.023). It is very unlikely that the distribution of bankruptcy risk is the same across countries.

In summary, our findings indicate that a higher score for *Embd* and a higher score for *Mast* lead to lower bankruptcy risk. However, the relation between *Embd* and bankruptcy risk is more robust than that between *Mast* and bankruptcy risk.

5.2 Agency activities

Our cultural argument suggests that while sensitivity to agency activity is negatively related to embeddedness, its relation with mastery is unclear. Prowse (1990) argues that, in a country where investors are more concerned with agency problems, the link between the leverage ratio and a propensity for agency activities should be more negative. Therefore, to examine the relationship between culture and sensitivity to agency activity, we follow Prowse (1990) and conduct a two-stage analysis. The first stage investigates the relationship between the inverse of the asset utilization ratio (*AS*, total assets divided by total sales) and the leverage ratio (*Lev*) across countries. The asset utilization ratio is a common proxy for agency costs in the accounting and finance literature (Ang, Cole, & Lin 2000) and indicates how efficient a manager is in generating sales from total assets. An agency problem arises when managers intentionally allocate funds to non–profit-maximizing projects and this behavior reduces the asset utilization ratio and hence increases *AS*. Therefore, we use *AS* as our measure of the propensity for agency activity.

Since creditors are reluctant to lend money to firms with severe agency problems, *AS* should be negatively associated with a firm's leverage ratio. Previous literature on capital structure also suggests that the leverage ratio decreases with business risk (*Oprisk*) and profitability (*Roa)* (e.g., Prowse 1990). To capture the tax shield of debt, Equation (4) also includes the effective tax rate (*TaxR*), which is the ratio between income taxes and operating income. The industry dummy variable (*Ind*) is used to control for industry effects on the leverage ratio. The definitions of these variables are listed in the Appendix.

We use OLS to estimate the following regression model at the firm level for each country–year:

$$Lev_{ijt} = \alpha_{jt} + \beta_{1jt} AS_{ijt-1} + \beta_{2jt} Oprisk_{ijt-1} + \beta_{3jt} Roa_{ijt-1} + \beta_{4jt} TaxR_{ijt-1} + \sum_{k=1}^{9} \gamma_{kt} Ind_{kjt} + \varepsilon_{ijt}, \quad (4)$$

where the subscripts *i*, *k*, *j*, and *t* represent for, respectively, firm *i*, industry *k*, country *j*, and year *t*. Note that the estimated coefficient of *AS* (i.e., $\hat{\beta}_{1jt}$) should be negative. To obtain a positive measure of sensitivity to agency activity (SAP_{jt}), we construct SAP_{jt} for country *j* in year *t* as $-\hat{\beta}_{1jt}$. A larger value of SAP_{jt} indicates that investors worry more about agency activity. Since people in high-embeddedness countries worry less about agency conflicts, we expect *SAP* to be lower in high-embeddedness countries. Although agency risk in high-mastery countries is more severe, debtholders in these countries could tolerate more agency risk. Hence, the relation between mastery and *SAP* is uncertain.

In the second stage, we estimate the equation

$$SAP_{jt} = \theta_o + \theta_1 Embd_j + \theta_2 Mast_j + \theta_3 Judicial_{jt-1} + \theta_4 PolR_j + \theta_5 Creditor_j + \theta_6 Lnrgdppc_{jt-1} + \theta_7 Inflation_{jt-1} + \epsilon_{jt}, \quad (5)$$

where the subscripts *j* and *t* are indexes for country and year, respectively. The judicial index (*Judicial*), the creditor rights index (*Creditor*), and the political rights index (*PolR*) are used to capture a country's institutional quality and we expect investors in countries with better institutional quality to be less concerned with agency conflicts. We also include the natural logarithm of the real GDP per capita (*Lnrgdppc*) as a measure for the level of economic development and inflation rate (*Inflation*) to control for macroeconomic instability. The effects of economic development and macroeconomic instability on sensitivity to agency activity are uncertain, however. On the one hand, a more mature economy will have stronger monitoring systems, thus reducing investor concerns about agency activities. On the other hand, managers in more developed economies tend to be more profit oriented and could have

stronger incentives to participate in agency activities. In addition, a higher inflation rate increases the nominal interest rates, which leads to decreases in firms' cash flows. Agency risk therefore becomes more severe. However, if the rise in price level is unanticipated, then a higher inflation rate tends to lower firms' real liabilities but not their real assets. Unanticipated inflation therefore increases firms' real net worth, which leads to lower agency risk.

Consistent with our expectation, while the estimated coefficient of *Embd* is negative and significant, the estimated coefficient of *Mast* is positive but insignificant. These results support our conjecture that investors in high-embeddedness countries are less concerned with agency activity. However, the relation between mastery and sensitivity to agency activities is weak. We also find that the estimated coefficient of *PolR* is negative and significant, while that of *Judicial* is significantly positive. The estimated coefficients of the other variables are insignificant in Equation (5). Table 5 shows the findings.

To explore if debtholders are more or less concerned with agency costs in high-mastery countries, we split our sample into two groups: high leverage versus low leverage. In each year, a country is allocated to the high-leverage (low-leverage) group if the average leverage of this country is higher than (less than or equal to) the median of the average leverage computed from all the countries in our sample. Debtholders should be more alert to agency costs in countries with highly leveraged firms. Hence, we expect *Mast* to have a stronger effect on sensitivity to agency activity (*SAP*) in the high-leverage group.[30] We estimate Equation (5) in these two groups and Table 5 reports the findings. Consistent with our previous results, the estimated coefficients of *Embd* are significantly negative in both sub-samples. The estimated coefficient of *Mast* is negative but insignificant in the low-leverage group, while it is positive and significant in the high-leverage group. Our finding indicates

[30] We would like to thank the reviewer for suggesting this test to us.

that debtholders have greater concern about agency activities in countries with high leverage, which leads to a strong positive relation between *Mast* and *SAP*.

[Insert Table 5 here]

5.3 Interaction effects

5.3.1 Financial intermediary development

The major role of financial intermediation is to mitigate the problem of information asymmetry between borrowers and lenders. Hence, the agency problem is expected to be less severe in a country with better-developed financial intermediaries. If our hypotheses hold, then financial intermediary development should weaken the cultural influence on the cost of debt through the agency cost channel. Since *Embd* has a negative impact on the cost of debt via the agency cost channel, we expect financial intermediary development to reduce the negative effect of *Embd* on the cost of debt and hence *Embd* to exert a less negative impact on the cost of debt.[31] Since the relation between Mast and agency costs is uncertain, a priori the influence of financial intermediary development on the cost of debt through *Mast* is also uncertain. However, our previous results indicate that *Mast* has an insignificant effect on sensitivity to agency activity among low-leverage countries and a strong positive effect on this sensitivity among high-leverage countries. Therefore, we expect the development of financial intermediaries to either have no effect on the relation between *Mast* and the cost of debt or reduce the positive effect of *Mast* on the cost of debt. In the latter case, the estimated effect of *Mast* on the cost of debt will become more negative.

To test these conjectures, we add two interaction terms in our baseline regression: $Embd \times Rank_{Arch}$ and $Mast \times Rank_{Arch}$. All countries in our sample are classified into four groups based on their average *Arch* over the whole sample period, from low (bottom 25%) to

[31] In high-*Embd* countries, there is less concern about agency costs. Conversely, in low-*Embd* countries, concerns are higher. Therefore, other things being equal, high-*Embd* countries have a lower cost of debt. However, with better-developed financial intermediaries, concerns of higher agency costs in low-*Embd* countries are alleviated. The advantage of high-*Embd* countries over low-*Embd* countries in the cost of debt through the agency channel is therefore less pronounced.

high (top 25%). The agency problem is expected to be less severe as we move from the low-*Arch* group to the high-*Arch* group. If a country belongs to the low-*Arch* group, its score for $Rank_{Arch}$ is one. Similarly, if a country belongs to the second-, third-, or highest-*Arch* group, its score for $Rank_{Arch}$ is 2, 3, or 4, respectively. We use the ranks of *Arch* instead of the raw data on *Arch* in the regression to reduce the degree of multicollinearity. Table 6 reports the findings. We find that all estimated coefficients related to culture are negative and significant. Consistent with our conjectures, the estimate of $Embd \times Rank_{Arch}$ is significantly positive and that of $Mast \times Rank_{Arch}$ is significantly negative. This result indicates that, comparing to the bankruptcy channel, the agency cost channel becomes less important as financial intermediaries develop. Therefore, *Embd* has a less negative influence on the cost of debt while *Mast* has a more negative influence on the cost of debt.

