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New evidence on national culture and bank capital structure

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New evidence on national culture and bank capital structure

Abstract

We examine the nature of impact of national culture on bank leverage using a broad sample of 1,701 banks from 79 countries, over the period 2000-2013, i.e., 18,996 bank-year observations. We find that banks in countries with high individualism culture dimensions hold more leverage while, banks in countries with high uncertainty-avoidance, power distance, and long-term orientation have less leverage. Notably, bank size substantially moderates these cultural effects. Our findings are robust to endogeneity, and alternative proxies for the dependent and core explanatory variables.

JEL classification: G01; G21; G28; G32; G38; H63; M14

Keywords: Bank leverage; National culture; Individualism; Power distance; Uncertainty avoidance; Long-term orientation; Endogeneity

1. Introduction

Given the recent academic, professional, regulatory, and public attention devoted to bank culture, we expand the current literature by examining whether and to what extent national culture affects bank leverage. 73% of respondents in a survey, conducted by the Economist Intelligence Unit, blamed “culture and excessive risk-taking” for the recent Global Financial Crisis (PricewaterhouseCoopers, 2008). Similarly, the Wall Street Journal mentions that “Senior officers with the Federal Reserve and other agencies in recent weeks have made it clear that they believe bad behaviour at banks goes deeper than a few bad apples...even regulators acknowledge culture is a difficult thing to measure”.¹ In general, these criticisms are about bank’s risk culture, which we argue is in part driven by behaviours that are related to the culture of the country involved. Accordingly, in this study, apart from formal institutions² (e.g., governance quality and macroeconomic conditions), we propose and test whether culture has an impact on managerial decisions which, in turn, affect banks debt financing. This view is consistent with two related studies that show national culture influences not only corporate risk (Li, Griffin, Yue, and Zhao, 2013) but also bank stability and earnings quality (Kanagaretnam, Lim, and Lobo, 2013, 2010; Carretta, Farina, Fiordelisi, Schwizer and Lopes, 2015).

Studies using national culture to explain corporate decisions are not new. For instance, national culture influences financing decisions (Aggarwal, Kearney, and Lucey, 2012; Chen, Dou, Rhee, Truong, and Veeraraghavan, 2015; Zheng, El Ghoul, Guedhami, and Kwok, 2012), portfolio trading strategies (Chui, Titman, and Wei, 2010), and merger and acquisition decisions (Ferris, Jayaraman, and Sabherwal, 2013; Frijns, Gilbert, Lehnert, and Tourani-Rad, 2013). Chui, Lloyd, and

¹ Web source <<http://www.wsj.com/articles/as-regulators-focus-on-culture-wall-street-struggles-to-define-it-1422838659>> viewed this article on Wall Street Journal on August 24, 2015.

² Following Williamson (2000), the terms informal institution and formal institution refer to the social embeddedness level (e.g., national culture, traditions and norms) and institutional environment (e.g., constitution, law and rules) respectively.

Kwok (2002) is the first study to show that national culture could explain the variation in non-bank firm capital structure because “national culture is the missing piece” to the determinants of firm capital structure (Chui et al., 2002). These studies support the view that culture has an important role in explaining cross-country variation in corporate decisions even after controlling for the influence of formal institutions and economic development. Similarly, we argue that culture is an important determinant of bank capital structure.

Using a broad sample of 1,701 listed local banks drawn from 79 countries over 2000 to 2013 period, we find that various dimensions of national culture affect bank leverage in predicted ways. For instance, using the cultural framework of Hofstede (1984, 2001, 2010), we find that banks in countries high on individualism are more leveraged while banks in countries high on power distance, long-term orientation, and indulgence are less leveraged. Our results are economically significant. For instance, a one standard deviation increase in individualism (power distance), leads to a 1% (1.59%) increase (decrease) in bank leverage compared to its mean. We also show that larger banks have an intermediating effect on culture, that is, the effect of culture on bank leverage is weakened for large banks. This finding provides some support for the proposition that large banks tend to have stronger corporate governance and external monitoring which countervails the influence of national culture.

Our study contributes to the existing literature in several important ways. This is the first study to show that dimensions of national culture are important determinants of bank capital structure; and, as such, contributes to the growing literature on culture and finance. In addition, compared to any prior studies, this study examines the effects of all six dimensions from Hofstede’s framework. Kirkman, Lowe, and Gibson (2006) review 64 studies that use Hofstede’s cultural framework and find that 54 of these studies examine only the individualism dimension. Our study also complements existing literature on the determinants of bank’ capital structure that is not as

well-understood as non-financial firms. The sample in this study is larger than that in any prior studies on bank culture and thus increases the reliability and validity of our results. Furthermore, from a policy perspective, the leverage ratio (which was recently added to Pillar 1 of Basel III) used in this study could help policymakers analyse and fine-tune Basel III. Currently, Basel II and Basel III follow a ‘one-size-fits-all’ countries approach. Thus, our study helps inform policy makers on the design of country-contingent policy, more suited to mitigate bank risk taking and, in turn, ensure financial stability.

