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Culture, agency costs, and governance: International evidence on capital structure

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ABSTRACT

We examine social characteristics (individualism and risk aversion) and their interaction with firm governance and capital structure across the G20 countries from 1995 to 2009 using roughly 13,000 firms. We show that higher levels of individualism are associated with increased firm use of debt and lower cost of capital, whereas higher risk aversion has the opposite effects. Better firm-level governance substantially reduces these cultural effects, as does larger firm size, and less research-intensity at the firm. The results show that capital structure in emerging markets is considerably less affected by national culture relative to developed countries. To address endogeneity concerns, we show our results hold after using a propensity score matching procedure.

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1. Introduction

How do national culture and firm governance interact to influence capital structure in firms as well as across markets with different levels of economic development? Past research (e.g., Chuluun et al. (2014), Chang et al. (2012), and Kim and Nofsinger (2008)) has suggested that behavioral and cultural factors can influence equity valuation and managerial decisions, but to date, we still have a limited understanding of the role that governance and national economic development play in conjunction with behavioral forces.² Greater understanding in this area is important given the on-going study of how firms set their capital structure and the evidence that firms in emerging markets and developed markets exhibit important differences in their

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² For example, Benson et al. (2011) show that good governance may reduce the ill effect of agency costs and can thus lead to shareholder value maximization. In our paper, we examine governance and agency costs, as well as the impact of cultural and social traits on a firm's capital structure.

capital structure choices (see DeAngelo et al. (2010), Fama and French (2005), and Baker and Wurgler (2002)).³

Chui et al. (2010) hypothesize that increased levels of national individualism impact equity market trading decisions. They find that higher levels of individualism are correlated with increased confidence by individuals in their own trading ability and that this increased confidence leads to increased stock price momentum. Chui et al. (2002) use static national-level time-invariant data on culture (mastery and conservatism) and find that national culture impacts managers' decisions on the use of leverage. Our work builds upon these findings by showing how national time-varying culture interacts with firm governance, the level of economic development, and capital structure.⁴

Capital structure choice is important in the US, but it is even more important internationally, where many equity markets are less developed (the Bank of International Settlements estimates that the worldwide debt outstanding is \$100 trillion as of mid-2013). Gozzi et al. (2012) show that even for large international firms, which have the capacity to access both domestic and international debt markets, domestic and foreign bond markets are complements rather than substitutes. Thus, the international differences in culture we identify are important because they have economic significance for firms that issue debt. Our results demonstrate that firm governance and national culture impact capital structure choices and that there is a markedly different impact in emerging versus developed nations.

Specifically, our research (to the authors' knowledge) is the first to show 1) that firm- and national-level governance offsets time-varying cultural effects on capital structure; 2) that governance and culture interact to jointly impact the likelihood of using debt, debt-to-equity ratios, and the debt cost of capital in both emerging and developed nations; and 3) that culture appears to be a more significant driver of capital structure choices in developed markets than in emerging markets. We focus on two major cultural characteristics, individualism and risk aversion, that define a society's behavior related to the measures proposed by noted sociologist Gert Hofstede (2001). We construct time-varying proxy indices for these cultural norms using data from the World Values Survey (WVS).⁵

In this paper, we find that culture has a significant impact on capital structure, particularly in developed nations. We also find that better firm governance largely offsets this relation. We first examine the relation of culture and governance on the likelihood of using debt. We conclude that the probability a firm uses debt increases when individualism is higher. On average, a 1% increase in the Individualism Index (our measure of individualism) increases the probability of using debt by an average of 1.6%. Alternatively, increases in the Risk Aversion Index negatively impact the probability of using debt (a 1% increase leads to an average 1.9% decrease in the probability of using debt). Firms in the top quartile (well governed) of firm-level governance are only 0.6% more likely to use debt given a 1% increase in individualism, and 0.7% less likely to use debt given a 1% increase in risk aversion. This is consistent with those firms with significantly better governance offsetting more than 50% of the influence of culture on management decisions. Further, we find that firms in emerging countries are an average of 13% less likely to use debt than comparable firms in developed countries, a result that we attribute to the differences in capital market development between emerging and developed nations.

Second, we examine the impact of culture on the debt-to-equity ratio of the firm. We find that increases in the Individualism Index are associated with increases in the leverage of the firm, while increases in the Risk Aversion Index have a significant negative association with leverage. This result only holds in developed markets, which may be a result of firms in emerging markets facing other constraints, such as limited access to capital. This is consistent with the work of Demirgüç-Kunt and Levine (1996), who show that firms in nations with more-developed stock markets make greater use

³ Differences in emerging and developed market capital structure are noted by Desai et al. (2004), who show that multinational firms in less-developed countries use less debt and pay more for that debt.

⁴ These topics are increasingly important, as noted by the September 2012 UK Stewardship Code submitted by the Financial Reporting Council. It states that investors should "include monitoring and engaging with companies on matters such as strategy, performance, risk, capital structure, and corporate governance, including culture and remuneration." The report can be found here: <https://www.ftc.org.uk/getattachment/e2db042e-120b-4e4e-bdc7-d540923533a6/UK-Stewardship-Code-September-2012.aspx>. It is important to note that the code focuses on mechanisms that increase long-term risk-adjusted earnings to shareholders.

⁵ Our results are quantitatively similar when using the Hofstede measures (including authoritarian control), but without the time-series component, as his measures are static measures in 2001 and 2010.

of debt. Our findings are also in line with the work of [Desai et al. \(2004\)](#), who show that multinational firm affiliates in underdeveloped markets make less use of external debt capital. Further, we find that better firm-level governance offsets more than half of the effects of national culture on capital structure choice at the firm level in developed nations.

Finally, we observe that the cultural measures are significantly linked with the firm-level debt cost of capital as measured through debt interest cost. Again, this result is driven by activity in developed nations, whereas culture does not appear to have a significant impact on debt cost of capital in emerging nations. We believe this may be a by-product of less flexible and open debt markets in many emerging markets. In developed markets, we find that increases in the Individualism Index are associated with a lower debt cost of capital at the firm level. In contrast, increases in the Risk Aversion Index are associated with an increased debt cost of capital. We further determine that firms in emerging markets have a significantly higher debt cost of capital than firms in developed countries.

Firms with better firm-level governance have lower debt costs of capital as individualism increases. Our supposition is that better governance and lower agency costs offset potential concerns that the firms' actions may be influenced by the cultural views of managers.⁶ Given the potential influence of culture on individual managers, better governance likely reduces cultural influences by restricting managerial bias. Further, we find that the Individualism Index influences the debt cost of capital with the effects driven by results in developed countries. A 1% increase in individualism in developed markets is correlated with a decrease of approximately 23 basis points in debt interest costs for an individual company. In developed markets, a higher Risk Aversion Index corresponds to increases in the debt cost of capital, an average of 16 basis points for every 1% increase in the index (significant at the 1% level).

A propensity score model where we match one firm in the same industry with another firm in the same industry but a different country yields similar results to those reported above. Our matching procedure pairs firms that are similar in all respects except their national culture. Our results are also robust to controlling for industry classifications, other country-level factors such as legal differences across countries, religion, country-level governance, level of economic development, firm-level variables, as well as alternative measures of national culture and governance. Furthermore, the results in this study are not driven by the US and UK firms that compose a large portion of our sample.

Overall, our results show that the effect of culture on capital structure is significantly offset by better firm-level governance, as firm's act more in accordance with the broader interests of the risk-neutral marginal shareholder. As we illustrate in this paper, it is important to account for time-varying cultural factors as well as the impact of governance with culture and the idea that culture may impact firms differently based on economic development. Additionally, our work provides an empirical international test of the prominent [Leland \(1998\)](#) model, where higher levels of agency costs restrict leverage and increase yield spreads on debt.

The remainder of this paper is organized as follows: [Section 2](#) reviews the past literature in the area, [Section 3](#) covers the hypotheses and data, [Section 4](#) presents the empirical results, [Section 5](#) discusses our robustness results, and [Section 6](#) concludes.

2. Background and literature review

Previous research suggests that cultural conventions matter to economic growth and that it is important to control for the social differences in finance and economic research. For example, [Knack and Keefer \(1997\)](#) use the World Values Survey (WVS) to examine international differences in trust and civic norms. They find that in nations with higher levels of trust and civic norms, economic performance is stronger. They also find that trust and civic norms are stronger in nations with institutions that protect property rights and in nations that are less polarized by class. We also use the WVS to construct our measures, but our measures of individualism and risk aversion are unrelated to their trust measure.⁷

[Chui et al. \(2010\)](#) suggest that the cultural characteristics of a society may have real impacts on the equity investment decisions of that society. Specifically, they show that individualism, as measured by the

⁶ This is consistent with the view of [Li et al. \(2013\)](#) and their findings regarding managerial behavior and culture as they relate to earnings discretion.

⁷ Nonetheless, our results are robust to the inclusion of trust, and trust is not significant in any of the regressions after controlling for other country-level factors.

Individualism Index developed by Hofstede (2001), is positively associated with trading volume and volatility as well as the magnitude of momentum trading profits. Further, these cross-country differences are persistent over time. In contrast to Chui et al. (2010), we focus on the impact of behavioral forces on capital structure.

Past behavioral work on culture and capital structure utilizes time-invariant cultural measures and largely focuses on US firms. Chang et al. (2012) show that debt is an effective mechanism for mitigating agency costs, with debt maturity choice in particular playing a valuable role in disciplining entrenched managers. They show that uncertainty avoidance, masculinity, and long-term orientation are negatively related to overall debt maturity in a country, with increased use of short-term debt being associated with greater levels of uncertainty. Using time-invariant measures of culture, Chui et al. (2002) show that debt ratios in 22 countries are partially explained by cultural factors.⁸

Shao et al. (2010) examine dividend payout policy based on the conservatism and mastery characteristics and find that conservatism has a significant positive relationship while mastery has a negative relation with dividend payouts. Malmendier and Tate (2005) examine CEO overconfidence using panel data on the decisions of Fortune 500 CEOs in the US. They show that CEOs who consistently maintain exposure to firm-specific risk (their proxy for overconfidence) make firm investments that are significantly more dependent on firm cash flow. Our study allows us to examine the impact of capital structure with time-varying cultural measures as well as to determine how the economic development of the country affects this relation. Additionally, we include controls for firm and country-level governance to see how these measures interact with culture and capital structure.