[Insert Table 6 here]

5.3.2 Enforcement of insider trading law

Bhattacharya and Daouk (2002) document that the enforcement of insider trading law decreases the cost of equity. The benefit of the enforcement of insider trading law could extend from the equity market to the debt market. Bhattacharya and Daouk argue that the enforcement of insider trading law can provide a better incentive for the controlling shareholders to monitor management. Since controlling shareholders' wealth is tied up with their firms, they have a strong incentive to reduce conflicts with debtholders (Anderson, Mansi, & Reeb 2003). Therefore, the agency risk of debt could also be reduced if insider trading law is enforced. In addition, a firm's performance could be improved when shareholder interests better align with the interests of managers. Hence, the enforcement of insider trading law could also reduce bankruptcy risk. If these conjectures are true, we expect the effect of *Embd* on the cost of debt to be less negative after this law is enforced. However, the effect of the enforcement of insider trading law on the relation between *Mast* and the cost

of debt is uncertain. We use a dummy variable for the enforcement of insider trading law, *Insider*, from Bhattacharya and Daouk (2002). The variable *Insider* takes the value of one for a country after year *t* if insider trading law is enforced in year *t* in that country and zero otherwise. We find information on insider trading law enforcement for 28 countries in our sample and hence only 430 country–year observations are involved in this test. We add *Insider* and two interaction terms, *Embd* × *Insider* and *Mast* × *Insider,* to our baseline model. Table 6 shows that the estimates of *Embd* and *Mast* continue to be significantly negative. We document that the cost of debt is significantly reduced if insider trading law is enforced. Consistent with our expectation, the estimate of *Embd* × *Insider* is positive and significant. However, the estimate of *Mast* × *Insider* is positive but insignificant. Our evidence indicates that the enforcement of insider trading law mitigates the effect of embeddedness on the cost of debt. These findings are reported in Table 6.

5.4 Culture, channels, and the cost of debt

This section investigates further if culture indeed affects the cost of debt through the bankruptcy and agency cost channels.[32] For each year, embeddedness (*Embd*) is regressed on the perceived bankruptcy ratio based on *Z-scores* and sensitivity to agency activity (*SAP*).[33] The variables *Embd (Predicted)* and *Embd (Other)* of country *j* in year *t* are, respectively, the predicted *Embd* and the residual of country *j* from this regression in year *t*. By construction, *Embd (Predicted)* is the portion of culture related to our suggested channels and *Embd (Other)* is unrelated to these channels. The variables *Mast (Predicted)* and *Mast (Other)* are constructed using the same procedure. We substitute *Embd (Predicted)* and *Embd (Other)* for *Embd* and *Mast (Predicted)* and *Mast (Other)* for *Mast* in our baseline model. We estimate this revised baseline model with OLS and Petersen's (2009) approach is used to compute

[32] We would like to thank the reviewer for suggesting this statistical procedure to us. However, this procedure does not imply that bankruptcy and agency costs cause cultural differences; it merely captures their associations with culture.

[33] We use the bankruptcy risk measure based on Z-scores to obtain a larger sample covering all 33 countries.

standard errors clustered by country and year. If culture affects the cost of debt through the suggested channels, then we expect the estimated coefficients of *Embd (Predicted)* and *Mast (Predicted)* to be significant. Consistent with our expectation, the estimated coefficients of these two variables are significantly negative. We also find that the estimated coefficients of *Embd (Other)* and *Mast (Other)* are significantly negative. We obtain similar findings when the cost of debt is used as the dependent variable instead of the adjusted cost of debt. Table 7 reports the findings. In summary, there is a direct link between the suggested channels and the relation between culture and the cost of debt. Moreover, culture has an additional effect on the cost of debt that is unrelated to these channels.

[Insert Table 7 here]

6. Robustness checks

6.1 Multicollinearity

Since cultural values are strongly correlated with the control variables in the baseline model, multicollinearity could be a concern. Multicollinearity can increase the standard errors of the estimated coefficients, produce estimated coefficients with incorrect signs, and generate wide swings in the estimates with a small change in sample or model specifications. These problems make the interpretation of our findings less reliable.[34] To investigate the extent to which multicollinearity could affect our findings on cultural values, we implement two sensitivity tests.[35] The first test is on small changes in sample size. We randomly remove five countries from our sample of 33 countries and estimate our baseline model with this reduced sample. We repeat this procedure 1000 times and find that 99.8% (86.9%) of the estimated coefficients of *Embd* (*Mast*) are significant at the 5% level. Our second sensitivity test is on a small alternation of the model specification. This test is a variant of the extreme

[34] Table 3 shows that the maximum variance inflation factors (*VIF*) for each model specification are less than 10. The *VIF* scores of *Embd* range from 3.30 to 4.28 and those associated with *Mas*t range from 1.52 to 1.92. These findings indicate that the problem of multicollinearity is at most moderate in our baseline model and is concentrated on the control variables.

[35] For brevity, the results of these two sensitivity tests are not tabulated.

bound analysis suggested by Levine and Renelt (1992). For each regression, we remove one to three variables of the eight control variables from our baseline model.[36] Similar to the previous sensitivity test, all the estimated coefficients of *Embd* and *Mast* are negative and more than 95% of them are significant at the 5% level. Furthermore, the extreme upper and lower bounds of *Embd* and *Mast* are negative.[37] This finding suggests that the relation between the adjusted cost of debt and cultural values is robust to small alternations in our sample size or model specification. In summary, the results from our sensitivity tests suggest that the relation between the cost of debt and cultural values is not affected by multicollinearity.

6.2 Does leverage matter?

Chui et al. (2002) document that firms in countries with high scores for *Embd* and *Mast* tend to have lower leverages. Table 3 shows a significant positive relation between the cost of debt and leverage. Therefore, the effect of culture on the cost of debt could mainly go through leverage. This section explores if culture exerts an effect on the cost of debt that is independent from leverage. Each year, firms in various countries are allocated to five groups based on their leverage, from low (bottom 20%) to high (top 20%). We require that each group have at least 17 countries in each year and each country have at least 10 firms in each portfolio year. The sample period in this test therefore ranges from 1997 to 2012. We estimate our baseline model in each group and report the estimates on *Embd* and *Mast* in Panel A of Table 8. We find that all the estimates on cultural values are significantly negative and the

[36] The eight control variables are *Judicial*, *Common*, *Disclosure*, *Lnrgdppc*, *Lncredit*, *Arch*, *Creditor*, and *Rating*. The variables *Embd*, *Mast*, and *Inflation* are always included in the regression because cultural values are the variables of interest and we need to control for inflation when comparing the cost of debt across countries. We end up with 92 regressions.

[37] The extreme upper bound of a variable is computed from the group of estimated coefficients on this variable that are significant at the 5% level and this group is labeled *Z*. The extreme upper bound is defined by the estimated coefficient ($\hat{\beta}_{max}$) from group *Z* that produces the maximum value of $\hat{\beta}_{max} + 1.96\,\sigma(\hat{\beta}_{max})$, where $\sigma(\hat{\beta}_{max})$ is the standard error of $\hat{\beta}_{max}$. The extreme lower bound is $\hat{\beta}_{max} - 1.96\,\sigma(\hat{\beta}_{max})$. For a 95% confidence interval, the critical value is approximately 1.96. The interval between the upper and lower bounds represents those values of the estimated coefficient that are not statistically different from the estimated coefficients used to construct these bounds.

magnitudes of the estimates are similar across leverage-sorted groups. This result suggests that the negative relation between culture and the cost of debt is not influenced by leverage.

[Insert Table 8 here]

One may argue that culture could affect the cost of debt through its influences on firm characteristics other than leverage. To address this concern, we estimate our baseline model in a sample of firms with similar firm characteristics. To construct this sample, we start with the firms in the United States. First, we classify firms in the United States into two groups (above/below the median) based on each of the four firm characteristics of size, profitability, leverage, and tangibility, independently each year from 1995 to 2012. Hence, we obtain 16 groups of US firms with different number of firms each year. Of these 16 groups, only the group with large firms of high profitability, low leverage, and low tangibility can generate a sample suitable for this test. We name this sample of US firms the target sample. Second, we find non-US firms with similar firm characteristics for each firm in the target sample each year from 1995 to 2012. We define firms with similar firm characteristic as those firms whose size, profitability, leverage, and tangibility are within ±35% of that of a target firm. To have enough countries each year, we require each country to have at least 35 observations instead of 50 each year. Finally, our sample of firms with similar firm characteristics consists of 316 country–year observations across 28 countries. We estimated our baseline model using this reduced sample and find that the estimated coefficients of *Embd* and *Mast* are negative and significant. Panel B of Table 8 reports the findings. The estimates for the other variable are similar to those reported in Table 3, except for *Lncredit*, *Arch*, *Creditor*, and *Rating*. While the estimates of *Lncredit*, *Arch*, and *Rating* become insignificant, the estimate of *Creditor* becomes significantly positive. Our result suggests that the effect of cultural values on the cost of debt does not have to go through firm characteristics.

6.3 *Endogeneity*

One could raise the concern that our baseline model excludes a key variable that is highly correlated to both cultural values and the cost of debt. As in recent studies in cultural finance, we use two methods to mitigate this endogeneity issue (Shao, Kwok, & Zhang 2013; Zheng, El Ghoul, Guedhami, & Kwok 2013; El Ghoul, Guedhami, Kwok, & Shao 2015): We include additional variables in our baseline model and use the instrumental variable approach to handle this problem.