The remainder of the paper is structured as follows. Section 2 presents a critical review of academic literature on national culture leading to the hypotheses development. Section 3 describes the data, empirical framework, and descriptive statistics. Section 4 provides the empirical results while section 5 investigates the robustness of the results. Finally, Section 6 concludes the paper.

2. Related literature and hypotheses development

National culture involves a set of values and beliefs that guide how people make their decisions (Schwartz, 1994), which distinguishes such individuals (Hofstede, 2001). In a model developed by Williamson (2000), national culture, including norms and customs, form the first tier of the informal institutions. According to Williamson (2000), “informal institutions [culture] at this level change very slowly, on the order of centuries or millennia.” This is followed by formal institutions such as law and property rights in tier 2, corporate governance structure in tier 3 and actual firm practices in tier 4. In this framework, the higher tiers (i.e., culture in tier 1 condition legal framework in tier 2) impose constrains top-down and this implies that culture has an indirect impact on the business practices of a country through the conditioning of the lower tiers. This is on top of culture’s direct impact on individuals’ actions and decision-making.

2.1. Individualism and bank leverage

Individualism (IDV) pertains to societies where there are loose ties between individuals, and people are expected to look after themselves (Hofstede, 1984).³ In individualistic cultures, people are more 'I' conscious in that they place greater importance on self-actualisation (De Mooij and Hofstede, 2010). Many cross-cultural psychological experiments show that people in individualistic cultures, such as the US, believe that their abilities are above average, while people in collectivistic cultures, such as Japan, think quite differently (Heine, Lehman, Markus, and Kitayama, 1999). Those of individualistic cultures, from over-estimating their abilities, are overly optimistic about the future (Van den Steen, 2004). Moreover, IDV is linked to self-attribution cognitive biases whereby people tend to enhance or protect their self-esteem by taking credit for success and denying responsibility for failure (Zuckerman, 1979). This enhancement of one's self-esteem results in such self-attribution (Kagitcibasi, 1997; Markus and Kitayama, 1991).

In essence, a higher level of firm leverage is empirically shown to be associated with individuals who tend to be over-confident (Chui et al., 2010; Ferris et al., 2013), and thus tend to take on more risk. This particularly characterises corporate firms (Anderson, Fedenia, Hirschey, and Skiba, 2011; Li et al., 2013) and, of strong interest to our study on banks (Kanagaretnam, Lim, and Lobo, 2013).

Taken together, managers in individualistic countries tend to overlook the inherent risk with greater levels of debt, and second, they are likely to be over-optimistic in evaluating their bank's financial health and, as a result, prefer to use debt rather than equity. Thus, we offer the following hypothesis:

Hypothesis 1 (H1): Bank leverage is positively associated with individualism.

³ The contrast is collectivism which refers to societies wherein people have strong ties and behave cohesively.

2.2. *Uncertainty-avoidance and bank leverage*

Uncertainty-avoidance (UAI) measures the extent to which members of a society feel uncomfortable with ambiguity (Hofstede, 1984). People in high UAI cultures tend to be more anxious in unstructured situations and, therefore, likely to take immediate actions to reduce the level of uncertainty (Hofstede, 2001). UAI is also linked to preferences for rules, stability and characteristics such as risk aversion. Since, risk-taking encompasses unknown outcomes, managers from high UAI cultures tend to be less tolerant towards ambiguity and negatively related to risk-taking (Kwok and Tadesse, 2006; Li et al., 2013). Similarly, corporate cash holdings are positively associated with UAI (Chen et al., 2015). This supports Li et al's (2013) position that UAI cultures are more risk-averse and thus tend to hold more cash because they are less tolerant of uncertainty in future cash flows. Consistent with the above findings and most related to our study, UAI is associated with higher short-term debt (Zheng et al., 2012), lower personal debt (Arosa, Richie, and Schuhmann, 2014), and notably, lower risk-taking (Kanagaretnam, Lim, and Lobo, 2013) in banks.

Therefore, we hypothesise that banks from high uncertainty-avoidance cultures have lower tolerance for uncertain risk and the possible financial consequences associated with high leverage. Therefore, we hypothesise that:

Hypothesis 2 (H2): Bank leverage is negatively associated with uncertainty-avoidance.

2.3. *Masculinity and bank leverage*

Masculinity (MAS) measures the extent to which male characteristics of assertiveness, competition and success are rewarded (Hofstede, 1984). Societies that score highly on MAS tend to exhibit behaviour towards achievement rather than solidarity. On the other hand, femininity stands for values such as modesty and caring for the weak.

Previous studies on gender differences in risk preferences demonstrate that, in financial decision making, males exhibit more risk-seeking behaviours (Powell and Ansic, 1997) and are likely

to display characteristics of self-attribution or overconfidence (Barber and Odean, 2001). Consistent with the physical gender difference, masculine behavioural tends to be associated with people who act opportunistically (Doney, Cannon, and Mullen, 1998). This finding suggests that managers in high masculine countries are more likely to take decisions of higher risk. We, therefore, hypothesise:

Hypothesis 3 (H3): Bank leverage is positively associated with masculinity.