Baker et al. (2007) and Thaler (2005) conclude that firms are impacted by behavioral factors. Both works show that these forces influence both managers and corporate actions and that it is likely that behavioral factors can also impact corporate financial decisions. Further, Chuluun et al. (2014) show that well-connected boards provide financial benefits to firms by reducing their debt cost of capital. Similarly, Boeprasert et al. (2014) show that corporate social responsibility leads to improved credit ratings for firms. This evidence is consistent with the view that cultural and behavioral characteristics can influence financial outcomes for a firm.

Finally, at a macro level, it appears that national culture matters as well. Supporting this view, Stulz and Williamson (2003) show evidence that cultural differences impact creditor rights, the type of cultural factors that prevail in a country, and the relative risk aversion of residents of the country. This evidence implies that cultural differences lead to differences in national culture and market behavior. Kumar and Page (2014) find evidence strongly suggesting that cultural preferences (including religious and political values) impact investment decisions. They find that institutional investors will only violate their risk-aversion preferences in return for abnormally large profit opportunities. The study in this paper attempts to fill the gap in the literature regarding time-varying behavioral factors, firm- and country-level governance, and their impact on capital structure in an international setting.

3. Hypotheses and data

Psychology and sociology literature has examined personality traits extensively. Therefore, we turn to that literature to determine what type of behavior one might expect from more individualistic societies. The literature in this area, including work by Anderson and Galinsky (2006) and Zinns (2008), shows that higher levels of individualistic behavior are associated with higher levels of risk taking and that individualism is associated with greater levels of overconfidence as well (Gupta et al., 2006; Rosenbloom, 2003). Consistent with this literature and with past work (in finance) by Chui et al. (2010), we hypothesize that market participants in societies that are more individualistic will tend to be more confident in their own analysis and logic, and less likely to conform to group rationale on investment decisions. This increased confidence leads to a greater likelihood of being less cautious, and perhaps overconfident, regarding investment decisions. We build on this hypothesis and posit that both individualism and risk aversion impact managerial actions but in distinctly separate ways. Thus, we believe it is important to control for both factors when studying firm actions.

We now turn our attention to the connection between governance and culture, where little has been done to show the impact of corporate governance on national culture. Han et al. (2010) illustrate that national

⁸ Chui et al. (2002) utilize the Schwartz (2004) time-invariant cultural measures.

culture influences earnings discretion through prescribed institutional mechanisms that can potentially curtail managerial activity. More recently, the work of Li et al. (2013) investigates corporate risk taking and shows that stronger corporate governance at the firm level mitigates cultural influences. In particular, they show that corporate risk taking is more influenced by national culture in firms with “greater managerial discretion” and weaker internal controls through earnings. Thus, it appears that stronger corporate governance measures can be effective in altering the behavior of managers and hence restricting cultural influences. In light of this work, our hypothesis is that stronger corporate governance will restrict the influence of national culture on capital structure choices by managers at the firm level.

To quantify national culture, we use data from the long-running World Values Survey to create an index for each aspect—individualism and risk aversion—that ranges from 0 to 100. We choose to examine these two aspects of culture because past research has shown they have significant effects at the macroeconomic level (e.g., Gorodnichenko and Gerard (2011)), and because of the time-series nature of the data. In contrast, while other measures of culture may also be important, the hypotheses surrounding their impact on culture are much less clear. The World Values Survey has been in existence since the 1970s and asks hundreds of survey questions every two years of tens of thousands of participants from more than 100 nations around the world. It is a widely used data source throughout the humanities disciplines and is occasionally in economics and finance research (e.g., Knack and Keefer (1997); Gorodnichenko and Gerard (2011)).

The sociology literature defines individualism and its opposite, collectivism, to be the degree to which individuals are integrated into groups. In societies that are more individualistic, the ties between individuals are loose and everyone is expected to look after him- or herself. In less individualistic societies, people from birth onwards are integrated into strong, cohesive groups, often extended families, which continue protecting them in exchange for unquestioning loyalty. We create an Individualism Index by gathering all of the responses to questions involving terms such as “individuals”, “collective good”, “conforming to society”, and “freedom of expression”. The questions are asked in a fashion similar to the following: “To what extent should individuals adhere to social expectations?” Answers are on a numeric (1–5) scale for extreme approval or disapproval of individuals conforming to social views. There are varying numbers of relevant questions in each survey year, but in each year we gather all such questions, order the responses from individualistic to collectivist based on the question, and then equal weight the responses to form an index measure for the country’s level of individualism. We use this measure for the Individualism Index. We use a similar procedure to create a Risk Aversion Index, this time based on questions involving terms such as “risk”, “avoiding uncertainty”, “security”, “opportunity”, “safety”, and “taking chances”.

3.1. Hypotheses development

To address the relation between national culture and firm debt issues, we test the following hypotheses:

Hypothesis 1. Greater levels of individualism will be associated with a greater likelihood of using debt, whereas greater risk aversion will be associated with a lower likelihood of using debt, with better governance offsetting these effects.

Given that culture varies across countries, we hypothesize that it will have a differential effect on capital structure across countries after controlling for known factors that influence firm capital structure choices. There are at least two different channels by which increased individualism may influence the likelihood of issuing debt. The first is that increased individualism may be associated with increased confidence (consistent with the evidence of Gupta et al., 2006, and Rosenbloom, 2003), and the second is that increased individualism may be associated with less herding behavior (as discussed by Anderson and Galinsky (2006) and Zinn (2008)). Specifically, increased confidence leads to a greater belief in the ability of managers across a firm to handle debt. Similarly, increased individualism may lead to less herding behavior on the part of investors and managers. If this is the case, then managers may be more willing to issue debt rather than simply pursuing the same capital structure policies that others at the firm advocate.

However, simply examining manager individualism (and by extension either confidence or herding) is not enough because this ignores the risk aversion aspect of decision-making. The Risk Aversion Index and the likelihood of using debt should have a negative relation. The rationale is that the higher the level of risk aversion, the greater the inclination to avoid risk and uncertainty, and given that taking on more debt increases

financial risk, the inclination for more risk-averse firms is to take on less debt, all else being equal. While our measures of risk aversion and individualism surely will not be precisely accurate for all managers or market participants, our goal with these measures is to capture average cultural characteristics for managers across a firm rather than specific characteristics for any given individual.

We further hypothesize that these cultural factors will be offset by better governance at the firm level. This is based on the idea that the degree of managerial discretion is an important potential channel for culture to influence their decisions. Intuitively, as governance deteriorates and agency costs rise, firms become more difficult to monitor, and management has a greater ability to run the firm based on their own priorities, rather than based on what shareholders want. International institutions make up an increasingly important part of the investor base of many firms. When agency costs are low, these investors will be better able to monitor firm management to make sure that the firm is not taking on debt when it will not benefit shareholders. For that reason, we suspect that better governance will have significant interaction effects with individualism and risk aversion (supported by Li et al. (2013) with managerial decisions related to earnings discretion). We examine [Hypothesis 1](#) in [Table 4](#). Similarly, smaller firms and more dynamic research-intensive firms (which tend to be younger firms that are growing rapidly) should also be more likely to be influenced by national culture.

Because we examine the relation between culture and the likelihood of using debt, it is logical to also examine the interaction between culture and the debt-to-equity ratio and the debt cost of capital at the firm. Furthermore, we believe that because the debt markets are considerably less transparent than equity markets, culture may have an even greater impact on the debt cost of capital and debt-to-equity ratio compared with equity capital.⁹ This is true (both in the US and even more so outside the US) because institutional investors do not generally have to disclose the same level of detail about their debt holdings to the public (Bessembinder and Maxwell, 2008; Edwards et al., 2007). This leads us to our [Hypotheses 2 and 3](#):

Hypothesis 2. Higher levels of individualism are associated with an increase in the debt-to-equity ratio, whereas an increase in risk aversion is associated with lower levels of debt-to-equity, with better governance offsetting each of these effects.

The argument for the sign of the culture coefficients is similar to our argument regarding the likelihood of taking on debt. Firms in societies that are more individualistic will tend to be led by executives who are more confident in their own abilities. Given this, they will be more confident that they understand the inherent risk with greater levels of debt. This would imply that the firm would prefer to use cheaper, but riskier debt rather than equity. We also hypothesize that an increase in the Risk Aversion Index should lead to lower debt-to-equity ratios as executives seek to avoid the risk associated with running a highly leveraged firm. Again, we believe that managerial actions based on cultural views towards risk and individualism will be less important in firms that have low agency costs and better governance. We examine [Hypothesis 2](#) in [Tables 5 and 7](#).

Hypothesis 3. Higher levels of individualism are associated with a decrease in the debt interest cost of the firm, whereas an increase in risk aversion is associated with higher levels of the debt interest cost, with better governance offsetting each of these effects.

The hypothesized that signs on our culture variables, individualism and debt cost of capital are likely driven by the control of the management of the firm. The more control management maintains, the more likely that they will be successful in exercising their own beliefs. When management behavior and choices are influenced by excess confidence, markets are likely to penalize the firm with a higher cost of capital to compensate. However, we also believe that bond investors who are more confident are more likely to believe in their skills in analyzing and choosing bonds. As a result of this, they will be more certain in their analysis of a bond's risk. This will lead to a smaller confidence interval on their valuation of the bond, which will make them willing to accept a lower yield on the bond. Because the firm's debt cost of capital is based on the marginal yield at which they can issue debt, this increased willingness to pay for risky bonds will ultimately lead to a lower debt cost of capital. Because these two effects offset one another, the net effect of increased individualism is unclear. However, to the extent that firm managers take actions that lead to higher debt

⁹ For example, while mutual funds and institutions are required to disclose their equity holdings on a semi-annual basis, they are not required to disclose holdings in corporate bonds. Similarly, banks are not required to disclose the firms or individuals to whom they loan money (Goodhart (1988)).

cost of capital, we believe that lower agency costs will enable stronger monitoring by investors, reducing managerial discretion and hence the impact of culture, and this will offset any change in debt cost of capital. Similarly, the effect of greater risk aversion on the debt cost of capital is unclear. More risk-averse investors will need greater compensation in order to induce them to purchase risky debt securities in the market, but more caution on the part of management is likely to result in lower debt costs. Given that management's risk aversion in isolation is likely to improve borrowing by avoiding risk at the firm level, it seems unlikely that the interaction of risk aversion and agency costs will play a significant role in driving firm-level debt cost of capital.