6.3.1 Other institutional explanations

First, we replace *Judicial* in our baseline model with *Private Property Right* and *Law*.[38] We note that the estimated coefficient of *Property* is negative but insignificant. The estimated coefficient of *Law* is positive and insignificant. Moreover, the estimated coefficients of the cultural values remain significantly negative.[39] Second, we include the political rights index (*Political Rights*) of La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999) in our baseline model.[40] We find that its estimated coefficient is significantly positive. Nevertheless, the estimated coefficients of *Embd* and *Mast* remain significantly negative.[41]

6.3.2 Instrumental variable regression

Our second method for handling the endogeneity problem arising from omitted variables is the instrumental variable approach. This approach can also help us address potential measurement errors in our cultural variables. The instruments used are an index for pathogen prevalence (*Pathogen*) and an index on pronoun drop (*Pronoun drop*). Cultural values could be developed as a defense mechanism to prevent the transmission of pathogenic diseases and

[38] Our index for judicial efficiency is the average of the private property rights index (*Private Property Right*) and the law and order index (*Law*).
[39] We also replicate Bae and Goyal's (2009) findings by regressing the adjusted cost of debt on *Private Property Right* and *Creditor*. Consistent with their study, we find that the estimated coefficient of *Private Property Right* is significantly negative. However, the estimate of *Creditor* is negative but insignificant. While the coefficient of *Private Property Right* is -0.011 (robust *t*-statistic = -1.82), that of *Creditor* is -0.069 (robust *t*-statistic = -0.99). For brevity, these findings are not reported in detail.
[40] Qi et al. (2010) find that the cost of debt is negatively related to political rights across 39 countries.
[41] For brevity, the findings for these two tests are not tabulated.

Fincher, Thornhill, Murray, and Schaller (2008) document that pathogen prevalence predicts cultural values. On the other hand, the grammatical rule on pronoun drop is frequently used as an instrument for cultural values (e.g., Licht, Goldschmidt, and Schwartz 2007; Eun, Wang, and Xiao 2015). The measure of pathogen prevalence is obtained from Fincher et al. (2008) and the index on pronoun drop is from Kashima and Kashima (1998). Although *Pathogen* and *Pronoun drop* are closely related to culture, there is no a priori reason to expect them to have a direct impact on the cost of debt. Therefore, we use *Pronoun drop* and *Pathogen*, respectively, as instruments for our cultural values *Embd*, and *Mast*. We use two-stage least squares to estimate our baseline model and use Petersen's (2009) method to compute standard errors clustered by country and year in both stages. In the first stage, cultural values are regressed on the instruments and the control variables. For brevity, Panel A of Table 9 only reports the stage one estimates for the instruments. We find a strong relation between the instruments and the cultural values. In particular, the adjusted R^2 decreases by 4% (13%) if the instruments are excluded from the regression of *Embd* (*Mast*) and the estimates of the instruments are jointly significant. The results of the second stage are shown in Panel B of Table 9. We find that the estimated coefficients of both *Embd* and *Mast* are negative. Moreover, only the estimate of *Embd* is significant. In summary, our findings indicate that the negative relation between the cost of debt and *Mast* is less robust than that between the cost of debt and *Embd*. The negative relation between *Mast* and the cost of debt could be affected by endogeneity.

[Insert Table 9 here]

6.4 Other robustness tests

6.4.1 Measuring the cost of debt as interest on syndicated loans

Prior studies measure the cost of debt using interest rates on syndicated loans (Bae & Goyal 2009; Giannetti & Yafeh 2012). Indeed, our measure based on interest expenses and

the measure based on syndicated loans are closely related across countries. In our sample, the correlation coefficient between these measures is 0.517 (p-value = 0.00).[42] As a robustness check, we also measure the cost of debt as in these studies. We collect data on syndicated loans from 1995 to 2012 from Thomson One. We use the location of the headquarters of the borrowers and lenders to classify them into different countries. To be included in our sample, we require at least one of the bookrunners (the main underwriters) of each loan of the borrower to belong to the same country. About 23% of our observations have more than one bookrunner and only 6% have more than two. This requirement effectively restricts most of the observations on loans between lenders and borrowers in the same country. To include more countries in this test, we require each country to have at least five observations in a given year. The national interest rate on the loans of a country in a given year is the average of the interest rates on individual loans in that country–year. Finally, our sample of syndicated loans includes 253 country–year observations covering 24 countries.

To implement our test using the natural logarithm of the interest rates on loans as the dependent variable, we include average loan characteristics in our baseline model.[43] Following Giannetti and Yafeh (2012), the loan characteristics included as explanatory variables are a B rating (*Rating B*), a C rating (*Rating C*), a rating below C (*Default*), an unavailable rating (*Unrated*), the natural logarithm of the loan amount in US dollars (*Amount*), the natural logarithm of the number of years to maturity (*Maturity*), the number of banks involved in the loan (*Number of banks*), and the number of tranches in the loan (*Number of tranches*). Since there may be more than one bookrunner for a given loan and additional bookrunners could be from a different country, we also include a ratio of foreign bookrunners to total bookrunners (*Foreign bookrunners ratio*) as an explanatory variable. We

[42] There are 30 countries in our sample that are also included in the sample of Bae and Goyal (2009). The correlation between the median national cost of debt in this study and the median national loan spread of Bae and Goyal (2009) is 0.541 (p-value = 0.002).

[43] If we also control for firm characteristics, the number of observations in our sample is significantly reduced and we cannot implement this test.

estimate our baseline model with average loan characteristics and report the findings in Table 10.

[Insert Table 10 here]

Consistent with our hypothesis, the estimated coefficient of *Embd* is negative and significant. However, the estimated coefficient of *Mast* is negative but insignificant.[44] Among other country-level variables, only the estimated coefficients of *Judicial*, *Common*, and *Lncredit* are significant. While the estimates of *Judicial* and *Common* are positive, that of *Lncredit* is negative. Regarding the estimated coefficients of loan characteristics, only the estimates of *Rating B*, *Default*, *Maturity*, *Number of banks*, and *Foreign bookrunners ratio* are significant. Consistent with Giannetti and Yafeh (2012), we find that borrowers with a B or default rating have a higher cost of debt and the cost of debt increases with *Maturity*. In contrast to their findings, we find that the estimate of *Number of banks* is positive, suggesting that the cost of debt is affected by the higher transaction costs associated with more banks. Our findings also indicate that involving foreign bookrunners helps reduce the cost of debt. In summary, the relation between embeddedness and the cost of debt remains negative and significant even if we compute the cost of debt using interest rates on loans.

6.4.2 Alternative measures of culture and other aspects of informal institution

We look at alternative measure of cultural values. Hofstede's cultural values, individualism (*Indv*), masculinity (*Mas*), uncertainty avoidance (*Uai*), and power distance (*Pdi*) are widely used in the international finance literature.[45] Schwartz (2004) suggests that *Embd* and Hofstede's individualism index (*Indv*) overlap conceptually to some extent, in that both dimensions contrast an autonomous self-concept with an interdependent self-concept.

[44] Table 11 indicates that the effect of mastery (*Mast*) on the cost of debt is very profound among developing countries. Our sample of syndicated loans involves 24 countries, 19 of which are developed countries. Therefore, the effect of mastery on the cost of debt is likely to be weaker in this sample.

[45] The respondents in Hofstede's survey are the employees of IBM worldwide. In an early stage, Hofstede classified values into four dimensions: individualism, masculinity, uncertainty avoidance, and power distance. In a later stage, long-term orientation was added as a fifth dimension. Unlike the other four dimensions, a number of countries do not have scores on long-term orientation. Therefore, we do not include this dimension in our test.

Note that embeddedness and individualism are negatively related. Furthermore, Schwartz indicates that mastery has some conceptual overlap with Hofstede's masculinity index, in that both dimensions emphasize values related to personal accomplishment, such as assertiveness and ambition. Using data from our sample countries, we find that the estimated correlation coefficient between *Embd* and *Indv* is -0.663 (*p*-value = 0.00) and that between *Mast* and *Mas* is 0.416 (*p*-value = 0.02). On the other hand, Li et al. (2013) document that corporate risk taking is positively related to *Indv* and negatively related to Hofstede's uncertainty avoidance index (*Uai*). Hence, Hofstede's cultural values could affect the corporate cost of debt through corporate risk taking. As a robustness test, we replace Schwartz's cultural values with Hofstede's culture values in our baseline model. We find that the estimates for *Indv*, *Mas,* and *Pdi* are positive and the estimate of *Uai* is negative. However, only the estimated coefficient on *Indv* is significant. We obtain similar findings if *Pdi* is excluded from the model. Panel A of Table 11 shows the findings.[46]

[Insert Table 11 here]

Other frequently used cultural measures are from the Global Leadership and Organizational Behavior Effectiveness (GLOBE) project launched in the 1990s. GLOBE identifies nine cultural dimensions. Among them, in-group collectivism and assertiveness are connected to our cultural argument on the cost of debt. People in high in-group collectivism counties tend to have high degrees of pride, loyalty, and cohesiveness in their organizations or families. On the other hand, people in high-assertiveness countries tend to be tough, assertive, confrontational, and aggressive. While in-group collectivism is conceptually related to *Embd*, assertiveness is conceptually related to *Mast*. We collect indexes on the practice scores on in-group collectivism and assertiveness from House et al. (2004) and use them to replace Schwartz's cultural values in the baseline model. We find that the estimate for in-

[46] For brevity, the estimated coefficients on the control variables are not reported in Table 11.

group collectivism is significantly negative and the estimate for assertiveness is positive but insignificant.