2.4. Power distance and bank leverage

Power distance (PDI) measures the extent to which the less powerful members of institutions expect and accept that power is distributed unequally (Hofstede, 1984). People in societies that exhibit a high degree of PDI accept a hierarchical order whereby power and wealth disparity is the basis of societal order. The characteristics of countries with high PDI therefore are that it is normal to have people at the extreme end of power. Even though societies with high PDI endeavour to equalise the distribution of power, such societies are more likely to cultivate inequity, social stratification, and authority centralisation (Hofstede, 1984). Bjornskov (2008) argues that people at one end of the societal distributions of status, wealth, and authority find it difficult to comprehend and to develop trust in people at the other end, and as a result, there is lower social trust. Social trust is considered more important to banks than to non-financial firms because depositors are banks' main source of financing. When there is lower trust, transaction costs increase (Aggarwal and Goodell, 2009), thus discouraging firms in those countries from using long-term financing (Zheng et al., 2012). Accordingly, we could argue that banks are discouraged from taking on more leverage when transaction costs arising from lower societal trust in high PDI countries increase. In this regard, we map our fourth hypothesis relating power distance and bank leverage as follows:

Hypothesis 4 (H4): Bank leverage is negatively associated with power distance.

2.5. Long-term orientation and bank leverage

Hofstede's long-term orientation (LTO) is introduced as a response to the concern that the original framework might be biased towards 'Western' culture. This dimension is based on Confucian

thinking and extends the existing four dimensions (Hofstede, 1991). LTO reflects the importance that a society attaches to the future as opposed to the past and present (Hofstede, 2010). According to Hofstede (2001), societies with high LTO demonstrate their resilience in working towards long-term goals, thrift, and economy with resources.

In a later study, Hofstede and his co-author find that children in LTO countries learn thrift and not to expect instant gratification. In contrast, children in short-term-oriented cultures often experience the need for immediate rewards, spending, and sensitivity to peer pressure in consumption. In the same way, self-discipline characterises long-term-oriented cultures, whereas thinking for oneself is a prevailing value in short-term-oriented cultures (Hofstede and Minkov, 2010).

Societies that exemplify long-term orientation are less likely to engage in opportunistic enterprise because they are less myopic, instead focusing more on a longer horizon and performance (Doney et al., 1998). In contrast, people belonging to short-term orientation societies focus more on short-term results (Hofstede and Minkov, 2010), which could lead them to opportunistic behaviour (Doney et al., 1998).

Zheng et al. (2012) find that firms with high LTO are more forward-looking and thus emphasise adaptability. Therefore, these firms avoid getting their funds tied up with long-term funding. From a risk-management perspective, societies characterised by LTO value the long-term survival of the firm, hence engaging in more hedging (Lievenbrück and Schmid, 2014). In addition, Newman and Nollen, 1996 also show that managers in societies with high LTO tend to provide long-term employment. To offer job security, firms have to take on less risky decisions.

The above arguments suggest that bank managers from societies characterised as short-term orientation are myopic and, as a result, tend to pursue short-term gains by borrowing more. Furthermore, to provide long-term job security by reducing the risk of insolvency, banks should be

less leveraged in societies that exemplify LTO. Therefore, we anticipate that leverage decreases with LTO and hence we hypothesise:

Hypothesis 5 (H5): Bank leverage is negatively associated with LTO.

2.6. Indulgence and bank leverage

The indulgence dimension is the new addition to Hofstede's cultural framework. Societies characterised as indulgent tend to allow relatively free gratification of general human desires such as enjoying life and having fun. People in such societies place a higher degree of importance on leisure time, act as they please and spend money frivolously. In contrast, strongly constrained societies are bound by strict regulations that people are expected to follow and respect its social norms (Hofstede, 2010).

Using the above framework, we argue that societies with high indulgence scores are more likely to have less self-control, therefore are likely to take on more leverage. In addition, the positive association with leverage can also be due to the lenient regulations that are expected in societies with strong indulgence dimension. Hence, we hypothesise that:⁴

Hypothesis 6 (H6): Bank leverage is positively associated with indulgence.

3. Data and econometric methods

3.1. Sample and data

This study uses a global dataset of publicly listed banks from 79 countries between 2000 and 2013. Our sample is an intersection of three databases – Fitch Solutions for financials, DataStream for market information, Osiris for bank headquarters addresses. For panel data analysis, we require each bank in our sample to have at least two years of observations. The final sample is an unbalanced

⁴ Prior studies using Hofstede's cultural framework do not include LTO and IND because of the inconsistency in sample between the two new dimensions (LTO and indulgence) and the other dimensions (Zheng et al., 2012). Specifically, Hofstede's first four dimensions are developed from a survey conducted in 1967 to 1973, while LTO and IND were added in 2001 and 2010 respectively. Moreover, the first four dimensions are based on a survey of employees from IBM, while LTO is based on the Chinese Value Survey of students. As a result, few studies include the two new dimensions (e.g., López-Duarte, Vidal-Suárez, and González-Díaz, 2015). Nevertheless, including the rest of the 'not-so commonly' used cultural dimensions broadens the culture research (Kirkman et al., 2006), which marks our approach in this study.

panel consisting of 18,996 observations on 1,701 unique banks over 2000-2013 period. Table A.2 shows the sample bank types across countries in panel A and mean values of our main variables including cultural dimensions across countries in panel B. As we could observe that US and Japanese banks dominate our sample, our robustness analysis on a sample of banks excluding US and Japanese banks confirms all our main results in Table 2 as discussed later in Section 4.⁵

3.2. Measures of bank leverage

Following Gropp and Heider (2010) and De Jonghe and Öztekin (2015), we measure bank leverage as one minus the ratio of equity and assets. Although, leverage is often measured in either book or market values in non-bank studies, the distinction between book and market values is more crucial in banks as capital regulation is imposed on book values but not on market values (De Jong, Kabir, and Nguyen, 2008).