We implicitly assume that the marginal bond investor comes from the same country as the firm issuing the debt. While we cannot directly check this assumption, we do examine a random sample of 1% of all of our firms and their outstanding bond issues using Bloomberg. For this sample, we find that less than 10% have any foreign-denominated debt. Given that firms issue foreign-denominated debt with the intention of selling it to foreign investors, the relative lack of this debt suggests that international investors are rarely the marginal price setting investors in the debt markets (evidence from Black and Munro (2010) and Claessens et al. (2007) supports this view). We examine Hypothesis 3 in Tables 6 and 7.

3.2. Data

Our sample consists of all stocks in the G20 nations¹⁰ between January 1, 1995 and December 31, 2009 for which we have complete data from Datastream/WorldScope.¹¹ Specifically, firms from the following nations are included in the sample: Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, the Russian Federation, Saudi Arabia, South Africa, South Korea, Turkey, the United Kingdom, and the United States (see Table 1). We examine the G20 because they are economically significant to the overall world economy. The G20 includes both advanced and developing nations. It includes diversified economies and economies dependent on a few key industries. It includes democracies, oligarchies, and monarchies. In short, the G20 captures an accurate picture of the cross-country variation we see across the world.¹²

Further, focusing on the G20 helps us to avoid a key weakness in our study that we would otherwise face if we looked at smaller nations, or those with very few publicly traded firms. The general criticism that is often levied at research examining personality traits of managers and firm decisions is that a single manager's personality may not be a significant driver of a large firm's actions. However, by examining cultural factors, which will impact the vast majority of managers and investors across a nation, we mitigate this concern. Provided that investors and managers have similar levels of individualism and risk aversion compared to the general population, our measures of these factors should be valid for both groups. By focusing on the G20 countries, we avoid the possibility that a large subsection of managers in our firms are from other nations. In a 2010 report on the G20, foreign-born residents are less than 15% of the population, even in open nations such as the US (12.9%) and the UK (11.9%).¹³ Given that the US and the UK account for a large portion of our sample, we re-run the results excluding these countries and find qualitatively similar results to those reported in the paper.¹⁴

Data on stock prices, accounting variables, debt levels, and other firm-specific information are obtained from DataStream and WorldScope.¹⁵ Data on 2-year and 10-year bond interest rates for various credit ratings in all 19 nations were also gathered from WorldScope/DataStream and Bloomberg and were checked against data at BondsOnline.com.

¹⁰ The G20 nations consist of 19 nations plus the European Union. This is despite the fact that multiple EU nations are also among the G20, essentially resulting in double representation. The EU was not used as a "nation" in this study, but firms that were in the G20 and the EU independently are included.

¹¹ January 1995 is the earliest date for which DataStream has comprehensive data, but even in 1995 the data is somewhat sparse for certain variables. All major results in the paper are robust to the exclusion of the 1995 data.

¹² According to the information at www.g20.org, these countries represent 90% of the world's GDP, 80% of international trade, and 67% of the total population.

¹³ Foreign resident data can be found in national census bureau data. For example, the US Census (<http://www.census.gov/prod/2012pubs/acs-19.pdf>), or the UK Office for National Statistics (<http://www.ons.gov.uk/ons/taxonomy/index.html?nscl=International+Migration>).

¹⁴ These unreported results are available from the authors upon request.

¹⁵ Consistent with the procedures of Ince and Porter (2006) and Griffin et al. (2010), we compare the US firms in our sample from WorldScope/DataStream with those in CRSP/Compustat data, and where values differ for US firms, CRSP and Compustat data are used.

Table 1

Culture indices. Column 2 lists the number of firms in our sample in each nation in WorldScope/Datastream between 1995 and 2009. Columns 3–4 are the average values across years for the individualism and risk aversion indices in each nation.

| Country | Number of firms | Average Individualism Index | Average Risk Aversion Index |
|----------------|-----------------|-----------------------------|-----------------------------|
| Argentina | 64 | 43 | 84 |
| Australia | 793 | 91 | 49 |
| Brazil | 317 | 37 | 73 |
| Canada | 726 | 85 | 46 |
| China | 659 | 15 | 32 |
| France | 531 | 70 | 88 |
| Germany | 412 | 65 | 70 |
| India | 636 | 46 | 39 |
| Indonesia | 207 | 19 | 45 |
| Italy | 271 | 74 | 77 |
| Japan | 854 | 45 | 93 |
| Mexico | 205 | 32 | 85 |
| Russia | 143 | 41 | 90 |
| Saudi Arabia | 29 | 37 | 66 |
| South Africa | 208 | 63 | 49 |
| South Korea | 652 | 18 | 87 |
| Turkey | 183 | 40 | 82 |
| United Kingdom | 1046 | 92 | 38 |
| United States | 5027 | 93 | 44 |
| Total firms | 12,963 | 53.1 (Mean) | 65.1 (Mean) |

We measure firm-level governance using the Thomson Reuters ASSET4 Corporate Governance Performance measure. This measure is an equally weighted calculation based upon relative firm performance and includes indicators based on board structure, compensation policies, board functions, shareholder rights, and vision and strategy. The comparison set of firms comprises all of the firms from ASSET4 (roughly 4000 firms). All of these data are only from publically available sources and include information from annual reports, proxy filings, a firm's website, major news agencies, among other sources.¹⁶ The values within the categories are based upon yes/no (a value of 1 is assigned for a yes and a 0 for a no) responses where a high value is obtained when only a limited number of firms have the same response. For example, if having a value of yes (a value of 1) is a positive attribute, then the firm is assigned a high value in this category if only a few other firms have a yes within this category. According to Thomson Reuters, "these ratings are z-scored and normalized to position the score between 0 and 100%". However, this measure does not cover our full sample of companies and runs from 2002 through 2009, while our WorldScope data runs from 1995 through 2009.

Our choice of control variables is based on past literature. Consistent with [Titman and Wessels \(1988\)](#) and the model proposed by [Leland \(1998\)](#), we control for size, profitability, growth, and tax considerations. We proxy for size using the natural log of total sales and free cash flow to total assets. Our profitability and growth controls include return on equity, dividends to total assets, R&D to sales, and capital expenditures to sales. Income taxes to total assets controls for the tax structure at the firm level. We also control for the level of fixed assets via property, plant, and equipment to total assets. We control for religious intensity in each nation based on WVS data to account for the results of [Stulz and Williamson \(2003\)](#) and [Kumar et al. \(2011\)](#). Finally, we also include industry dummies and year dummies based on the work of [Rajan and Zingales \(1995\)](#).

[Table 1](#) lists the average annual index value for risk aversion and individualism in each nation during the period from 1995 to 2009. Column 2 lists the number of firms in each country, while columns 3–4 list our measure of each country's individualism and risk aversion. We observe that Saudi Arabia has the fewest firms (29) and, not surprisingly, the US has the most (5027). South Korea and China are near the bottom of

¹⁶ Thomson Reuters does not identify the specific components within these five categories or the scoring, as this information is proprietary. Please see http://thomsonreuters.com/products/financial-risk/content/07_008/starminquant-research-note-on-asset4-data.pdf for a more detailed description of the data.

Table 2

Descriptive statistics and univariate results. All of the variables are defined in Appendix 1. Significant at 1% (***), 5% (**), and 10% (*) levels.

| Variable | All firms | | Emerging market firms | | Developed market firms | | Difference in means | Difference in medians |
|------------------------|-----------|--------|-----------------------|--------|------------------------|--------|---------------------|-----------------------|
| | Mean | Median | Mean | Median | Mean | Median | | |
| Total assets (\$M) | 1211.9 | 153.5 | 286.4 | 134.3 | 1781.5 | 165.3 | −1615.1*** | −91.0*** |
| Cash/Total Assets | 0.139 | 0.079 | 0.178 | 0.092 | 0.028 | 0.048 | 0.15** | 0.04* |
| Dividends/Total Assets | 0.018 | 0.008 | 0.025 | 0.008 | 0.015 | 0.031 | 0.01** | −0.02** |
| FCF/Total Assets | 0.063 | 0.053 | 0.046 | 0.041 | 0.087 | 0.072 | −0.04*** | −0.03** |
| PP&E/Total Assets | 0.128 | 0.047 | 0.128 | 0.027 | 0.135 | 0.074 | −0.01* | −0.05** |
| ROE (%) | 7.60 | 6.86 | 7.53 | 6.84 | 10.92 | 11.17 | −3.39*** | −4.33*** |
| CapEx/Sales | 0.089 | 0.073 | 0.067 | 0.052 | 0.124 | 0.095 | −0.06** | −0.04** |
| R&D to Sales | 0.015 | 0.019 | 0.012 | 0.037 | 0.017 | 0.007 | −0.005* | 0.03** |
| Debt Interest Cost | 8.81% | 8.42% | 10.88% | 10.60% | 7.58% | 7.07% | 3.30*** | 3.53*** |
| Debt-to-Equity | 0.901 | 1.082 | 0.765 | 0.931 | 0.982 | 1.173 | 0.217*** | 0.242*** |
| Income Taxes/Assets | 0.058 | 0.044 | 0.064 | 0.042 | 0.053 | 0.045 | 0.011 | −0.003 |
| Debt User Dummy | 0.44 | – | 0.430 | – | 0.726 | – | −0.30*** | – |
| Individualism Index | 63.88 | 65.50 | 34.21 | 36.00 | 82.08 | 92.50 | −47.87*** | −56.50*** |
| Risk Aversion Index | 55.13 | 57.00 | 56.19 | 59.00 | 54.46 | 44.00 | 1.73 | 15.00*** |
| Religious Fervor | 36.20 | 41.00 | 57.41 | 63.00 | 23.19 | 21.00 | 34.22*** | 42.00*** |
| Firm-Level Gov Score | 52.01 | 59.24 | 45.92 | 52.70 | 55.22 | 62.68 | −9.30*** | −9.58*** |
| Firm-Year Observations | 64,670 | 64,670 | 13,814 | 13,814 | 50,856 | 50,856 | | |

the Individualism Index, whereas Australia, the UK, and the US are among the top. Additionally, China and India score among the lowest on the Risk Aversion Index, while Russia and Japan score the highest.¹⁷

4. Results

4.1. Summary stats

The descriptive statistics presented in Table 2 reveal that many of the approximately 13,000 firms in the sample are small and that a few large firms skew the mean values.¹⁸ Furthermore, there is a large disparity between firms in emerging versus developed countries.¹⁹ Additionally, we observe that both of the cultural measures are significantly different between emerging and developed countries (except for the difference in means for the risk aversion measure). We also note that all of our accounting variables are significantly different between emerging and developed countries, with the exception of the income taxes to sales ratio (we believe this is largely because there is a mix of both high-tax and low-tax nations in both emerging and developed nations).