Giannetti and Yafeh (2012) measure cultural distance based on the cultural values developed by the World Values Survey (WVS) and find that this cultural distance is a major determinant of the cost of debt across countries. The WVS classifies cultures into two dimensions, traditional versus secular–rational values (*Tradrat*) and survival versus self-expression values (*Survself*). Countries with high *Tradrat* scores place less emphasis on traditional values such as religion, family, and authority. On the other hand, countries with high *Survself* scores place less emphasis on economic and physical security and more on trust and tolerance. Dobewall and Rudnev (2014) show that people in high-embeddedness countries tend to have low scores for both *Tradrat* and *Survself*. Their findings also suggest that Schwartz's mastery value is unrelated to both *Tradrat* and *Survself*. As a further robustness test, we include *Tradrat* and *Survself* in our baseline model to replace *Embd*. We find that the estimate of *Tradrat* is negative but insignificant and the estimate of *Survself* is significantly positive. The estimate of *Mast* is negative and significant. In summary, there is a robust relation between the cost of debt and Schwartz's cultural values. The estimates of *Embd* or its alternative measures are always negative and significant. However, the estimates of *Mast* or its alternative measures are significantly negative in some of the tests.

Williamson (2000) provides a conceptual framework describing how formal and informal institutions influence business decisions. An informal institution consists of customs, norms, tradition, and religion. National culture is part of the informal institution. In this section, we consider how other aspects of informal institution could affect our findings. The findings from these tests are reported in Panel A of Table 11. Guiso, Sapienza, and Zingales (2009) document that trust has an important impact on cross-border trade and investment. Guiso et al. (2006) summarize a number of studies that illustrate how trust affects various economic

outcomes. One would expect the cost of debt to be lower in countries where people are more trusting. To investigate this possibility, we collect data on distrust (*Distrust*) from Aghion, Algan, Cahuc, and Shleifer (2010) and include it in our baseline model. We find that the estimated coefficient of *Distrust* is negative but insignificant. The variables *Embd* and *Mast*, however, still exert a strong negative impact on the cost of debt after the level of distrust in each country is controlled for.

Another frequently used informal institution in credit market research is religious orientation. Stulz and Williamson (2003) find that Catholic countries have lower creditor protection than non-Catholic countries and Bae and Goyal (2009) document a negative relation between creditor rights and the cost of debt. We note that 13 of the 33 countries in our sample are Catholic and they tend to have lower scores for embeddedness and mastery. Therefore, it is important to know if our previous findings are driven by these Catholic countries. We include one dummy variable, *Catholic*, in our baseline model to capture the effect of this belief on the cost of debt. The variable *Catholic* will take on the value of one if Catholicism is practiced by the largest proportion of the country's population. We collect the religion data from the 2012 CIA World Report. We find that the estimated coefficient of *Catholic* is positive but insignificant. Nonetheless, the estimated coefficients of *Embd* and *Mast* are still negative and significant.

In a tight culture, people respect norms and tend not to deviate from them (Uz 2015). In a recent study, Eun et al. (2015) document a positive relation between the cultural value of tightness, *Tightness*, and stock prices co-movement as measured by R^2. Since countries with poor corporate governance tend to have high R^2 (Jin & Myers 2006), *Tightness* could be related to corporate governance and thus exert an effect on the cost of debt.[47] One should note

[47] We also investigate if R^2 could influence the relation between culture and the cost of debt. We classify countries into two groups based on the average R^2 of the firms in each country–year. We estimate our baseline model in each group and find that all the estimated coefficients on *Embd* and *Mast* are significantly negative. We note that the effect of embeddedness on the cost of debt is more negative and the effect of mastery is less

that *Tightness* is conceptually not the same as *Embd*. For example, if the pervasive norm in a country with tight culture is pleasure (preserving one's public image), then this country should have a low (high) embeddedness score. As a robustness test, we include *Tightness* as a control variable in our baseline model. We obtain data on *Tightness* from Uz (2015) and a higher score for Uz's measure of tightness indicates a lower level of tightness. We can find tightness scores for 23 countries in our sample. Panel A of Table 11 shows that the estimated coefficients of *Tightness*, *Embd*, and *Mast* are negative. Nonetheless, only the estimates of *Tightness* and *Embd* are significant.

6.4.3 Confining the sample to small firms

One may be concerned that the large firms in our sample could access the international market for loans, which could contaminate our findings. To address this issue, we eliminate from our sample those firms whose annual sales are larger than USD 80 million and estimate our baseline model in this sample of small firms.[48] Unlike large firms, small firms rely on domestic capital market for their loans. Our findings using small firms are consistent with our previous results. The estimated coefficient of *Embd* and *Mast* are negative and significant. The findings for the other variables are similar to those obtained for the full sample, except for *Inflation*, *Lncredit*, and *Arch*. The estimates for these three variables become insignificant. Panel B of Table 11 reports the findings.

6.4.4 Comparing results across time

We explore whether our findings change over time. We split our sample into two sub-samples, each with an equal number of years, before and after 2003, and re-estimate the

negative among high-R^2 countries than among low-R^2 countries. Since R^2 is positively related to opacity, our finding indicates that cultural values have a greater influence on the cost of debt through the agency channel in countries with high levels of opacity. Moreover, the differences of the estimates between the low- and high-R^2 groups are not significant. For brevity, the findings of this test are not reported in detail.

[48] The average (median) 30th percentile of annual sales of the US firms in our sample is USD 60 million (USD 45 million). The maximum 20th percentile of annual sales of the US firms in our sample is USD 77 million. Hence, firms with annual sales less than USD 80 million are very small firms in the United States.

baseline model for these two sub-periods. Panel B of Table 11 reports the findings. Our previous findings on the cultural values, *Disclosure*, *Inflation*, and *Arch* remain unchanged. Compared to the pre-2003 period, the estimate of *Embd* is slightly less negative and the estimate of *Mast* is much less negative in the post-2003 period. Overall, our results suggest that the relation between culture and the cost of debt is stable across time.

6.4.5 Developing countries and the global financial crisis

Our sample consists of 33 countries, nine of which are developing countries. Table 2 shows that *Embd* and *Mast* are positively related among developed countries, while they are negatively related among developing countries. It would be interesting to examine if this flip in sign in their correlations could affect the relation between the cost of debt and cultural values.[49] Furthermore, the agency problem could have become more severe and bankruptcy risk could have increased worldwide after the 2008 global financial crisis. It would be worth investigating how the 2008 global financial tsunami potentially affects our findings on cultural values and the cost of debt. We define a dummy variable *Dev* that equals one for developing countries and zero otherwise. We construct another dummy variable, *Fincrisis,* that equals one for the years from 2008 to 2012 and zero otherwise. We include *Dev* and *Fincrisis* and their interaction terms with the cultural values in our baseline regression and the findings are shown in Panel B of Table 11.

The estimated coefficients of the cultural values continue to be negative and significant. While the estimate of *Dev* is significantly positive, that of *Fincrisis* is significantly negative. These results are consistent with our expectation that the cost of debt is higher among developing countries than among developed countries and that the expansionary monetary policies implemented around the globe since the crisis has led to a low-interest environment. Regarding the interaction terms, the estimates of *Embd* × *Dev* and *Embd* × *Fincrisis* are

[49] We thank the reviewer for bringing up this point.

positive but insignificant. The estimated coefficient of *Mast* × *Dev* is negative and significant, while that of *Mast* × *Fincrisis* is positive and significant. These findings indicate that *Mast* has a stronger negative effect on the cost of debt among developing countries and its impact on the cost of debt increased since the global financial crisis. These findings are consistent with the possibility that the agency channel related to mastery is less significant among developed countries and has become more profound since the financial crisis.

7. Conclusions

In this paper, we conduct an international study on whether national culture helps explain the variation of the corporate cost of debt around the world. We argue that firms in countries with high for embeddedness tend to have lower bankruptcy risk and investors in these countries are less concerned with the agency activities of managers. Therefore, compared to countries with low scores for embeddedness, firms in high-embeddedness countries have a lower cost of debt. On the other hand, firms in countries with high scores in mastery could have higher or lower bankruptcy risk and investors in these countries could worry more or less about the agency activities of managers. The relationship between the corporate cost of debt and mastery is therefore ambiguous.

Using various measures for bankruptcy risk, we find evidence that bankruptcy risk is indeed lower in countries with high scores for embeddedness or mastery. Moreover, compared to the relation between embeddedness and bankruptcy risk, the relation between mastery and bankruptcy risk is less robust. Using an asset utilization ratio as an inverse measure of the propensity to engage in agency activities, we find that, despite a strong negative relation between embeddedness and sensitivity to agency activity, the relation between mastery and sensitivity to agency activity is flat. These results support the conjectures usually made in the literature (e.g., Chui et al. 2002; Shao et al. 2010; Li et al. (2011, 2013)).

Consistent with our hypothesis, we find a strong negative relationship between embeddedness and cross-country differences in the cost of debt. This result is robust to alternative measures of the cost of debt; alternative model specifications and estimation methods; reduced samples; and alternative measures of cultural dimensions. The relation between mastery and the cost of debt across countries is significantly negative in most of the tests. Moreover, we find that culture has an additional effect on the cost of debt that is beyond the bankruptcy and agency cost channels. Future research should explore other possible channels through which culture matters for the cost of debt.

We also find that the development of financial intermediaries helps reduce the impact of culture on the cost of debt through the agency cost channel. In addition, the enforcement of insider trading law reduces the cost of debt and moderates the effect of embeddedness on the cost of debt. On the other hand, the impact of mastery on the cost of debt through the agency channel has increased since the global financial crisis.