3.3. Measure of national culture

Scholars have developed different theories to quantify culture (Hofstede, 1984; House, Hanges, Javidan, Dorfman, and Gupta, 2004; Schwartz, 1994). Our study focuses on cultural dimensions developed by Hofstede (Hofstede, 1984, 1991, 2001, 2010). Hofstede's cultural framework is the most well-known cultural framework, which characterises different cultural traits of a nation into six dimensions (power distance, uncertainty-avoidance, individualism, masculinity, long-term orientation and indulgence) from a world-wide survey of employees' values at IBM. The importance of Hofstede's cultural dimensions is highlighted by Kirkman et al. (2006) who document 180 empirical studies that rely on Hofstede's cultural framework and are published in leading journals between 1980 and 2002.

As proxies for national culture, we use all six cultural dimensions - individualism, uncertainty avoidance, masculinity, power distance, long-term orientation and indulgence from Hofstede's

⁵ The authors are willing to share the results upon request.

(1984, 2001 and 2010) studies.⁶ The scores from the six dimensions are from the Hofstede psychological survey of IBM employee values conducted between 1967 and 1973. Thereafter, the country mean scores from the survey are to form an index that range between 0 and 100.

Although some could argue that Hofstede's cultural data is outdated, Hofstede contends that these cultural measures retain their validity over a long period due to the two reasons. First, national cultures are extremely stable over time which is aligned to Williamson (2000) framework. Second, the dimensions scores for each country do not indicate an absolute position, instead it is a relative position with respect to other countries, which rarely shifts even if culture does change (Beugelsdijk, Maseland, and Hoorn, 2015; Hofstede, 2001). Consistent with Hofstede's argument, Tang and Koveos (2008) show that cultural dimensions such as uncertainty-avoidance and masculinity tend to be sticky and mirror stable institutional factors such as language, religion, climate and legal origin. As a robustness check, we use GLOBE and Tang and Koveos (2008) scores on national cultures as alternative proxies of culture.

3.4. Measures of other explanatory variables

3.4.1 Bank-level controls

We have considered six bank level variables in all our analysis: proximity, profitability, market-to-book value ratio, size, risk, and revenue diversification index. Following prior studies (Anderson et al., 2011; Chhaochharia et al., 2012; Uysal, Kedia, and Panchapagesan, 2008), proximity is measured as the (geodesic) distance between each bank and their local regulators based on hand-collected information. The latitude and longitude of banks and regulators are from the addresses compiled in Osiris database. We then use the Haversine formula (Robusto, 1957) to estimate the distance (*proximity*) between the two coordinates. With R as the radius of the earth ($\approx 6378\text{km}$) the distance is calculated as follows:

⁶ To address the concerns that Hofstede's cultural framework may be outdated, and following Triandis (1995) who suggests the importance in triangulating the findings with different cultural frameworks, we include two other commonly-used cultural frameworks (GLOBE and Tang and Koveos frameworks) in Section 5 of robustness tests.

$$Distance = 2R \times \arcsin(\sqrt{h}) \quad (1)$$

$$h = (\sin[dlat/2])^2 + \cos(lat1) \times \cos(lat2) \times (\sin[dlong/2])^2 \quad (2)$$

where $dlat=lat2-lat1$, $dlong=long2-long1$, and $lat1$ ($lat2$) and $long1$ ($long2$) are the latitude and longitude of the bank (local regulator). Following Anderson et al. (2011), proximity is measured as the natural logarithm of distance.⁷

Profitability is calculated as the ratio of pre-tax profit plus interest expenses and book value of assets. The market to book ratio is measured as the ratio of market value of assets and the book value of assets. Size is estimated as the natural logarithm of total assets. Risk is calculated as the annualised standard deviation of daily stock returns. Following, Stiroh and Rumble (2006), we calculate a revenue diversification index (RDI) to proxy for bank diversification.

3.4.2 Country-level controls

Following prior studies, all our regression analysis controls for four country-level variables: capital stringency index, deposit insurance coverage, and gross domestic product and inflation. We include the capital stringency index (Barth, Caprio, and Levine, 2013) to capture the strength of capital regulation of each country that might have an impact on bank capital structure (De Jonghe and Öztekin, 2015). The information for deposit insurance coverage relative to GDP per capita is obtained from Demirguc-Kunt, Kane and Laeven (2014). Finally, following prior literature (De Jonghe and Öztekin, 2015; Gropp and Heider, 2010), we also control for real GDP growth and inflation. The definitions of all variables are summarised in Table A.1 of Appendix.