The variables shown in Table 2 generally track the variables of interest examined in past research.²⁰ Several results from this table are worth noting. In general, firms in developed countries are larger (as measured by total assets), have higher R&D and capital expenditures as a percentage of sales (our proxy for research intensity at the firm level), are more likely to use debt, and have a higher debt-to-equity ratio. We also observe that firms in developed countries have a significantly lower debt interest cost relative to firms emerging countries. The average firm in a developed country pays approximately 7.6% for their debt interest compared to 10.9% for the average firm in an emerging country. Table 2 also suggests that it is important to control for the level of economic development in our multivariate framework.

Table 3 shows the pairwise correlations between all of the accounting variables of interest. It should be noted that a number of the variables have relatively weak (significance at the 10% level) correlations.

¹⁷ This is consistent with a recent global consumer confidence survey by Nielsen that indicates the high risk-taking behavior of developing Asian economies compared to developed Western countries (see <http://www.cnbc.com/id/48142500>).

¹⁸ To control for some of these outliers (e.g., sales less than \$1,000,000 or more than \$100 billion), the data were Winsorized at the top and bottom 1% of revenues. All of the results are robust to not being Winsorized, though the level of significance decreases slightly.

¹⁹ The emerging markets are defined using the lists from by S&P, Dow Jones, and *The Economist*, with nations included as emerging if they appear on at least two of the three lists.

²⁰ Missing observations for PP&E and R&D are set to zero. Setting these variables to missing has no significant impact on our overall results.

Table 3

Pairwise correlations. All of the variables are defined in Appendix 1. An * indicates statistically significant correlation at the 10% level or higher.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|----|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1 | 1.000 | | | | | | | | | | | | | |
| 2 | −0.442* | 1.000 | | | | | | | | | | | | |
| 3 | −0.001 | 0.028* | 1.000 | | | | | | | | | | | |
| 4 | −0.083* | 0.058* | 0.382* | 1.000 | | | | | | | | | | |
| 5 | 0.036* | 0.008* | 0.580* | 0.569* | 1.000 | | | | | | | | | |
| 6 | −0.027* | 0.045* | 0.057* | 0.029* | 0.021* | 1.000 | | | | | | | | |
| 7 | 0.017* | −0.007* | 0.045* | 0.242* | 0.022* | 0.027* | 1.000 | | | | | | | |
| 8 | −0.012* | 0.019* | 0.026* | −0.011* | 0.033* | 0.064* | 0.006 | 1.000 | | | | | | |
| 9 | 0.053* | −0.032* | 0.049* | 0.163* | 0.016* | 0.019* | 0.258* | 0.046* | 1.000 | | | | | |
| 10 | 0.201* | −0.127* | 0.041* | 0.019* | 0.023* | 0.257* | 0.015* | −0.021* | 0.032* | 1.000 | | | | |
| 11 | 0.023* | −0.019* | 0.015* | 0.082* | 0.007* | 0.011* | 0.409* | 0.038* | 0.501* | 0.022* | 1.000 | | | |
| 12 | 0.044* | −0.027* | 0.045* | 0.008 | −0.004 | 0.016 | 0.043* | −0.093* | 0.182* | 0.030* | 0.151* | 1.000 | | |
| 13 | −0.022* | −0.031* | −0.104* | 0.045* | 0.036* | 0.010 | −0.117* | −0.075* | −0.089* | 0.216* | −0.172* | −0.139* | 1.000 | |
| 14 | −0.028* | 0.025* | −0.136* | −0.098* | −0.177* | 0.012 | 0.010 | −0.126* | −0.223* | −0.031* | 0.046* | 0.194* | −0.068* | 1.000 |
| 15 | 0.096* | −0.079* | 0.006 | 0.009 | −0.012 | −0.026* | 0.035* | 0.015 | 0.051* | 0.074* | 0.049* | 0.136* | 0.089* | −0.156* |

Variables are as follows:

1. Individualism Index
2. Risk Aversion Index
3. Total Assets
4. Sales
5. Cash
6. Dividends
7. R&D Spending
8. FCF/Assets
9. PP&E/Assets
10. ROE
11. Capital Expenditures/Sales (CES)
12. Debt/Equity
13. Firm-Level Gov Score
14. Debt Interest Cost
15. Private Credit-to-GDP.

From Table 3, we observe that individualism and risk aversion are negatively correlated with sales-to-assets, whereas individualism is positively correlated with free cash flow-to-assets, but risk aversion is negatively correlated with free cash flow-to-assets. Individualism is negatively correlated with debt interest costs, and positively correlated with debt-to-equity ratios. This suggests that countries with higher levels of individualism use more debt in their capital structures. It may also reflect the fact that these countries have deeper debt markets as well. Risk aversion is negatively correlated with debt-to-equity ratio and positively correlated with debt interest cost, suggesting that when countries are more risk-averse, they are less likely to use debt and that debt is more costly. Consistent with the theoretical predictions of Leland (1998), governance is negatively correlated with leverage and with debt interest costs, suggesting that firms with better governance use less debt and pay less for that debt. Governance is also negatively correlated with our cultural variables, suggesting that governance problems are more common in countries with greater individualism and risk aversion. Table 3 also shows that multicollinearity is unlikely to be a major concern in the regression specifications used later.

4.2. Multivariate regression results

We start our multivariate analysis by running a probit regression to test our first hypothesis: Does culture and the interaction with governance and agency costs impact the likelihood of using debt as proposed?²¹ First and foremost, Table 4 demonstrates that cultural measures affect the likelihood of using debt. As predicted, the Individualism Index loads positively and is significant in all of the regressions. Specifically, from the regressions, we observe that a 1% increase in the Individualism Index increases the probability of using debt by an average of approximately 1.3% (a low of 1.27% to a high of 1.87%, based on the coefficients from the Individualism Index in columns 1–6). Conversely, an increase in the Risk Aversion Index has a negative effect on the probability of using debt, with a 1% increase leading to an approximately 1.7% to a 2.4% decrease in the probability of using total debt (these results are all significant at the 1% level).

These results are consistent with our Hypothesis 1 and the view that higher levels of individualism correlate with greater overconfidence. Firm executives who are overly confident about their own skills in managing a firm may be more willing to issue debt, which of course is less costly to a firm than equity but also carries greater financial risk. Similarly, in countries where the population is typically more risk-averse, firm executives may be less willing to take on firm risk in the form of heavier debt loads, while risk-averse investors may be less willing to buy the debt of those firms that do take on financial risk. In all of the regressions, we include time-varying country-level measures for liquidity and economic development available from the World Bank. The first measure is the market capitalization of domestic listed firms as a percentage of GDP (Market cap/GDP), and the second measure captures the domestic credit that is provided to the private sector as a percentage of the country's GDP (Private credit/GDP).²²

Regression 2 shows the interaction of the cultural measures with our firm-level governance measure and shows that the interaction of governance with individualism is negative and significant, whereas the interaction between governance and risk aversion is positive and significant. It appears that better firm governance mitigates the impact of the cultural measures on the likelihood of using debt, perhaps by keeping in check the cultural predilections of the firm's managers. (This is again consistent with our Hypothesis 1 that culture influences the decision to use debt and will be offset by good governance.) The magnitude of the coefficient of governance and individualism suggests that the marginal one unit increase in firm-level governance offsets approximately 25% of the increase in probability of using debt due to an increase in individualism. Similarly, the coefficient on the interaction term of risk aversion and governance shows that an increase in firm governance offsets slightly under 20% of the effect of an increase in risk aversion. Our view is that culture impacts the probability of using debt and better governance helps to offset this effect. This is related to the findings of Benson et al. (2011) with regard to better governance leading to shareholder value-maximizing efforts.

²¹ The regression results include Fama French (FF) industry dummies, year dummies, as well as clustering at the firm level.

²² Dittmar et al. (2003) include similar measures; however, instead of our time-varying market capitalization to GDP measure, they utilize the market capitalization held by minority investors as a ratio of GNP. This value is found in LaPorta et al. (1997) and is calculated only for 1994 and is not available for all of the countries in our sample. Nonetheless, our results in Tables IV–VI are robust to the inclusion of this measure in place of our market capitalization to GDP variable with fewer observations.