Our findings not only shed light on how culture affects the cost of capital worldwide, but also enrich our understanding of corporate finance and corporate governance. For instance, during the last decade, empirical studies in these areas have focused on how institutional quality mitigates agency problems around the world (Shleifer and Vishny 1997; Giannetti 2003). Recent attention has been paid to how culture influences firm corporate finance choices. Our findings support this new wave of research and postulate that, apart from formal institutions, culture also helps moderate agency problems. For example, given the level of agency cost, high-embeddedness countries can rely less on formal institutions to address agency problems and could suffer less from lower institutional quality than low-embeddedness countries. This reasoning has plentiful implications for future research. For example, since strong creditor rights mitigate agency problems, firms investing in intangible assets can more easily obtain loans in countries with better creditor rights (Giannetti 2003).

Since culture can help mitigate agency problems, culture could moderate this finding or even directly affect lending to such firms. On the other hand, because of agency problems, corporate diversification tends to reduce firm value (Denis, Denis, and Sarin 1997; Mansi and Reeb 2002). Shleifer and Vishny (1997) suggest that a good corporate governance system prevents managers from undertaking acquisitions and mergers that destroy firm value. Our results indicate that culture complements governance systems in alleviating agency problems. Therefore, we may expect fewer adverse effects of diversification on firm valuation in high-embeddedness countries. Finally, since the cost of equity is also related to bankruptcy risk and agency costs, it is worth investigating how embeddedness and mastery could influence the cost of equity across countries in future research.

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Appendix: Description of variables

Variable	Definition
I. Informal Institution Variables	
Embeddedness (*Embd*)	A higher score indicates a higher degree of embeddedness. Source: Lichi, Goldschmidt, and Schwartz (2007).
Mastery (*Mast*)	A higher score indicates a higher degree of mastery. Source: Lichi et al. (2007).
Individualism (*Indv*)	A higher score indicates a lower degree of embeddedness. Source: Hofstede (2001).
Masculinity (*Mas*)	A higher score indicates a higher degree of mastery. Source: Hofstede (2001).
Power Distance (*Pdi*)	A higher score indicates a higher degree of power distance. Source: Hofstede (2001).
Uncertainty avoidance (*Uai*)	A higher score indicates a higher degree of uncertainty avoidance. Source: Hofstede (2001).
Tightness (*Tightness*)	A higher score indicates a stronger social norm constraint on behavior and a lower tolerance for deviant behavior. Source: Uz (2015)
Traditional/secular-rational index (*Tradrat*)	A higher score indicates less emphasis on religion, traditional family values, and authority. Source: WVS.
Survival/self-expression index *(Survself*)	A higher score indicates less emphasis on economic and physical security and more emphasis on the tolerance of others and participation in political decision making. Source: WVS.
Collectivism (In-group)	A higher score indicates a higher degree of in-group collectivism. Source: GLOBE
Assertiveness	A higher score indicates a higher degree of assertiveness. Source: GLOBE
Distrust	A higher score indicates a higher degree of distrust. Source: Aghion et al. (2010).
Religion dummy variables	Protestant/Catholic equals 1 if it is the religion practiced by the largest proportion of population in a country. Source: 2012 CIA World Report.
II. Accounting Variables	
Cost of debt (*Cod*)	$Cod_{it} = \frac{Interest_{it}}{Avgdebt_{it}}$, where $Interest_{it}$ is firm *i*'s total interest expenses in year *t*, $Avgdebt_{it}$ is firm *i*'s average total debts computed from year *t* - 1 to year *t*, and *LnCod* is the natural logarithm of *Cod*. Source: Compustat (Global/North America).
Profitability (*Roa*)	Roa_{it} is the ratio of firm *i*'s net income to its total assets in year *t*. Source: Compustat (Global/North America).
Leverage (*Lev*)	Lev_{it} is the natural logarithm of the ratio of firm *i*'s total liabilities to its total assets in year *t*. Source: Compustat (Global/North America).
Firm size (*Size*)	$Size_{it}$ is the natural logarithm of firm *i*'s total sales in year *t*. Source: Compustat (Global/North America).
Tangibility (*Tang*)	$Tang_{it}$ is the natural logarithm of the ratio of firm *i*'s fixed assets to its total assets in year *t*. Source: Compustat (Global/North America).
Assets-to-sales ratio (*AS*)	*AS* is the inverse of the asset utilization ratio of firm *i* in year *t*, i.e., the ratio of total assets to total sales of firm *i* in year *t*. Source: Compustat (Global/North America).
Business risk (*Oprisk*)	$Oprisk_{it}$ of firm *i* in year *t* is the absolute value of the coefficient of variation of this firm's ratio between operating income and total interest expenses. This coefficient is computed over the period from *t* - 4 to *t* and each firm is required to have no missing observations of this ratio in each estimation period. Source: Compustat (Global/North America).

Effective tax rate (*TaxR*)	Tax_{it} is the ratio of firm *i*'s income tax to its operating income in year *t*. Source: Compustat (Global/North America).
Z-Score	Altman Z-score of firm *i* in year *t* is computed as 1.2(Net working capital/Total assets) + 1.4(Retained earnings/Total assets) + 3.3(Earnings before interest and taxes/Total assets) + 0.6(Market value of equity/Book value of liabilities) + 0.999(Sales/Total assets). A higher score indicates a lower likelihood of bankruptcy. Source: Compustat (Global/North America).
O-Score	Ohlson O-score of firm *i* in year *t* is computed as -1.32 - 0.407(Ln(Total assets/GNP price - level index)) + 6.03(Total liabilities/Total assets) - 1.43(Working capital/Total assets) + 0.0757(Current liabilities/Current assets) - 2.37(Net income/Total assets) - 1.83(Funds provided by operation/Total liabilities) + 0.285INTWO - 1.72OENEG - 0.521(Change in net income/sum of the absolute values of net income in prior year and this year), where INTWO equals 1 if net income was negative for the prior two years and zero otherwise and OENEG equals 1 if total liabilities exceed total assets and zero otherwise. A higher score indicates a higher likelihood of bankruptcy. Source: Compustat (Global/North America).
Industry dummy variables (Ind_1–Ind_{10})	Ind_k equals 1 if a firm belongs to industry *k* and 0 otherwise. Using four-digit Standard Industrial Classification codes, we classify firms into 10 industries based on the 12-industry classification from Ken French's data library. We use 10 instead of 12 industries because utility and financial industries are excluded from our sample. Source: Compustat (Global/North America).
III. Economic Variables	
Inflation	Inflation rate, computed from the consumer price index. Source: World Development Indicators/World Economic Outlook (Taiwan, China).
Real per capita GDP (*Lnrgdppc*)	$Lnrgdppc_{jt}$ is the natural logarithm of country *j*'s real per capita GDP in year *t*. The GDP per capita is in constant 2000 US dollars. Source: World Development Indicators/World Economic Outlook (Taiwan, China; constant 2006 USD).
Credit-to-GDP ratio (*Lncredit*)	$Credit_{jt}$ in year *t* in country *j* is measured as the natural logarithm of the ratio between bank credit to the private sector and the GDP. Source: World Development Indicators/Bank for International Settlements/Central Bank of Taiwan.
Financial Architecture *(Arch*)	The ratio between deposit money bank assets to stock market capitalization. Source: Financial Development and Structure Dataset (Beck, Demirgüç-Kunt, & Levine 2010)/Central Bank of Taiwan.
Developing country (*Dev*)	A dummy variable equal to 1 if the country is a developing country and 0 otherwise.
Rating	Average ratings on sovereign debt. These ratings are assigned by Moody's and Fitch. A higher score indicates a higher rating. Source: Moody's and Fitch.
Bankruptcy	$Bankruptcy_{jt}$ is measured as the ratio between the total number of bankruptcy filings and the total number of firms of country *j* in year *t*. These data are available from 1990 to 1999. Source: Claessens and Klapper (2005).
Real per capita GDP growth rate (*Growth*)	$Growth_{jt}$ in year *t* in country *j* is measured as the growth rate of the real GDP per capita of country *j* in years *t* - 1 to *t*. Source: World Development Indicators/World Economic Outlook (Taiwan, China).
Systemic banking crisis (*Crisis*)	$Crisis_{jt}$ in year *t* of country *j* equals 1 when this country has a systemic banking crisis in year *t* and 0 otherwise. Source: World Bank.
Real interest rate	Annual real lending rate. Source: World Development Indicators.
Market	*Market* is a dummy variable that equals 1 if a country is market oriented and 0 otherwise. Source: Claessens and Klapper (2002).
SME	*SME* is the percentage of total employment in the small and medium enterprise sector. Source: Claessens and Klapper (2005).

IV. Institutional Variables

Judicial efficiency index (*Judicial*)	Average of the private property rights index and the law and order index. These two indexes are converted to a common scale before averaging. Source: The property rights index is from the Heritage Foundation. The law and order index (*LAW*) is from the International Country Risk Guide.
Common law dummy variable (*Common*)	*Common* takes a value of 1 if country *j* belongs to the common law regime and 0 otherwise. Source: La Porta et al. (2006).
Creditor rights index (*Creditor*)	A higher score indicates stronger creditor rights. Source: La Porta et al. (1998).
Insider	Insider takes a value of 1 if insider trading ordinance in country *j* in year *t* was enforced and 0 otherwise. Source: Bhattacharya and Daouk (2002).
Pronoun drop	If a country uses pronoun drop language then Drop = 1 and 2 otherwise. Source: Kashima and Kashima (1998).
Pathogen prevalence (*Pathogen*)	The historical prevalence of pathogenic diseases. A higher score indicates greater prevalence. Source: Fincher et al. (2008)
Private property rights Index (*Property*)	A component of the Index of Economic Freedom. Source: Heritage Foundation.
Disclosure index (*Disclosure*)	A higher score indicates a higher degree of corporate transparency. Source: La Porta et al. (2006).
Political rights index (*PolR*)	A higher score indicates stronger citizen political rights. Source: La Porta et al. (1999).
Rule of law index (*Rule*)	A higher score indicates a more efficient legal system. Source: La Porta et al. (2006).