⁷ To address concerns of a potential nonlinear relationship between proximity and on-site examinations, we also consider an alternative proximity measure as a dummy variable that equals 1 if the distance between individual bank and the local regulator is more than 100km, and 0 if otherwise. Such analysis remains consistent with the main analysis and is available upon request from the authors. Further, the use of 200km, 500km and 1000km as alternative measures of proximity, yields similar results (also available on request from the authors).

3.5. Empirical models and descriptive statistics

3.5.1 Empirical models

The following regression equation is to test the main hypotheses, H1-H6, given the literature discussion in Section 2:

$$Leverage_{i,c,t} = \begin{cases} \alpha_0 + \sum_{i=1}^{n=6} \gamma_i Culture_i + \sum_{i=1}^{n=6} \omega_i BankControls_{i,c,t-1} \\ + \sum_{i=1}^{n=4} \delta_i CountryControls_{c,t} + \mu_t + \varepsilon_{i,c,t} \end{cases} \quad (3)$$

where, subscripts i , c , and t refer to bank, country and time respectively, while μ capture year fixed effects, and ε is the error term. Culture consists of the following- IDV = Individualism; UAI = Uncertainty avoidance; MAS = Masculinity; PDI = Power distance; LTO = Long-term orientation; IND = Indulgence. Bank-level controls consist of proximity, profit, MTB, ln(size), risk and revenue diversification. To mitigate endogeneity problems ex-ante, we lag all the bank-level control variables by one year (Gropp and Heider, 2010). Finally, country-level controls consist of capital stringency, deposit, inflation and GDP.⁸

3.5.2 Estimation method

We use pooled ordinary least squares (OLS) with robust standard errors. The inclusion of robust standard errors is to control for heteroscedasticity which could arise from the cross-sectional and time-series nature of the data (Petersen, 2009).⁹ The biases in OLS estimates from endogeneity could arise from several sources including reverse causality, and omitted variables. Endogeneity is unlikely to be a major concern for our study for several practical reasons. First, the notion that bank leverage might change country culture traits is implausible. Cultural values as informal institutions regulate

⁸ Country fixed effects are not considered here because time invariant country-specific variables such as culture will be absorbed.

⁹ Even though, firm fixed effects (FE) could generally be an alternative method to eliminate the bias in OLS standard errors (Petersen, 2009), it is not suitable for this study because the time-invariant variables like culture proxies cannot be accommodated with FE regression as it would be wiped out in 'within transformation' or 'time-demeaning' process of the variables in FE.

human behaviours and are in presence long before the creation of financial markets, and hence reverse causality should not be a serious concern for this research. Second, we control for several other country-level factors. It is challenging to think of any omitted variables more exogenous than culture that can cause changes in both culture and bank leverage. Finally, prior literature (e.g., Guiso, Sapienza, and Zingales, 2008; Hofstede, 2001; Licht et al., 2005) in social science have emphasised the long-term persistence of culture even with substantial changes in economic conditions or political institutions.

Nevertheless, to alleviate endogeneity concerns about culture, we consider several alternative approaches to assess the robustness of our main results. First, we employ two-stage least squares (2SLS) instrumental variable approach to control for possible reverse causality. Second, we include additional country-level variables to reduce concerns related to omitted variable bias. Finally, we conduct GLS random effect (RE) estimation to control for the unobserved omitted variable problem (the residuals of a given firm could be correlated between years due to unobserved firm-specific time constant characteristics such as culture).

3.6. Descriptive statistics and correlation matrix

Panel A of Table 1 reports the descriptive statistics of variables. To mitigate the confounding effects of outliers, we winsorise the data at the 1st and 99th percentile for all bank-level continuous variables. The number of bank-level observations varies because of data availability. From the descriptive statistics, it can be seen that the dependent variable, leverage, has a mean of 88.5% which is comparable to the mean leverage of 93% in Gropp and Heider (2010). This high bank leverage is consistent with the theory that it is optimal for banks to hold high leverage to provide liquidity to the market (DeAngelo and Stulz, 2015). Distance has a mean of 550 km, the furthest bank has a geodesic distance of 9,366 km compared to 0.038 km for the closest bank in relation to their

respective regulator. The distances indicate that the data are skewed, hence, to approximate normality, we transform distance using the natural logarithmic transformation.

Panel B reports the pair-wise correlation matrix. A few brief comments on this matrix are worthy of mention. There is a significant correlation between the six cultural dimensions. For instance, IDV is highly negatively correlated with UAI (0.963). In addition, the six culture dimensions are also correlated with country-level institutional variables. For instance, IDV is positively correlated with CapStringency (0.423), Deposit (0.284) and Inf (0.673). The significant correlations between cultural values and measures of formal institutions are consistent with Williamson (2000) and Licht, Goldschmidt, and Schwartz (2005), who argue that a country's governance quality reflect its national culture background and the same correlation is evident in a recent empirical study by Li et al. (2013).

Following prior literature (e.g.; Chui and Kwok, 2008; Kanagaretnam et al., 2011 and Tajaddini and Gholipour, 2015; Zheng et al., 2012), we examine the effect of each cultural dimension so as to avoid multicollinearity. We also re-run our analysis including all six cultural dimensions, in which the mean variance inflation factors (VIF) exceeds the threshold of 10 (Gujarati, 2012) suggesting the possibility of biases in these estimates from multicollinearity.