Table 4

Impact of individualism and risk aversion on likelihood of using debt. All of the variables are defined in Appendix 1. P-values are in parentheses. Significant at 1% (***), 5% (**), and 10% (*) levels. Industries are defined using Fama French. Standard errors are clustered at the firm level.

| Probability of using | Debt | Debt | Debt | Debt | Debt | Debt |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Variables | (1) | (2) | (3) | (4) | (5) | (6) |
| Individualism | 0.019*** (0.000) | 0.018*** (0.000) | 0.017*** (0.000) | 0.013** (0.030) | 0.017*** (0.000) | 0.013*** (0.000) |
| Risk Aversion | -0.018*** (0.000) | -0.024*** (0.000) | -0.017*** (0.000) | -0.020*** (0.000) | -0.017*** (0.000) | -0.020*** (0.000) |
| Top Quintile of Total Assets * Individualism | | | -0.285*** (0.000) | -0.344*** (0.000) | | |
| Bottom Quintile of Total Assets * Individualism | | | 0.042* (0.058) | 0.003 (0.203) | | |
| Ln(ROE) | 0.040*** (0.000) | 0.045*** (0.000) | 0.036*** (0.000) | 0.042*** (0.000) | 0.035*** (0.000) | 0.041*** (0.000) |
| CES | 0.000* (0.099) | 0.000* (0.070) | 0.000 (0.111) | 0.000* (0.066) | 0.000 (0.109) | 0.000* (0.064) |
| Ln(Total Assets) | 0.150*** (0.000) | 0.129*** (0.000) | 0.134*** (0.000) | 0.110*** (0.000) | 0.134*** (0.000) | 0.114*** (0.000) |
| Cash/Total Assets | 0.038 (0.270) | 0.029 (0.411) | 0.063* (0.068) | 0.070** (0.047) | 0.071** (0.041) | 0.073** (0.038) |
| Income Tax/Total Assets | 0.000* (0.073) | 0.000* (0.062) | 0.000* (0.084) | 0.000* (0.057) | 0.000* (0.083) | 0.000* (0.056) |
| Emerging Market | -0.159*** (0.000) | -0.135*** (0.000) | -0.130*** (0.000) | -0.105*** (0.000) | -0.138*** (0.000) | -0.111*** (0.000) |
| Religious Fervor | 0.155** (0.010) | 0.223*** (0.000) | 0.126** (0.036) | 0.175*** (0.003) | 0.132** (0.028) | 0.183*** (0.002) |
| Country Governance | 0.010*** (0.000) | 0.009*** (0.000) | 0.009*** (0.000) | 0.007*** (0.000) | 0.009*** (0.000) | 0.007*** (0.000) |
| Private Credit/GDP | -0.001* (0.096) | 0.000 (0.787) | -0.000 (0.260) | 0.000 (0.622) | -0.000 (0.162) | 0.000 (0.762) |
| Market Cap/GDP | -0.001*** (0.000) | -0.001*** (0.000) | -0.001*** (0.000) | -0.001*** (0.000) | -0.001*** (0.000) | -0.001*** (0.000) |
| Top Quintile of CES * Risk Aversion | | | | | 0.266*** (0.000) | 0.327*** (0.000) |
| Bottom Quintile of CES * Risk Aversion | | | | | -0.074*** (0.000) | -0.093*** (0.000) |
| Firm Governance Score | | 0.023** (0.018) | | 0.015 (0.102) | | 0.015 (0.105) |
| Firm-Level Gov Score * Individualism | | -0.004*** (0.000) | | -0.003*** (0.000) | | -0.003*** (0.000) |
| Firm-Level Gov Score * Risk Aversion | | 0.004*** (0.000) | | 0.003*** (0.000) | | 0.003*** (0.000) |
| Constant | 0.114 (0.562) | 0.417 (0.445) | 0.055 (0.778) | 0.043 (0.935) | 0.015 (0.939) | -0.037 (0.945) |
| Industry dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Pseudo R-squared | 0.22 | 0.25 | 0.23 | 0.26 | 0.22 | 0.26 |
| Observations | 64,670 | 27,130 | 64,670 | 27,130 | 64,670 | 27,130 |

In the table, we also examine the interaction effects of firm size (proxied by firm assets) and R&D intensity (proxied by capital expenditures to sales) on cultural norms. As the table shows, individualism has different effects on large firms and small firms. This is shown in the table by the interaction variables between the top and bottom quintiles of total assets and the individualism proxy. Here, the theory is that larger companies have corporate policies and strategies that are less likely to be affected by cultural traits such as individualism than small companies are. The table shows evidence in favor of this view and is consistent with the results of Li et al. (2013), who argue that larger firms have greater internal regulations that mitigate the effect of culture on corporate risk taking. Here we see that while the effects of individualism on debt use are significantly offset for firms in the top size quintile, firms in the bottom size quintile are more impacted by national culture and

hence are more likely to use debt as individualism increases. Overall, this is consistent with small firms being more open to change and driven by the personal characteristics of executives, while larger firms are more resistant to change and more heavily influenced by markets rather than culture.

We find similar style effects when we examine the level R&D intensity as each firm interacted with our measure of risk aversion. Here, we find that the top quintile of CES firms offset the effects of culture (positive coefficient on interaction term versus a negative coefficient on risk aversion), while the bottom quintile of firms see greater embracing of national cultural effects (negative coefficient on interaction and risk aversion coefficients). This is consistent with a view that more R&D-intensive firms are frequently younger tech firms that growing rapidly, and adding many new employees who are not already influenced by the firm's typical business practices, and hence are more open to culture influences. In contrast less R&D-intensive firms tend to be more established and less open to cultural influences.

Finally, turning our attention to other variables in the regression, we observe that all firms in emerging countries (as opposed to developed countries) are less likely to use debt (consistent with Desai et al. (2004), who find that multinational firms in less-developed capital markets use less debt). Specifically, we observe that firms located in emerging countries are on average 13% less likely to use debt compared to firms that are located in developed countries. These results are not only economically significant but statistically significant as well (all of the coefficients on Emerging Market in regressions (1)–(6) are significant at the 1% level). Additionally, from Table 4, we observe that larger firms (as measured by the natural logarithm of assets), firms with higher income taxes scaled by assets, firms operating in countries with stronger governance, firms with higher return on equity have a greater likelihood of using debt.

The next set of regressions involves testing whether our cultural measures and agency costs affect the firm's debt-to-equity ratio in the direction we propose (Hypothesis 2). Given the impact of the emerging market dummy and its economic significance on the likelihood of using debt observed in all of the regressions in Table 4, for Tables 5–7 and 10, we run separate regressions for emerging and developed economies with similar controls found in Table 4.

In regression (1) of Table 5, we examine debt-to-equity ratio for firms using the entire sample of countries. The regression shows that increases in the Individualism Index are associated with increases in the debt-to-equity ratio. Specifically, the marginal effect of an increase in individualism is associated with an increase in debt-to-equity of 0.130 in all countries. The Risk Aversion Index has a negative and significant impact on the debt-to-equity ratio, with the coefficient showing that the marginal effect of an increase in risk aversion is a decline in debt-to-equity of 0.205. This is consistent with the predictions we make in Hypothesis 2, where we believe that individualism will have a positive effect on the amount of debt used and risk aversion will have a negative effect.

Again, similar to our findings in Table 4, the interaction of governance with individualism is negative and significant, and the interaction of governance with risk aversion is positive and significant. Better governance appears to mitigate the impact of individualism and risk aversion on the firm when it relates to debt-to-equity, as shown by the -0.038 coefficient on the interaction of individualism and governance and the $+0.025$ coefficient on risk aversion interaction with governance (again consistent with the work of Li et al. (2013), showing that the influence of culture is lessened with better governance related to managerial discretion of earnings). However, these effects are only significant for the full sample and in developed markets, suggesting that there are limits to the positive impact of governance in controlling the local effects of culture on capital structure in emerging countries. The coefficients on log of total assets, income taxes to total assets, and the Private Credit/GDP measure are all positive, whereas return on equity, cash/total assets, the measure of religious fervor, and the Market Cap/GDP variables are all negative.²³ From regression (1), we observe that the Emerging Dummy is positive and highly significant. Specifically, firms in emerging countries have higher debt-to-equity ratios compared to firms in developed countries by an amount of 3.448. This finding is consistent with Demirgüç-Kunt and Levine (1996), who conclude that firms in emerging countries have higher debt-to-equity ratios as stock market development increases.

²³ Private Credit/GDP is positive and significant in only developed countries, whereas Market Cap/GDP is negative and significant in two of the three regressions using only developed countries but is positive and significant for emerging countries.

Table 5

Debt to equity: This regression differentiates between debt-to-equity ratios across different countries. All of the variables are defined in Appendix 1. P-values are in parentheses. Significant at 1% (***), 5% (**), and 10% (*) levels. Industries are defined using Fama French. Standard errors are clustered at the firm level.

| Variables | All nations | Emerging | Developed | Developed | Developed |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) |
| | Debt-to-Equity | Debt-to-Equity | Debt-to-Equity | Debt-to-Equity | Debt-to-Equity |
| Individualism | 0.130*** (0.008) | 0.041 (0.618) | 0.430*** (0.000) | 0.421*** (0.000) | 0.419*** (0.000) |
| Risk Aversion | -0.205*** (0.000) | 0.014 (0.809) | -0.602*** (0.000) | -0.597*** (0.000) | -0.594*** (0.000) |
| Top Quintile of Total Assets * Individualism | | | | -0.620*** (0.009) | |
| Bottom Quintile of Total Assets * Individualism | | | | 0.352* (0.084) | |
| Firm Governance Score | 0.267** (0.012) | -0.108 (0.523) | 0.949*** (0.000) | 0.944*** (0.000) | 0.928*** (0.000) |
| Firm-Level Gov Score * Individualism | -0.038*** (0.000) | -0.011 (0.481) | -0.080*** (0.000) | -0.079*** (0.000) | -0.078*** (0.000) |
| Firm-Level Gov Score * Risk Aversion | 0.025*** (0.003) | -0.005 (0.664) | 0.084*** (0.000) | 0.083*** (0.000) | 0.082*** (0.000) |
| Ln(ROE) | 0.036 (0.486) | -1.665*** (0.000) | 0.444*** (0.000) | 0.437*** (0.000) | 0.432*** (0.000) |
| CES | -0.000*** (0.000) | -0.000*** (0.000) | -0.000* (0.069) | -0.000 (0.115) | -0.000* (0.095) |
| Ln(Total Assets) | 0.409*** (0.000) | 0.518*** (0.000) | 0.345*** (0.000) | 0.303*** (0.000) | 0.358*** (0.000) |
| Cash/Total Assets | -1.079*** (0.000) | -0.712 (0.339) | -0.757*** (0.004) | -0.708*** (0.006) | -0.644** (0.012) |
| Income Tax/Total Assets | 0.000*** (0.000) | 0.000*** (0.000) | 0.000*** (0.001) | 0.000*** (0.000) | 0.000*** (0.000) |
| Religious Fervor | -2.325*** (0.000) | -1.554 (0.181) | -2.799*** (0.000) | -2.854*** (0.000) | -2.988*** (0.000) |
| Private Credit/GDP | 0.001 (0.725) | 0.001 (0.838) | 0.011*** (0.004) | 0.012*** (0.003) | 0.007** (0.034) |
| Market Cap/GDP | 0.001 (0.819) | 0.013*** (0.002) | -0.008** (0.038) | -0.008** (0.040) | -0.006 (0.109) |
| Country Governance | 0.004 (0.569) | 0.029 (0.213) | -0.011 (0.165) | -0.016** (0.039) | |
| Emerging Market | 3.448*** (0.000) | | | | |
| Top Quintile of CES * Risk Aversion | | | | | 0.597** (0.012) |
| Bottom Quintile of CES * Risk Aversion | | | | | -0.682* (0.064) |
| Constant | 26.917*** (0.000) | -4.016 (0.651) | 79.701*** (0.000) | 79.201*** (0.000) | 77.253*** (0.000) |
| Industry dummies | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes |
| R-squared | 0.183 | 0.087 | 0.360 | 0.361 | 0.361 |
| Observations | 27,130 | 9356 | 17,774 | 17,774 | 17,774 |