V. Syndicated Loan Characteristics

Rating (*Rating B, Rating C, Default, Unrated*)	If a loan has a rating below A but above C, then *Rating B* takes a value of 1 and 0 otherwise. If a loan has a rating below B but above D, then *Rating C* takes a value of 1 and 0 otherwise. If a loan has a rating below C, then *Default* takes a value of 1 and 0 otherwise. All ratings are assigned by Standard & Poor's, Moody's, or Fitch. If a loan does not have a rating assigned by Standard & Poor's, Moody's, or Fitch, then *Unrated* takes a value of 1 and 0 otherwise. Source: Thomson One.
Amount	The natural logarithm of the principal amount (in USD millions) of a loan. Source: Thomson One.
Maturity	The natural logarithm of the number of years to maturity of a loan. Source: Thomson One.
Foreign bookrunners ratio	The number of foreign bookrunners divided by the total number of bookrunners. Source: Thomson One.
Number of tranches	Number of tranches within a loan package. Source: Thomson One.
Number of banks	Number of banks within a loan package. Source: Thomson One.

Table 1 Descriptive statistics of the national cost of debt

Panel A: Developed countries

Country	Period	Cost of debt (%)	Real cost of debt (%)	Std. dev.	*Embd*	*Mast*
Australia	1995–2012	10.15	7.20	0.54	3.85	3.75
Austria	1997–2009	6.93	5.00	0.85	3.19	3.72
Canada	1995–2012	9.29	7.27	0.55	3.52	3.93
Denmark	1995–2012	7.71	5.44	1.74	3.29	3.74
Finland	1997–2012	6.91	5.18	1.75	3.53	3.39
France	1995–2012	7.23	5.55	1.44	3.10	3.57
Germany	1995–2012	11.38	9.65	1.69	3.18	3.75
Greece	1999–2012	6.84	3.37	1.56	3.47	4.13
Hong Kong China	1995–2012	7.39	5.49	1.79	3.87	3.93
Ireland	1997–2007	8.64	5.72	0.57	3.60	3.84
Israel	1997–2011	9.08	5.38	1.94	3.82	3.87
Italy	1995–2012	7.81	5.12	2.90	3.61	3.67
Japan	1995–2012	2.74	2.79	0.71	3.55	3.97
Korea Rep.	1995–2012	8.63	4.76	3.09	3.78	3.94
Netherlands	1995–2012	8.59	6.35	1.17	3.35	3.80
New Zealand	2000–2012	8.88	6.15	1.23	3.47	3.86
Norway	1997–2012	8.87	6.68	1.59	3.55	3.62
Singapore	1995–2012	5.99	4.24	0.79	4.21	3.62
Spain	1995–2012	8.83	5.67	3.31	3.36	3.68
Sweden	1995–2012	10.04	8.54	2.05	3.23	3.61
Switzerland	1995–2012	7.11	6.21	0.83	3.04	3.74
Taiwan China	1998–2011	4.11	3.13	1.49	4.05	3.87
United Kingdom	1995–2012	9.60	7.34	1.06	3.55	3.88
United States	1995–2012	10.06	7.39	0.81	3.77	3.92
	Mean	8.03	5.82	1.48	3.54	3.78

Panel B: Developing countries

Country	Period	Cost of debt (%)	Real cost of debt (%)	Std. dev.	*Embd*	*Mast*
Brazil	2006–2012	24.61	14.06	8.70	3.80	3.77
Chile	1998–2012	7.44	3.44	2.04	3.90	3.54
India	1997–2012	11.36	4.24	2.58	3.91	4.16
Indonesia	1996–2012	10.65	-0.01	2.40	4.53	3.60
Malaysia	1995–2012	7.27	4.48	1.55	4.33	3.83
Mexico	1998–2012	11.72	4.07	2.37	3.79	3.84
Peru	2007–2011	7.85	4.94	1.51	4.14	3.90
Philippines	1998–2011	10.29	4.99	1.87	4.07	3.73
Turkey	2003–2012	16.31	2.74	3.64	4.03	3.78
	Mean	11.94	4.77	2.96	4.06	3.79

The cost of debt of a firm in year *t* is computed as the ratio of interest expenses to average debt. Average debt is calculated from year *t* - 1 to year *t*. The real cost of debt is the cost of debt adjusted for inflation. The national (real) cost of debt of a country in year *t* is the simple average (real) cost of debt of the firms in that country in that year. This table shows the average national cost of debt, the average national real cost of debt, the standard deviation of the national cost of debt, and scores on cultural values across countries.

Table 2 Correlation analysis on country–year observations

Panel A: Developed countries

	Lncod	*Rcod*	*Embd*	*Mast*	*Judicial*	*Common*	*Disclosure*	*Inflation*	*Lnrgdppc*	*Lncredit*	*Arch*	*Creditor*
Rcod	0.721***											
Embd	-0.175***	-0.235***										
Mast	-0.124**	-0.137***	0.228***									
Judicial	0.305***	0.358***	-0.084	-0.271***								
Common	0.249***	0.130**	0.564***	0.282***	0.289***							
Disclosure	-0.074	-0.025	0.613***	0.199***	0.151***	0.675***						
Inflation	0.351***	-0.346***	0.113**	0.097*	-0.098*	0.124**	-0.058					
Lnrgdppc	-0.178***	0.035	-0.157***	-0.166***	0.476***	0.110**	0.254***	-0.295***				
Lncredit	-0.341***	-0.139***	-0.247***	0.394***	0.037	0.019	0.136***	-0.212***	0.450***			
Arch	-0.123**	-0.116**	-0.279***	0.014	-0.133***	-0.333***	-0.487***	0.043	-0.221***	0.145***		
Creditor	0.032	-0.009	0.373***	0.172***	0.096*	0.312***	0.130**	0.072	-0.052	-0.141***	0.070	
Rating	0.055	0.184***	-0.372***	-0.466***	0.557***	-0.002	0.008	-0.230***	0.566***	0.284***	-0.085	-0.206***

Panel B: Developing countries

	Lncod	*Rcod*	*Embd*	*Mast*	*Judicial*	*Common*	*Disclosure*	*Inflation*	*Lnrgdppc*	*Lncredit*	*Arch*	*Creditor*
Rcod	0.428***											
Embd	-0.471***	-0.325***										
Mast	-0.017	0.063	-0.466***									
Judicial	-0.216**	-0.102	0.044	0.283***								
Common	-0.386***	-0.056	0.143	0.676***	0.524***							
Disclosure	-0.576***	-0.228**	0.210**	0.459***	0.439***	0.759***						
Inflation	0.348***	-0.656***	-0.021	-0.118	-0.118	-0.216**	-0.251***					
Lnrgdppc	0.064	0.174*	-0.296***	-0.264***	-0.264***	-0.360***	-0.360***	-0.055				
Lncredit	-0.084	0.128	0.180*	-0.006	-0.006	0.358***	0.358***	-0.121	0.163*			
Arch	0.618***	-0.016	-0.032	-0.243***	-0.243***	0.522***	-0.406***	0.522***	-0.071	0.017		
Creditor	-0.292***	-0.214**	0.614***	0.179*	0.179*	0.684***	0.412***	0.004	-0.421***	0.458***	0.023	
Rating	-0.625***	0.005	-0.064	0.244***	0.244***	0.470***	0.456***	-0.453***	0.353***	0.308***	-0.636***	0.088

This table shows the correlation coefficients for the natural logarithm of the national cost of debt (*Lncod*), the real cost of debt (*Rcod*), embeddedness (*Embd*), mastery (*Mast*), the judicial index (*Judicial*), the common law dummy (*Common*), the disclosure index (*Disclosure*), the inflation rate (*Inflation*), the natural logarithm of the real GDP per capita (*Lnrgdppc*), the natural logarithm of the credit-to-GDP ratio (*Lncredit*), the financial architecture (*Arch*), the creditor rights index (*Creditor*), and the sovereign debt rating (*Rating*). The definitions of these variables are in the Appendix. The superscripts *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 3 Culture and cost of debt: Panel regressions