[INSERT TABLE 1 ABOUT HERE]

4. Empirical results

Table 2 presents the pooled-OLS estimates of equation (3) in relation to testing hypotheses H1-H6. Columns 1 to 6 show results, where each of the six cultural dimensions is included separately, while column 7 displays the result of all six cultural dimensions together. We follow Chen et al. (2015) to scale up the coefficients on the six cultural dimensions and proximity by a factor of 100 for the purpose of readability. The regression is well-fitted with an adjusted-R² ranging between 22% and 28%.

[INSERT TABLE 2 ABOUT HERE]

With regard to cultural dimensions, the coefficients on all dimensions of culture are statistically significant at the 1% level or better in columns 1 to 6 except for uncertainty avoidance (UAI). These results show that culture is an important determinant of bank leverage and support prior studies that culture influences corporate decisions (e.g., Chen et al., 2015; Kanagaretnam et al., 2013; Li et al., 2013). In particular, the significant positive coefficient on IDV in column 1 suggests that high individualistic setting banks tend to be overconfident in their ability to meet the capital adequacy requirements and, hence, are more levered. Thus, this finding strongly supports hypothesis H1, and the effect of IDV is economically significant as well. A one-standard deviation increase in individualism (IDV) (i.e., using Table 1, an increase in IDV of 29.06 points), increases bank leverage approximately by 1% [$= (29.06 \times 0.0003) / 0.885$]. The significant result for IDV is consistent with Kanagaretnam et al. (2013), who find that banks that belong to countries which have higher level of individualism tend to take on more risk. However, the coefficient on UAI in column 2 is negative but not statistically significant. Thus, this finding does not support H2 that banks in countries with high uncertainty avoidance are less levered.

Contrast to our anticipation, the coefficient on masculinity (MAS) is significantly negative (in column 3) and, hence, do not support hypothesis H3. This OLS estimate on MAS could be due to endogeneity bias as our two-stage least squares (2SLS) estimates in Table 3 and also other robustness checks in Table 4 as discussed later show significant positive coefficient on MAS supporting hypothesis H3. Furthermore, the coefficient on power distance (PDI) is negative and statistically significant at the 1% level or better, suggesting that power distance decreases bank leverage. The economic significance of power distance is similarly important. Specifically, with one standard deviation increase in power distance (PDI) (i.e., using Table 1, an increase in PDI of 20.14 points), bank leverage increases by approximately 2% ($= 20.14 \times -0.07 / 0.885$). This finding supports H4 that

banks in countries with high power distance hold less leverage as countries score high in power distance are perceived to suffer less agency problems but high transactions costs.

The coefficient on long-term orientation (LTO) is negative and statistically significant at the 1% level or better (in column 5). The coefficient is also economically significant. For instance, for one standard deviation increase in LTO (i.e. using Table 1, an increase in LTO of 23.48 points), bank leverage decreases by about 1% ($=23.48 \times -0.05/0.885$). This supports hypothesis H5 and is consistent with the idea that societies characterised by high LTO tend to engage in less opportunistic behaviour (Doney et al. 1998). Finally, contrast to our expectation, the estimated coefficient on IND is significantly positive (see column 6). Thus, we do not find support to our last hypothesis H6. Similar to MAS, this OLS estimate on IND could be due to biases related to endogeneity because our 2SLS estimate on MAS in Table 3 is insignificant while OLS estimates for alternative specifications offer significant positive coefficient on MAS in Table 4. Therefore, we find some support to our hypothesis H6 with 2SLS and alternative specifications.

We also estimate a regression that included all six cultural dimensions along with other control variables (see column 7). The interpretation of estimates in column 7 largely remain the same for all six cultural dimensions except for MAS, which now turns insignificant. To examine whether multicollinearity unduly affects these results, we calculate the VIFs across models 1 to 7 listed in Table 2. According to (Gujarati, 2012), VIF values of more than 10 warns biases from multicollinearity problem. The VIF of 34.51 in column 7 thus shows that multicollinearity is a problem when all cultural dimensions are incorporated. Henceforth, we primarily focus on separately examining the effect of each cultural dimension in the regression analysis.

With regard to bank-level variables, the findings provide some important insights. The coefficient on proximity is positive and statistically significant at the 1% level or better across the columns suggesting that an increase in distance between bank's headquarters and their

corresponding regulators tends to increase bank leverage. Further, our results show that bank profitability, MTB, and risk decreases bank leverage, while size and revenue diversification increases bank leverage. These results are all statistically significant at the 1% level and are consistent with the work of Gropp and Heider (2010). Consistent with pecking order theory (Myers and Majluf, 1984), leverage decreases with profitability, suggesting that banks with greater funds are more likely to choose internal equity over debt. On the other hand, consistent with trade-off theory (Bradley, Jarrell, and Kim, 1984), banks with higher MTB and risk, face higher uncertainty and risk of financial distress, and are therefore less leveraged. Trade-off theory also holds that larger banks are more diversified, face lower risk of default, and hence have more leverage. This supports the ‘too big to fail’ perception that potentially motivates banks to involve in riskier business/activities because they are implicitly guaranteed by government (Galloway, Lee, and Roden, 1997). The estimated coefficient on revenue diversification is positive and significant at the 1% level, indicating that diversification benefits exist, although the result suggests that such benefits are offset by increased risk-taking in other areas, which is consistent with Stiroh and Rumble (2006) findings.