For regressions (2)–(3), we break up the sample by emerging and developed countries. Regression (3) only examines emerging countries. In this regression, we observe that the coefficients on individualism and risk aversion are insignificant, as are the interactions with governance. These results are inconsistent with our Hypothesis 2, but this is not totally unexpected because governance will likely have limited effectiveness in less-developed nations. We propose that this lack of significance in emerging markets may be because in emerging markets, factors such as the legal system, country-level governance, and overall development of the credit markets may subsume the effects of individualism and risk aversion. For example, if government policies are set up such that most private credit is directed to state-owned enterprises, and these enterprises

Table 6

Multivariate regression of debt cost of capital. All of the variables are defined in Appendix 1. Coefficients are in % points (e.g., 0.50 is 50 bps, 5.00 is 500 bps or 5%). P-values are in parentheses. Significant at 1% (***), 5% (**), and 10% (*) levels. Industries are defined using Fama French. Standard errors are clustered at the firm level.

| Debt cost of capital | All Nations | Emerging | Developed | Developed | Developed |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| | (1) | (2) | (3) | (4) | (5) |
| Variables | Debt Interest Cost | Debt Interest Cost | Debt Interest Cost | Debt Interest Cost | Debt Interest Cost |
| Individualism | −0.111*** (0.001) | −0.004 (0.871) | −0.229*** (0.000) | −0.223*** (0.000) | −0.225*** (0.000) |
| Risk Aversion | 0.081*** (0.001) | −0.009 (0.696) | 0.164*** (0.001) | 0.161*** (0.001) | 0.162*** (0.001) |
| Firm Governance Score | −0.245*** (0.000) | 0.010 (0.808) | −0.318** (0.011) | −0.316** (0.012) | −0.316** (0.012) |
| Firm-Level Gov Score * Individualism | 0.023*** (0.000) | −0.002 (0.640) | 0.033*** (0.008) | 0.032*** (0.009) | 0.032*** (0.009) |
| Firm-Level Gov Score * Risk Aversion | −0.016*** (0.000) | 0.004 (0.179) | −0.022** (0.014) | −0.022** (0.015) | −0.022** (0.015) |
| Ln(ROE) | −0.030 (0.109) | −0.091 (0.223) | 0.030 (0.607) | 0.034 (0.556) | 0.033 (0.567) |
| CES | 0.000 (0.400) | 0.000 (0.270) | 0.000*** (0.005) | 0.000** (0.014) | 0.000*** (0.007) |
| Ln(Total Assets) | 0.155*** (0.000) | 0.168*** (0.000) | 0.079 (0.209) | 0.113* (0.079) | 0.095 (0.162) |
| Cash/Total Assets | 0.047 (0.683) | −0.128* (0.091) | 0.506 (0.186) | 0.476 (0.209) | 0.486 (0.203) |
| Income Tax/Total Assets | 0.000 (0.761) | −0.000 (0.154) | 0.000 (0.551) | 0.000 (0.590) | 0.000 (0.562) |
| Emerging Market | 5.100*** (0.000) | | | | |
| Religious Fervor | 0.499 (0.828) | 0.102*** (0.000) | −0.486*** (0.001) | −0.492*** (0.001) | −0.479*** (0.001) |
| Private Credit/GDP | −0.001 (0.407) | −0.040*** (0.000) | 0.023* (0.065) | 0.022* (0.076) | 0.023* (0.067) |
| Market Cap/GDP | −0.031*** (0.000) | −0.037*** (0.000) | −0.048*** (0.000) | −0.048*** (0.000) | −0.048*** (0.000) |
| Country Governance | −0.166*** (0.000) | 0.124*** (0.000) | −0.299*** (0.000) | −0.295*** (0.000) | −0.297*** (0.000) |
| Top Quintile of Total Assets * Individualism | | | | 0.298*** (0.006) | |
| Bottom Quintile of Total Assets * Individualism | | | | −0.431 (0.113) | |
| Top Quintile of CES * Risk Aversion | | | | | −0.352*** (0.001) |
| Bottom Quintile of CES * Risk Aversion | | | | | −0.020 (0.826) |
| Constant | −2.621 (0.984) | −5.153* (0.063) | 4.832 (0.943) | 0.739 (0.913) | 0.701 (0.918) |
| Industry dummies | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes |
| R-squared | 0.328 | 0.231 | 0.396 | 0.396 | 0.396 |
| Observations | 27,130 | 9356 | 17,774 | 17,774 | 17,774 |

are effectively connected to the government, then manager cultural characteristics will have limited importance.²⁴ On the other hand, while governments and legal systems can effectively limit access to credit for firms, it is much more difficult to force private firms to take on debt that is not desirable. Therefore, the coefficients on risk aversion may still show up as negative and significant in our analyses.

²⁴ An article in *The Economist* ("The State Advances", Oct 6, 2012) provides anecdotal evidence of a significant degree of control by the government in emerging markets over what cost of capital firms pay.

In regression (3), we focus on firms in developed countries. We observe that the cultural measures affect capital structure in developed markets similar to our results for the entire sample. This suggests that in markets where the legal system is well defined and credit markets are well established, culture may play an even larger role in determining executive and investor choices regarding capital structure. As projected in Hypothesis 2, more risk-averse developed nations use less debt, and more individualistic nations use more debt. Better firm governance in developed nations leads to lower debt-to-equity ratios along with the combination of lower agency costs and greater levels of individualism. Conversely, better governance with greater levels of risk aversion leads to higher levels of debt-to-equity ratios. These results are also consistent with lower levels of agency costs balancing out the effects of culture on debt-to-equity ratios. As before, we also observe that the size of the firm and its degree of R&D intensity (measure by CES) are important drivers of the strength of the cultural influence on the firm's leverage choice. This is evidenced in the table (as shown in regressions (4) and (5)) by the interaction term between risk aversion and the CES quintile and individualism and the size quintile.

Finally, in Table 6, we test our third hypothesis: Does culture impact the firms' cost of capital in the direction we hypothesize, and does governance offset this relation? Here, our debt cost of capital measure is based on the debt interest costs of capital measured as the change in interest expense divided by the change in long-term debt. Again, as in Table 5, we first examine all of the firms and then split the regressions by emerging versus developed. In regression (1), for all countries, the cultural measures are significant determinants of the debt cost of firms. An increase in individualism is associated with lower debt costs of 11.1 basis points per 1% increase in individualism, while increases in risk aversion correlate to debt costs that are 8 basis points higher (this is close to 1% of the average cost of capital for all of the firms in our sample).

The result for risk aversion is consistent with our Hypothesis 3 and follows from the findings of Korniotis and Kumar (2013) that local stock returns increase as risk aversion increases, implying that the equity cost of capital increases. Given the status of equity and debt capital as substitute sources of funding for many firms, we document a rise in debt cost of funding as consistent with their work. An alternative explanation (and not

Table 7

Robustness to control for country-level effects. Coefficients on other control variables are excluded for table brevity but include Ln(ROE), Ln(Total Assets), Cash/Total Assets, Long-Term Debt/Total Assets, Capital Expenditures to Sales (CES), Income Taxes/Total Assets, and FCF-to-Assets (as an alternative proxy for firm-level governance). P-values are in parentheses. Significant at 1% (***), 5% (**), and 10% (*) levels. Industries are defined using Fama French. Standard errors are clustered at the firm level.

| Variables | All countries | | Emerging markets | | Developed markets | |
|---|----------------------|---------------------|--------------------|--------------------|----------------------|---------------------|
| | Debt-to-Equity | Debt Interest Cost | Debt-to-Equity | Debt Interest Cost | Debt-to-Equity | Debt Interest Cost |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Individualism | 0.206** (0.048) | −0.099** (0.035) | 0.084 (0.178) | −0.024 (0.139) | 0.184*** (0.000) | −0.167** (0.020) |
| Risk Aversion | −0.233* (0.088) | 0.118* (0.067) | −0.122 (0.221) | 0.038 (0.183) | −0.142*** (0.000) | 0.131** (0.047) |
| FCF-to-Assets * Individualism | 0.002* (0.066) | 0.031* (0.098) | 0.0007 (0.205) | 0.012 (0.219) | 0.002*** (0.000) | 0.046*** (0.000) |
| FCF-to-Assets * Risk Aversion | −0.0010** (0.089) | 0.009 (0.382) | −0.0005 (0.181) | 0.003 (0.594) | −0.002*** (0.000) | 0.018 (0.254) |
| Top Quintile of Total Assets * Individualism | | | 0.003 (0.407) | 0.005 (0.531) | −0.011 (0.264) | 0.105 (0.456) |
| Bottom Quintile of Total Assets * Individualism | | | 0.006 (0.358) | 0.008 (0.427) | 0.032** (0.042) | −0.488* (0.053) |
| Top Quintile of CES * Risk Aversion | | | 0.007 (0.392) | 0.009 (0.360) | −0.064* (0.071) | 0.330* (0.069) |
| Bottom Quintile of CES * Risk Aversion | | | 0.010 (0.375) | 0.011 (0.343) | 0.018 (0.346) | −0.043 (0.515) |
| Other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| R-squared | 0.39 | 0.38 | 0.40 | 0.35 | 0.35 | 0.39 |
| Firm-Year Observations | 64,670 | 39,958 | 13,814 | 7555 | 50,856 | 32,403 |

necessarily independent from the findings above) is that as risk aversion increases, increased compensation is required by risk-averse societies to take on debt.