	Adjusted cost of debt				Adjusted real cost of debt	Real cost of debt	Cost of debt
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Embd		***-1.109****		***-1.521*****	***-22.614*****	***-5.084*****	***-0.674*****
		(-1.98)		***(-3.37)***	***(-5.16)***	***(-3.26)***	***(-5.23)***
Mast			***-1.213****	***-1.988*****	***-24.094*****	***-5.906****	***-0.644*****
			(-1.94)	***(-2.97)***	***(-3.39)***	***(-2.05)***	***(-2.73)***
Judicial	0.003	-0.002	0.003	-0.004	-0.147	0.042*	0.007**
	(0.39)	(-0.29)	(0.33)	(-0.51)	(-1.21)	(1.89)	(2.53)
Common	0.205	0.325	0.362	0.627***	8.135***	3.824***	0.541***
	(0.67)	(1.12)	(1.17)	(2.62)	(2.72)	(3.46)	(5.32)
Disclosure	-2.239***	-1.596**	-2.234***	-1.349**	-16.742**	-5.598**	-0.521**
	(-3.28)	(-2.19)	(-3.62)	(-2.17)	(-2.10)	(-2.06)	(-2.38)
Inflation	0.045***	0.045***	0.040***	0.038***	-0.311**	-0.687***	0.008
	(3.87)	(4.43)	(3.45)	(3.84)	(-2.25)	(-15.09)	(1.50)
Lnrgdppc	0.077	0.110	0.078	0.124	3.475*	0.081	-0.112**
	(0.59)	(0.57)	(0.76)	(0.87)	(1.95)	(0.13)	(-2.16)
Lncredit	-0.418**	-0.570***	-0.256	-0.360*	-3.545	-0.630	-0.270***
	(-2.16)	(-2.73)	(-1.09)	(-1.64)	(-1.39)	(-0.75)	(-2.95)
Arch	-0.096*	-0.113**	-0.089	-0.108*	-1.319*	-0.395**	-0.046**
	(-1.70)	(-2.20)	(-1.50)	(-1.88)	(-1.88)	(-2.01)	(-2.33)
Creditor	-0.016	0.055	-0.022	0.070	0.775	0.025	0.022
	(-0.27)	(0.79)	(-0.39)	(1.11)	(1.03)	(0.09)	(0.78)
Rating	0.004	-0.040	-0.023	-0.100*	-1.673**	-0.766***	-0.067***
	(0.09)	(-0.80)	(-0.47)	(-1.91)	(-2.24)	(-2.94)	(-3.66)
Size						0.432	0.114***
						(1.37)	(3.96)
Roa						-0.122**	-0.017***
						(-2.48)	(-3.61)
Lev						5.328***	0.508***
						(4.53)	(2.93)
Tang						3.079**	0.304**
						(2.03)	(2.37)
Adjusted R^2	0.21	0.24	0.22	0.29	0.21	0.61	0.66
Max. VIF	6.59	7.28	7.12	8.41	8.41	8.62	8.62
No. of countries	33	33	33	33	33	33	33
Observations	488	488	488	488	488	488	488

Our sample consists of 488 country–year observations involving 33 countries over the period from 1995 to 2012. We use Petersen's (2009) method to compute standard errors clustered by country and year. All robust *t*-statistics are in parentheses and *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 4 Culture and bankruptcy risk

	Actual bankruptcy ratio		Perceived bankruptcy ratio	
	Number of firms bankrupted		*O-score*	*Z-score*
Model	(1)	(2)	(3)	(4)
Embd		***-2.138****	***-0.061*****	***-0.046****
		(-1.71)	***(-2.60)***	***(-2.48)***
Mast		***-2.106****	***-0.035***	***0.015***
		(-1.98)	***(-0.75)***	***(0.67)***
Lnrgdppc	0.263	0.290	0.008	0.006
	(0.76)	(0.77)	(0.54)	(0.59)
Growth	-0.055	-0.026	0.000	-0.002
	(-1.04)	(-0.48)	(0.69)	(-1.60)
Crisis	2.093**	1.904***	-0.008	0.009
	(2.20)	(2.64)	(-0.70)	(1.06)
Real Interest Rate	0.002	-0.002	-0.001	0.001
	(0.13)	(-0.14)	(-0.77)	(0.84)
Rule	1.067***	0.257	-0.053***	-0.020
	(4.99)	(0.64)	(-3.52)	(-1.61)
Creditor	-0.573***	-0.478***	0.007**	0.005***
	(-5.51)	(-3.49)	(2.03)	(2.86)
Market	1.240**	1.636***	-0.029**	-0.004
	(2.52)	(2.85)	(-2.16)	(-0.47)
SME	-0.037**	-0.053***	0.000	0.000
	(-2.27)	(-3.41)	(0.35)	(0.18)
Adjusted R^2	0.58	0.67	0.47	0.10
Period	1990-1999	1990-1999	1990-2012	1990-2012
Observations	188	188	240	360
Number of countries	24	24	20	23

The actual bankruptcy ratio is computed as the proportion of firms that filed bankruptcy. The perceived bankruptcy ratio is computed as the proportion of firms with Z-scores (O-scores) lower (higher) than the threshold. The threshold for the Z-score (O-score) is one standard deviation below (higher than) the mean. The models are estimated using OLS. We use Petersen's (2009) method to compute standard errors clustered by country and year. All robust *t*-statistics are in parentheses and *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 5 Culture and sensitivity to agency activity

Stage one: Fama–MacBeth (dependent variable: *Leverage*)

AS	-0.031***
	(-18.05)
Oprisk	-0.006***
	(-3.15)
Roa	-1.219***
	(-31.92)
TaxR	-0.206***
	(-23.35)
Industry fixed effects	Yes
Average adjusted R^2	0.23
No. of countries	32
Observations	131,074

Stage two: Petersen (dependent variable: *SAP*)

	Full sample	Low leverage	High leverage
Embd	***-0.036****	***-0.033****	***-0.059****
	(-2.25)	***(2.06)***	***(-1.96)***
Mast	***0.011***	***-0.023***	***0.053****
	(0.52)	***(-1.01)***	***(1.93)***
Judicial	0.001***	0.000	0.001
	(3.29)	(1.15)	(1.61)
PolR	-0.007**	-0.004	-0.019**
	(-2.00)	(-0.71)	(-2.52)
Creditor	-0.002	-0.003	0.003
	(-0.72)	(-0.80)	(0.77)
Lnrgdppc	-0.006	-0.006	0.013
	(-1.37)	(-1.03)	(1.21)
Inflation	-0.000	-0.000	-0.000
	(-0.92)	(-0.07)	(-0.83)
Adjusted R^2	0.07	0.11	0.09
No. of countries	32	23	21
Observations	369	188	181

In the first stage, we use OLS regression to estimate the relationship between leverage and the asset-to-sales ratio (*AS*), a proxy for the propensity to agency activity, in each country. The other determinants of leverage are operating risk (*Oprisk*), profitability (*Roa*), the effective tax rate (*TaxR*), and industry dummy variables. Using the estimated coefficient of *AS* ($\hat{\beta}_{jt}$) in stage one, we compute sensitivity to agency activity (SAP_{jt}) as $-\hat{\beta}_{jt}$. A higher value of SAP_{jt} indicates that investors in country *j* in year *t* worry more about agency conflicts. In the second stage, *SAP* is regressed on cultural values and other determinants of agency costs. The last two columns show the results for sub-sample tests. In each year, a country is allocated to the high-leverage (low-leverage) group if its average leverage is higher than (less than or equal to) the median of the average leverage computed from all countries in the sample. Robust *t*-statistics are in parentheses. Newey–West heteroskedasticity- and autocorrelation-consistent estimates of standard errors are used to compute the *t*-statistics in stage 1. In stage 2, we use Petersen's (2009) method to compute standard errors clustered by country and year. The superscripts *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 6 Interaction effects

	Development of financial intermediation	Enforcement of insider trading law
	(1)	(2)
Embd	***-2.141****	***-5.012****
	(-4.74)	***(-13.09)***
Embd × ***Rank$_{Arch}$***	***0.331****	
	(2.39)	
Embd × ***Insider***		***3.545****
		(10.67)
Mast	***-1.163****	***-2.228****
	(-1.66)	***(2.02)***
Mast × ***Rank$_{Arch}$***	***-0.345****	
	(-2.64)	
Mast × ***Insider***		***-0.291***
		(-0.24)
Insider		-15.269***
		(-2.99)
Judicial	-0.004	-0.000
	(-0.53)	(-0.03)
Common	0.619**	0.873***
	(2.45)	(3.96)
Disclosure	-1.513**	-2.228***
	(-2.56)	(-4.05)
Inflation	0.034***	0.036***
	(2.60)	(3.40)
Lnrgdppc	0.101	0.112
	(0.70)	(0.69)
Lncredit	-0.349*	-0.244
	(-1.73)	(-1.03)
Arch	-0.029	-0.132
	(-0.36)	(-1.63)
Creditor	0.079	0.096
	(1.31)	(1.53)
Rating	-0.084	-0.100**
	(-1.54)	(-2.06)
Adjusted R^2	0.30	0.39
No. of countries	33	28
Observations	488	430

Interaction terms related to *Rank$_{Arch}$*/enforcement of insider trading law (*Insider*) and cultural values are included in our baseline model. The measure *Rank$_{Arch}$* equals 1, 2, 3, or 4 if the average *Arch* value of a country is in the bottom 25%, 25% to 50%, 50% to 75%, or the top 25%, respectively. The dummy variable *Insider* takes a value of one if insider trading law has been enforced and zero otherwise. The dependent variable is the adjusted cost of debt. We use Petersen's (2009) method to compute standard errors clustered by country and year. Robust *t*-statistics are in parentheses and *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 7 Culture and the cost of debt: Channel effects