With regard to country-level attributes, the coefficient on deposit insurance is positive and statistically significant at the 10% level in three cases (see columns 1, 5 and 7). Thus, the results suggest that deposit insurance coverage encourages banks to borrow more. Inflation and GDP are positively associated with bank leverage across all columns, suggesting that, as the economy improves, leverage increases. These results agree with prior literature showing that the capital buffer is negatively associated with the business cycle (proxy using GDP growth rate) (Shim, 2013).

5. Robustness tests

5.1. Two-stage least squares instrumental variable (2SLS-IV) regression

Kwok and Tadesse (2006) propose the use of religion, geography and demography based on the Hofstede (2001) theory that these three factors are the key determinants of cultural differences. In

review of prior literature, there are only a few studies that attempt the IV approach. For instance, Li et al. (2013) use religion, demography and geography as instruments for IDV and UAI, whereas Fidrmuc and Jacob (2010) use them for IDV, UAI and PDI, and they find that their results hold in general. Following Li et al. (2013), we use the following instruments. Religion as the fraction of the population that is Protestant, Muslim or Catholic from La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1999), Demography as a measure of the degree of ethnic heterogeneity from Alesina, Devleeschauwer, Easterly, Kurlat, and Wacziarg (2003). The continent of a country is used as a proxy for geography.

According to Gippel, Smith, and Zhu (2015), there are three important specification tests relating to endogeneity: the Hausman-Wu test for endogeneity and two other tests to assess the appropriateness of the instrument. Accordingly, we test for relevance using the F-test for the joint significance of the instruments. A general rule of thumb is that instruments are not weak if the F-statistic is more than 10 (Staiger and Stock, 1994). As another point of check, we also test for the relevance of the instruments using the Cragg-Donald (C-D) Wald test. Instruments in IV regressions are not classified as weak if the C-D statistic exceeds the Stock-Yogo critical value (5% is the lowest significance level) (Stock and Yogo, 2005). We also use the Hansen J-statistic to test for over-identifying restrictions under the null that the error term is uncorrelated with the instruments (i.e., valid).

[INSERT TABLE 3 ABOUT HERE]

Table 3 reports the 2SLS analysis and shows that even after controlling for the endogeneity of the cultural dimensions, the estimated coefficient on IDV, UAI, MAS, PDI are all statistically significant and assumes our expected signs while coefficients on LTO and IND turns insignificant. The specification tests suggest that the instruments used are both relevant and valid. The insignificance on LTO (0.03) and IND (0.037) could be due to insufficient independence between

the instruments and the error term (e.g., valid) as indicated by the Hansen J-statistic. Finally, we perform Hausman-Wu χ^2 tests for endogeneity. The tests produce insignificant χ^2 -statistics across the columns in both panels, suggesting that there are no endogeneity issues with the culture measure. Taken all these results together, we have additional support to our earlier findings and confirm that culture has a significant effect on bank leverage.

5.2. Additional country level controls and random effects

La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1996) argue that a country's legal system can affect the financial system depending on the content and enforceability of the country's law. Moreover, according to Beck, De Jonghe, and Schepens (2013), the level of a country's institutional expertise will affect the stability and effectiveness of its banking system. Since our sample includes countries of different legal and institutional types, we control for the quality of the specific country's legal environment using the Worldwide Governance Indicator (WGI) introduced by Kaufmann, Kraay, and Mastruzzi (2011). The WGI consists of six categories: voice, accountability of political system, rule of law, government efficiency, regulatory quality, and control of corruption. We use the sum of ranking (0-100) instead of the sum of estimates to avoid any negative values. The higher the index score, the stronger will be the governance quality.

Djankov, McLiesh, and Shleifer (2007) illustrate that the legal structure in the resolution of default varies across countries. In countries with weak enforceability, creditors are challenged in accessing the collateral of distressed firms. On the other hand, countries with better protections for creditors should experience a positive impact on banks' leverage, as creditors are more willing to lend to a wider set of borrowers. Therefore, we control for this by using the creditor rights index from Djankov et al. (2007). The higher the index score, the higher will be the level of creditor protection and hence greater bank leverage.

We present the regression results with the inclusion of the additional control variables in Panel A of Table 4. In general, the results confirm the influence of culture on bank leverage and they are largely similar to those in Table 2 with two exceptions. Consistent with our respective expectations as discussed in Section 2, the coefficient on UAI is significantly negative while the coefficient on MAS is significantly positive. The significant positive coefficient on creditor rights index across all the columns except for column 4 is in line with prior studies (Houston, Lin, Lin, and Ma, 2010) suggesting that banks in countries with greater creditor protection appear to lend more and thus carry more leverage. However, we find no appreciable result for governance quality. Overall, the results here reinforce that, in addition to formal institutions, national culture plays an important role in explaining cross-country variations in bank capital structure.