The individualism results may be driven by a greater willingness in those societies to invest in firm bonds rather than using traditional savings vehicles such as banks or government securities. This finding may also imply that capital markets are deeper in nations with greater levels of individualism. This is consistent with an overconfidence explanation, where more individualistic investors have greater faith in their ability to identify what they believe to be less-risky debt. This would lead these investors to systematically underestimate the risk in these firms and therefore to overpay for the firm's debt (lowering the yield on the debt and the firm's debt cost of capital). This explanation not only fits with our results but is also consistent with the results of [Chui et al. \(2010\)](#), who show similar behavior on the part of equity investors. Our results indicate that better governance has a material effect on lowering debt costs only in developed nations. The coefficients in emerging nations are not statistically significant.

From regression (1), we conclude that firms in emerging countries pay an average of 5.1% more in their cost of capital (coefficient on Emerging Market) compared to firms in developed countries. The paper by [Desai et al. \(2004\)](#) documents that multinational firms pay more for debt, but it appears from our results that all firms in emerging countries face higher costs of capital on average relative to firms in developed countries.

As with [Table 5](#), we find that when we divide our sample into developed and emerging markets, the effects of culture are very different. In emerging markets (regression (2)), where debt costs are likely to be controlled by the government (either implicitly or explicitly) and state-owned banks, culture has a diminished effect. Neither risk aversion nor individualism, or the interaction terms show up as significant. This finding may also reflect the shallow credit markets typically found in these nations. Alternatively, in developed markets, culture plays a major role in the debt cost of capital comparable to what we observe in the overall sample. In these countries, where government is potentially less intrusive, culture plays more of a role and thus impacts the cost of capital. Specifically, higher levels of individualism lead to lower levels of debt cost of capital, whereas higher levels of risk aversion cause higher levels of debt cost of capital (results from regressions (3)–(5)). Better governance is correlated with a lower debt cost of capital, consistent with [Leland \(1998\)](#). Better governance combined with greater levels of individualism is also associated with lower levels of debt cost of capital.²⁵ This partially offsets the increase in debt costs highlighted above. We observe that risk aversion interacted with governance has no statistically significant impact on the debt cost of capital. Again, this is consistent with our view in [Hypothesis 3](#) that better governance should offset the effects of culture on the cost of capital.

5. Robustness

In [Table 7](#), we address the possibility that our results are driven by other unobservable country-level factors. Here, we re-run our regressions for debt-to-equity and debt cost of capital using country dummies to control for national unobservable factors and the [Jensen \(1986\)](#) proxy for firm-level agency costs: FCF-to-Assets. Our results are largely the same, with the cultural variables having the same sign and similar significance. However, because increases in FCF-to-Assets are a proxy for higher agency costs (as they allow greater opportunities for perquisite consumption), and increases in our governance measure indicate better firm governance, the sign of the interaction coefficients is reversed. For example, individualism interacted with FCF-to-Assets is positive and significant for the debt-to-equity, indicating that the interaction of stronger individualism effects and higher agency costs are associated with increased use of risky debt by confident executives. This is consistent with the findings above.

In [Table 8](#), we use a propensity score matching technique to address possible endogeneity concerns. Here, we match firms from countries with high levels of individualism and risk aversion to firms from countries with low levels of individualism and risk aversion based on our governance and firm-level control variables (i.e., firm industry, total assets, ROE, cash holdings/total assets, income taxes/total assets, and capital expenditures to sales). We use a propensity score model for our matching. Specifically, we run a probit regression to determine the likelihood of a given firm having debt outstanding based on our full set of independent variables but excluding our individualism and risk aversion variables. Then, we match each firm on a one-to-one basis with another firm in the same industry but in a different country based on the propensity scores of each

²⁵ These firms may also experience less information asymmetry because of their better governance. [Chuluun et al. \(2014\)](#) conclude that greater connectedness by the board leads to a lower cost of capital and is more prevalent in firms with greater information asymmetry.

Table 8

Propensity score matched effects culture on debt cost of capital and leverage. All of the variables are defined in [Appendix 1](#). Culture variables are stratified based on quartiles with a binary variable for top and bottom quartiles and the middle quartiles omitted. P-values are in parentheses. Significant at 1% (***), 5% (**), and 10% (*) levels. Industries are defined using Fama French. Standard errors are clustered at the firm level.

| | Probability of using debt | Probability of using debt | Debt/Equity | Debt/Equity | Debt Interest Cost | Debt Interest Cost |
|---|------------------------------|------------------------------|--------------------|--------------------|-----------------------|-----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Difference in Individualism | 0.016** (0.035) | | 0.236** (0.042) | | −0.119** (0.026) | |
| Difference in Risk Aversion | −0.022** (0.028) | | −0.259* (0.070) | | 0.135* (0.061) | |
| Top Quartile of Individualism Difference | | 0.025** (0.018) | | 0.273** (0.020) | | −0.140** (0.018) |
| Top Quartile of Risk Aversion Difference | | −0.030*** (0.009) | | −0.324* (0.015) | | 0.179** (0.036) |
| Other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| R-squared | 0.35 | 0.35 | 0.27 | 0.26 | 0.24 | 0.23 |
| Matched pairs of observations | 17,050 | 4440 | 17,050 | 4440 | 17,050 | 4440 |

firm. We use two different approaches to this matching procedure in the table. In columns 1, 3, and 5, we match firms in one country to the firm with the closest propensity score in another country, with the individualism and risk aversion difference variables measuring the difference in these cultural variables between each pair of firms. This leaves us with a total sample of 17,050 pairs of matched firm observations. In columns 2, 4, and 6, we match firms from countries in the top quartile of individualism and risk aversion in a given year to the closest firms in other countries. The result is a more dramatic difference in the risk aversion and individualism levels.

In columns 1 and 2, we show that consistent with our hypotheses, higher levels of individualism lead to greater debt use, while higher levels of risk aversion lead to reduced debt use. In particular, our results show that a one-unit increase in individualism leads to a 1.6% increase in likelihood of using debt versus a propensity score matched peer firm. A one-unit increase in risk aversion has the opposite effect and is associated with a 2.2% decline in the likelihood of using debt. This result is even stronger when the treated firms in question are in the top quartile of individualism and risk aversion. In this case, a one-unit change in individualism (risk aversion) leads to a 2.5% increase (3% decrease) in the likelihood of using debt.

In columns 3 and 5, our results show that a one-unit increase in individualism in our matched pairs of firms is associated with a 0.236 increase in debt-to-equity ratio, while a one-unit positive difference in risk aversion leads to a −0.259 fall in the debt-to-equity ratio. For the debt interest cost measure, a one unit increase in the individualism difference in the matched set of firms corresponds to a −0.119 fall in debt interest cost, and a one unit increase in risk aversion differentials between firms is associated with a 0.135 increase in debt interest costs.

The results are even starker in columns 4 and 6 with the matched pairs when the treated firms fall in the top quartile of risk aversion and individualism. Here, a one-unit increase in the individualism (risk aversion) differential is associated with a 0.273 increase (−0.324 decrease) in the debt-to-equity ratio. The effects on debt interest cost are also more dramatic, with a one-unit increase in the individualism (risk aversion) differential corresponding to a −0.140 decrease (0.179 increase) in debt interest costs. We therefore conclude from [Table 8](#) that our results are robust to controlling for potential issues regarding endogeneity.

To account for the possibility that our selection of cultural measures drives our results, in [Table 9](#), we re-examine debt-to-equity ratios and debt interest costs after controlling for three other popular measures of national culture.²⁶ Columns 1 and 4 examine the impacts of Hofstede's Individualism and Uncertainty Avoidance measures (we use the updated measures from [Tang and Koveos \(2008\)](#)), columns 2 and 5 examine the

²⁶ Caution should be taken when interpreting the results here because although the direction is consistent with our main results for these time-invariant cultural values, the magnitude and significance levels vary, as does the sign and magnitude of several of the other variables in the regression.

Table 9

Robustness for alternative culture measures. All of the variables are defined in Appendix 1. Coefficients are in % points (e.g., 0.50 is 50 bps, 5.00 is 500 bps or 5%). P-values are in parentheses. Significant at 1% (***), 5% (**), and 10% (*) levels. Industries are defined using Fama French. Standard errors are clustered at the firm level.

| Variables | All nations | All nations | All nations | All nations | All nations | All nations |
|--------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Debt-to-Equity | Debt-to-Equity | Debt-to-Equity | Debt Interest Cost | Debt Interest Cost | Debt Interest Cost |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Hofstede Individualism | 0.025*** (0.000) | | | –0.238*** (0.000) | | |
| Hofstede Uncertainty Avoidance | –0.009* (0.069) | | | 0.327*** (0.000) | | |
| Schwartz Autonomy | | –0.404 (0.275) | | | 0.021 (0.351) | |
| Schwartz Conservatism | | 0.259*** (0.000) | | | 0.038*** (0.000) | |
| GLOBE | | | 0.863* (0.079) | | | 0.656*** (0.000) |
| Firm-Level Gov Score | 0.011 (0.254) | 0.002 (0.810) | 0.024 (0.279) | –0.031* (0.090) | 0.015** (0.012) | 0.015*** (0.000) |
| Firm-Level Gov Score * Individualism | –0.326*** (0.000) | | | 0.234*** (0.000) | | |
| Firm-Level Gov Score * Uncertainty | 0.237 (0.162) | | | –0.184*** (0.000) | | |
| Firm-Level Gov Score * Autonomy | | –0.029 (0.158) | | | –1.819*** (0.000) | |
| Firm-Level Gov Score * Conservatism | | 2.420** (0.026) | | | 1.783*** (0.000) | |
| Firm-Level Gov Score * GLOBE | | | –1.363*** (0.002) | | | –1.069*** (0.000) |
| Emerging Market Dummy | –1.029*** (0.000) | –0.872*** (0.000) | 0.597** (0.019) | 0.071*** (0.000) | 0.051*** (0.000) | 0.013*** (0.000) |
| Private Credit/GDP | 0.015*** (0.000) | 0.015*** (0.000) | 0.016*** (0.000) | –0.021*** (0.000) | –0.034*** (0.000) | –0.038*** (0.000) |
| Market Cap/GDP | 0.020*** (0.000) | 0.028*** (0.000) | 0.015*** (0.000) | 0.055*** (0.009) | –0.087*** (0.000) | –0.029*** (0.000) |
| Other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| R-squared | 0.09 | 0.10 | 0.09 | 0.29 | 0.29 | 0.28 |
| Firm-Year Observations | 24,689 | 24,689 | 24,689 | 24,689 | 24,689 | 24,689 |

Schwartz measures of conservatism and autonomy, and columns 3 and 6 focus on the GLOBE²⁷ measure of national culture.²⁸ While a complete paper could be written about any of these measures of culture, the broad result is that these different measures of national culture are generally all related to both capital structure choice and the cost of capital. The only exception to this finding is the Schwartz Autonomy measure, which is not statistically significant. We attribute this outcome to the fact that the Schwartz measure was published in 1994 (presumably having been calculated earlier than in 1994). Hence, that measure is made prior to our sample period and thus has limited predictive power. Indeed, if anything, that result is indicative of the importance of using a time-varying measure of culture, as we have done throughout this paper.²⁹

In Table 10, we conduct a country-level analysis where we examine country-level measures of capital structure and the cost of capital. Specifically, we use the time-varying measures of individualism and risk aversion

²⁷ The GLOBE measure is calculated by taking the mean of all of the GLOBE variables.