	Adjusted cost of debt	Cost of debt
Embd (Predicted)	***-2.373****	***-0.704****
	(-2.76)	***(-4.51)***
Embd (Other)	***-1.658****	***-0.744****
	(-3.62)	***(-5.22)***
Mast (Predicted)	***-4.840****	***-1.067****
	(-2.34)	***(-2.65)***
Mast (Other)	***-1.943****	***-0.749****
	(-2.65)	***(-3.36)***
Judicial	-0.009	0.005*
	(-1.04)	(1.65)
Common	0.806***	0.677***
	(3.13)	(6.97)
Disclosure	-1.229*	-0.622***
	(-1.86)	(-3.04)
Inflation	0.049**	0.006
	(2.41)	(0.82)
Lnrgdppc	0.172	-0.074
	(0.87)	(-1.31)
Lncredit	-0.375	-0.278***
	(-1.53)	(-3.56)
Arch	-0.145**	-0.056***
	(-2.30)	(-3.80)
Creditor	0.084	0.039
	(1.22)	(1.31)
Rating	-0.099*	-0.071***
	(-1.81)	(-4.18)
Size		0.128***
		(4.44)
Roa		-0.016***
		(-3.39)
Lev		0.547***
		(2.73)
Tang		0.271**
		(2.11)
Adjusted R^2	0.27	0.69
No. of countries	33	33
Observations	423	423

The adjusted cost of debt (cost of debt) is regressed on *Embd (Predicted), Embd (Other), Mast (Predicted), Mast (Other),* and other control variables. In each year, embeddedness (*Embd*) is regressed on sensitivity to agency activity (*SAP*) and the perceived bankruptcy ratio, computed from their Z-scores. The variables *Embd (Predicted)* and *Embd (Other)* of country *j* in year *t* are, respectively, the predicted *Embd* (including the intercept) and the residual from this regression in year *t*. The variables *Mast (Predicted)* and *Mast (Other)* are constructed using the same procedure. We use Petersen's (2009) method to compute standard errors clustered by country and year. All robust *t*-statistics are in parentheses and *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 8 Culture, firm characteristics, and the cost of debt

Panel A: Leverage

	Leverage					
	Low	*2*	*3*	*4*	*High*	*Low minus High*
β_{Embd}	-1.179***	-1.270***	-1.218***	-1.206***	-1.317***	0.138
	(-3.71)	(-3.47)	(-3.42)	(-3.29)	(-2.87)	(0.25)
β_{Mast}	-2.367***	-2.057***	-1.875***	-1.762***	-2.257***	-0.058
	(-3.98)	(-3.35)	(-3.20)	(-2.97)	(-3.13)	(-0.12)

Firms are allocated among five equal groups, from low (bottom 20%) to high (top 20%), based on their leverage each year. We estimate the baseline model in each leverage-sorted group. Each country is required to have at least 10 firms in each year in each group and each group at least 17 countries each year. This panel reports the estimated coefficients of *Embd* and *Mast* in each group. For brevity, the coefficients of the control variables are not reported in this table. Petersen's (2009) method is used to compute standard errors clustered by country and year. All robust *t*-statistics are in parentheses and *** represents significance at the 1% level.

Panel B: Similar firm characteristics

Embd	*Mast*	*Judicial*	*Common*	*Disclosure*	*Inflation*	*Lnrgdppc*	*Lncredit*	*Arch*	*Creditor*	*Rating*	*AdjR²*
-1.454*	***-1.182****	0.009	0.657**	-2.202***	0.084***	0.220	-0.282	-0.078	0.110*	-0.094	0.37
(-3.30)	***(-2.05)***	(0.66)	(2.15)	(-3.25)	(2.92)	(1.01)	(-0.78)	(-1.32)	(1.70)	(-1.33)	

The sample of this test consists of firms with similar characteristics. These characteristics are firm size, profitability, leverage, and tangibility. This sample has 28 countries and 316 country–year observations. We use Petersen's (2009) method to compute standard errors clustered by country and year. All robust *t*-statistics are in parentheses and *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 9 Culture and cost of debt: Instrumental variables, two-stage least squares

Panel A: Stage-one—Dependent variable = cultural values

	Embd	*Mast*
Pathogen	-0.010*** (-3.82)	0.012*** (7.86)
Pronoun drop	-0.211** (-2.11)	-0.117 (-1.57)
Adjusted R^2	0.73	0.46
Adjusted R^2 (excl. instruments)	0.69	0.33
F-Statistics for the instruments	39.61 (*p*-value = 0.000)	59.41 (*p*-value = 0.000)
Observations	488	488

Panel B: Stage-two—Dependent variable = adjusted cost of debt

Embd	***-2.389****
	(-2.17)
Mast	***-0.307***
	(-0.26)
Judicial	-0.008
	(-0.81)
Common	0.523
	(1.27)
Disclosure	-0.853
	(-0.97)
Inflation	0.044***
	(4.17)
Lnrgdppc	0.149
	(0.51)
Lncredit	-0.704**
	(-2.26)
Arch	-0.132**
	(-2.14)
Creditor	0.135
	(1.20)
Rating	-0.097
	(-1.02)
Adjusted R^2	0.22
No. of countries	33
Observations	488

Pathogen and pronoun drop are used as the instruments for the cultural values. In both stages, we use Petersen's (2009) method to compute standard errors clustered by country and year. Robust *t*-statistics are in parentheses and ** and *** represent significance at the 5% and 1% levels, respectively.

Table 10 International syndicated loan data

	Country–year (panel)	
	(1)	(2)
Embd		***-0.836****
		(-2.04)
Mast		***-0.211***
		(-0.29)
Judicial	0.035***	0.032***
	(2.67)	(2.58)
Common	0.586*	0.808**
	(1.68)	(2.24)
Disc	-1.228	-1.065
	(-1.55)	(-1.33)
Inflation	-0.054	-0.047
	(-0.84)	(-0.75)
Lnrgdppc	0.072	0.183
	(0.35)	(0.88)
Lncredit	-1.246***	-1.346***
	(-3.37)	(-3.72)
Arch	-0.027	-0.022
	(-0.23)	(-0.19)
Creditor	-0.130*	-0.085
	(-1.94)	(-1.35)
Rating	-0.059	-0.104
	(-0.71)	(-1.11)
Rating B	2.877**	3.197**
	(2.20)	(2.29)
Rating C	4.803	5.592
	(1.11)	(1.20)
Default	15.824**	13.864**
	(2.34)	(2.30)
Unrated	1.080	1.258
	(1.07)	(1.18)
Amount	-0.078	-0.162
	(-0.56)	(-1.10)
Maturity	0.994***	0.823***
	(3.56)	(3.27)
Number of banks	0.034**	0.037**
	(2.06)	(2.49)
Foreign bookrunners ratio	-1.190**	-1.362***
	(-2.50)	(-3.23)
Number of tranches	-0.062	-0.056
	(-0.52)	(-0.46)
Adjusted R^2	0.36	0.37
No. of countries	24	24
Observations	253	253
Max VIF	5.69	7.32

This table reports the panel regression using data on syndicated loans. The dependent variable is the natural logarithm of the average interest rate on loans. We use Petersen's (2009) method to compute standard errors clustered by country and year. The robust *t*-statistics are in parentheses and *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 11 Robustness tests

Panel A: Alternative cultural values and other informal institutions

	Hofstede	GLOBE	WVS	Distrust	Religion	Tightness
	(1)	(2)	(3)	(4)	(5)	(6)
Indv	***0.023****					
	(3.42)					
Mas	***0.002***					
	(0.43)					
Uai	-0.004					
	(-0.87)					
Pdi	0.012					
	(1.59)					
Collectivism (In-group)		***-0.618****				
		(-2.37)				
Assertiveness		***0.373***				
		(1.47)				
Tradrat			***-0.008***			
			(-0.06)			
Survself			***0.364****			
			(2.50)			
Distrust				-0.457		
				(-0.94)		
Catholic					-0.002	
					(-0.71)	
Tightness						-0.014*
						(-1.94)
Embd				***-1.222****	***-1.620****	***-1.889****
				(-2.79)	***(-3.51)***	***(-2.43)***
Mast			***-0.916****	***-1.660****	***-2.133****	***-0.225***
			(-1.68)	***(-2.57)***	***(-2.88)***	***(-0.26)***
Controls	YES	YES	YES	YES	YES	YES
Adjusted R^2	0.27	0.28	0.25	0.22	0.29	0.20
No. of countries	33	30	33	28	33	23
Observations	488	470	488	411	488	329

(Table 11 continued)

Panel B: Sub-sample analyses

	Panel: Small firms	Panel: 1995–2003	Panel: 2004–2012	Panel: Country–year
	(1)	(2)	(3)	(4)
Embd	***-1.002****	***-1.571*****	***-1.411*****	***-2.004*****
	(-2.27)	***(-3.46)***	***(-2.95)***	***(-4.64)***
Embd* × *Dev				***0.070***
				(0.12)
Embd* × *Fincrisis				***0.475***
				(1.54)
Mast	***-2.664*****	***-2.737*****	***-1.647*****	***-1.777*****
	(-3.93)	***(-3.59)***	***(-2.81)***	***(-3.01)***
Mast* × *Dev				***-3.212****
				(-2.52)
Mast* × *Fincrisis				***1.924*****
				(3.87)
Dev				12.193*
				(1.76)
Controls	YES	YES	YES	YES
Adjusted R^2	0.49	0.39	0.33	0.38
No. of countries	24	33	33	33
Observations	306	488	488	488

For panel regressions, we use Petersen's (2009) method to compute standard errors clustered by country and year. The dependent variables in these tests are the adjusted cost of debt and, for brevity, the coefficients of the control variables are not reported. All robust *t*-statistics are in parentheses and *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.