²⁸ Individualism is the opposite of collectivism, which is the degree to which individuals are integrated into groups. The Uncertainty Avoidance Index (UAI) deals with a society's tolerance for uncertainty and ambiguity; it ultimately refers to man's search for Truth. It indicates to what extent a culture programs its members to feel comfortable in unstructured situations.

²⁹ We use the mean of the two measures of autonomy from Schwartz, but the results are similar when either measure is used individually.

Table 10

Robustness for country-level analysis. Coefficients on other control variables are excluded for table brevity but include Firm Governance, Ln(ROE), Ln(Total Assets), Cash/Total Assets, Long-Term Debt/Total Assets, Capital Expenditures to Sales (CES), Income Taxes/Total Assets, and FCF-to-Assets (as an alternative proxy for firm-level governance). Debt-to-Equity and Debt Interest Cost are the averages by country and year, respectively. P-values are in parentheses. Significant at 1% (***), 5% (**), and 10% (*) levels. Industries are defined using Fama French. Standard errors are clustered at the firm level.

| Variables | All countries | | Emerging markets | | Developed markets | |
|------------------------|----------------------|----------------------|-------------------|--------------------|----------------------|----------------------|
| | Debt-to-Equity | Debt Interest Cost | Debt-to-Equity | Debt Interest Cost | Debt-to-Equity | Debt Interest Cost |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Individualism | 0.069*** (0.000) | −0.269*** (0.000) | −0.007 (0.268) | 0.007 (0.388) | 0.271*** (0.000) | −0.175*** (0.000) |
| Risk Aversion | −0.072*** (0.000) | 0.191*** (0.000) | −0.011 (0.147) | −0.002 (0.509) | −0.163*** (0.000) | 0.303*** (0.000) |
| Other controls | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| Year dummies | Yes | Yes | Yes | Yes | Yes | Yes |
| R-squared | 0.74 | 0.48 | 0.83 | 0.50 | 0.69 | 0.48 |
| Firm-Year Observations | 27,130 | 27,130 | 9,356 | 9,356 | 17,774 | 17,774 |

regressed on the equal-weighted mean debt-to-equity and debt interest cost for all firms in a given country and year.³⁰ This leads to a panel data set that varies by country and year, but not by firm for our dependent variables.³¹ Consistent with our previous findings, columns 1 and 2 show that individualism and risk aversion have significant impacts on capital structure and the cost of capital in our complete sample. However, these results again appear to be driven by the developing markets. Columns 3 and 4 show that in emerging markets, individualism and risk aversion do not have a statistically significant association with our debt-to-equity ratios or the debt interest cost at the country level. In contrast, columns 5 and 6 reveal a very strong association between individualism and risk aversion and the national-level debt-to-equity ratios and debt interest costs. The magnitudes on these coefficients are similar to those found in our earlier tables and provide evidence that our results are not driven by a handful of firms in each country, as they appear to hold for at the country level as well.

Lastly, in unreported results, we include creditor rights and legal origin (common law dummy) in each of the regressions for Tables 4–6 (we include each variable separately in the regressions). Dittmar et al. (2003) examine these variables first reported by LaPorta et al. (1997). LaPorta, Lopez-de-Silanes, Shleifer, and Vishny show that these variables are related to the level of the capital market development and so we include them as additional proxies. We find similar results to those reported in the paper.

6. Conclusion

Past research examines measures of time-invariant culture as it pertains to equity and, more recently, to the effect on debt. This paper shows that time-varying cultural measures (individualism and risk aversion) impact capital structure in the G20 countries. These measures have differential impacts in emerging versus developed markets. We also show that the effects of culture are significantly offset by better governance and larger firm size. We find that the probability that a firm uses debt increases when individualism is higher. In contrast, an increase in the Risk Aversion Index negatively impacts the probability of using debt. However, effects are less than half as strong when a firm has high levels of good firm-level governance based on our governance measure. When we study the impact of culture on the debt-to-equity ratios of firms, we find that increases in individualism are associated with increases in the debt ratio of the firm. In contrast, risk aversion has a negative and significant effect on the debt ratio. Again, these effects are more than half eliminated in firms with high levels of our governance measure.

³⁰ We thank an anonymous referee for the suggestion to use this regression specification test.

³¹ We obtain qualitatively similar results when using country median levels of debt-to-equity and debt interest cost rather than mean levels.

We also find that individualism and risk aversion are significantly associated with the differences in the debt cost of capital only in developed countries. We attribute this to the fact that in many emerging countries, debt markets are tightly controlled by the government and are very illiquid. Additionally, debt rates in these countries may be driven by sovereign wealth funds and other government-affiliated entities that are less concerned with effective investments and more concerned with conveying government favor. In developed nations, where such political considerations are unlikely to play a role in setting debt costs, we find that individualism and governance have a strong influence on the debt cost of capital.

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Appendix 1. Variables used in the paper

| Variable | Description | Data source |
|--------------------------------|---|--|
| CES | The ratio of Capital Expenditures to Sales. Proxies for growth. | Calculated |
| Cash (\$10 M) | Cash on balance sheet of each firm in each year. | DataStream/WorldScope |
| Debt-to-Equity Ratio | Ratio of Debt to Equity for each firm in each year. | Calculated |
| Debt Interest Cost | Equal to Change in Interest Expense/Change in LT Debt. | Calculated |
| Dividends (\$10 M) | Dividends of each firm in each year. In ten million USD. | DataStream/WorldScope |
| Emerging Market | Indicator variable equal to one if the firm is located in Argentina, Brazil, China, India, Indonesia, Mexico, Russia, Saudi Arabia, South Korea, or Turkey, and zero otherwise. | Dow Jones, S&P, and <i>The Economist</i> |
| Enforcement | Anti-self-dealing index, which proxies for enforcement. | Djankov et al., 2008 |
| FCF (\$10 M) | Free cash flow of each firm in each year. Used the free cash flow measure of DataStream/WorldScope in USD. | DataStream/WorldScope |
| Country Governance Index | Governance indicators including rule of law, voice and accountability, political stability, control of corruption, government effectiveness, and regulatory quality. | Kaufman and Bellver (2009) |
| Firm-Level Gov Score | A measure of 0–100% based on the quality of firm-specific governance where higher levels indicate better governance and 100% would indicate the best governance in the sample year. | Thomson Reuters (ASSET4) |
| Hofstede Individualism | A measure of 0–100 indicating the society's level of individualism. Hofstede defines this as "a preference for a loosely knit social framework in which individuals are expected to take care of only themselves and their immediate families." | Tang and Koveos (2008) |
| Hofstede Uncertainty Avoidance | A measure of 0–100 indicating the society's level of uncertainty avoidance. Hofstede defines this as "the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity." | Tang and Koveos (2008) |
| Income Taxes (\$10 M) | Income taxes of each firm in each year in ten million USD. | DataStream/WorldScope |
| Individualism Index | Index ranging from 0 to 100. | Calculated from WVS |
| GLOBE | Societal cultural practices and values. Defined as the mean of all of the variables used in the GLOBE Score measure of culture. | GLOBE Institute |
| Market Cap/GDP | The market capitalization of all of the domestic listed firms as a percentage of GDP. A proxy for the size of the | The World Bank |

continued on next page

Appendix 1 (continued)

| Variable | Description | Data source |
|---------------------------------|--|--|
| PP&E (\$10 M) | domestic capital market. Property, Plant, and Equipment investment by each firm in each year in ten million USD. | DataStream/WorldScope |
| Private Credit/GDP | Domestic credit provided to the private sector as a percentage of GDP. A proxy for liquidity as well as economic development. | The World Bank used by Dittmar et al. (2003) |
| R&D to Sales | Ratio of R&D spending to Sales in each year. | Calculated |
| Religious Fervor | Index ranging from 0 to 100. | Calculated from WVS |
| Risk Aversion Index | Index ranging from 0 to 100. | Calculated from WVS |
| ROE | Return on Equity of each firm in each year. | DataStream/WorldScope |
| Sales (\$10 M) | Revenues or sales of each firm in each year in ten million USD. | DataStream/WorldScope |
| Sales-to-Assets * Individualism | Interaction term of the level of Individualism Index (0–100) and a binary variable equal to 1 if a firm is in the top quartile of sales-to-assets. | Calculated |
| Sales-to-Assets * Risk Aversion | Interaction term of the level of Risk Aversion Index (0–100) and a binary variable equal to 1 if a firm is in the top quartile of sales-to-assets. | Calculated |
| Schwartz Autonomy | Measure of national affective and intellectual autonomy cultural indicators. We define the value as the mean of these two measures. | Schwartz (1994) |
| Schwartz Conservatism | A measure used to characterize the degree of conservatism in a given country. | Schwartz (1994) |
| Total Assets (\$10 M) | Total Assets of each firm in each year in ten million USD. | DataStream/WorldScope |

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