[INSERT TABLE 4 ABOUT HERE]

Fixed firm effects (FE) or the random effects (RE) model with GLS are alternative methods to mitigate omitted variable bias. In addition, adopting either FE or RE also eliminate the bias in OLS standard errors (Petersen, 2009). In line with the reasoning above, GLS RE is used to re-estimate and test the robustness of the main analysis. Regarding the re-estimated base model reported in Panel B of Table 4, the estimated coefficients on culture are qualitatively robust. Specifically, with the exception of MAS, the estimated coefficients on the alternative cultural dimensions remain significant and assume the predicted signs.

5.3. Alternate dependent variable: Tier 1 capital ratio

An alternative way to evaluate the effects of the determinants on bank capital structure is to examine banks' tier 1 capital ratio. It is defined as tier 1 capital divided by risk weighted assets (BCBS, 1992), an important measure of capital adequacy in the Basel framework. We compute tier 1 capital ratio as tier 1 capital divided by risk-adjusted assets and off-balance sheet exposures. Tier 1 capital includes

shareholder funds and perpetual, non-cumulative preference shares. Thus, it captures the higher quality capital of the bank.

Panel A of Table 5 presents pooled-OLS estimates of the base regression equation 3 with bank tier 1 capital ratio as the dependent variable. The results remain broadly consistent with the main analysis displayed in Table 2. Except for MAS and IND, the coefficients on all cultural dimensions reflect their predicted sign and are statistically significant, suggesting that the effect of culture on banks regulatory capital remain the same.

[INSERT TABLE 5 ABOUT HERE]

5.4. Alternate proxies of national culture: *GLOBE* and *Tang and Koveos (2008)*

Although Hofstede's national culture dimensions are widely applied in the literature, it is disputed that the cultural data are outdated and that the indices fail to capture the change of culture over time (Kirkman et al., 2006). Based on this argument, changes in cultural values that occur over the past two decades can possibly confound our findings. Moreover, Triandis (1995) stresses the importance in triangulating the findings with different cultural frameworks when studying cultural differences. Accordingly, we redo our analysis of bank leverage by using the *GLOBE* and *Tang and Koveos (2008)* scores on national cultures as alternative proxies of culture.

The *GLOBE* project is based on surveys that are conducted in the mid-1990s, thereby more recent than Hofstede's original framework, which used surveys conducted between 1967 and 1973. Moreover, the *GLOBE* project identifies nine cultural dimensions: institutional collectivism, uncertainty-avoidance, power distance, assertiveness, in-group collectivism, gender egalitarianism, future orientation, humane orientation, and performance orientation. The first five dimensions are inspired to reflect the same constructs as Hofstede's dimensions (Hofstede, 2006; House, Javidan, Hanges, and Dorfman, 2002; House et al., 2004).

Following Chen et al. (2015), we create a GLOBE IDV dimension by taking minus one times the GLOBE's institutional collectivism dimension to facilitate easier comparison with Hofstede's IDV dimension. Panel B of Table 5 presents the estimation results of the base model, which are consistent with the main findings reported in Table 2. Using GLOBE cultural dimensions, the estimated coefficients on four out of five (uncertainty-avoidance is not statistically significant) dimensions that correspond to Hofstede's cultural framework are statistically significant and are consistent with the findings in the main analysis.

As a further alternative, we use the cultural framework that is derived from Tang and Koveos (2008) who argue that culture is correlated with economic development based on classic Marxism. This argument specifies that economic factors (e.g., production) dictate all human activities and thus form the foundation of human societies. Therefore, a framework to update Hofstede's indices based on the changing economic environments is constructed. Panel C of Table 5 reports the results of the pooled-OLS estimations of the base-model equation using culture scores provided by Tang and Koveos (2008). Overall, the interpretation of the statistically significant coefficients in this alternative analysis is qualitatively consistent with those in Table 2. The findings using GLOBE and Tang and Koveos (2008) indicate that, irrespective of the measure of culture, national culture is an important determinant of bank leverage.¹⁰

6. Results for intermediating effect of bank size

Large banks are heavily regulated and attract huge public and media attentions which could mitigate the effects of our cultural dimensions on bank leverage. In this regard, for nonfinancial firms, Li et al. (2013) argue that larger firms have greater corporate governance and rely more on their highly

¹⁰ To alleviate concerns that the results could be unduly influenced by US banks, which form the majority of the sample, we re-estimate on the subsample that excludes US banks. According to the untabulated results, the estimated coefficients on cultural variables generally remain consistent with the main analysis, except for LTO and IND which become statistically insignificant. Detailed results are available from the authors upon request.

controlled management regime, thus mitigating the effect of culture on corporate risk-taking. Similarly, larger banks are more likely to manage their earnings and tend to exercise more managerial discretion (Kanagaretnam, Lim, and Lobo, 2011). Hence, we have evaluated whether bank size influence the nature of relation between culture and bank leverage and the results are reported in Table 6.

Specifically, we add a Largebank dummy (taking a value of one for banks whose size is more than the median bank size of that particular year, and zero otherwise) and interact it with each of the six culture dimension proxies in equation (3). In this specification, the benchmark effect is the omitted case, small banks. We find that the estimated coefficients on interaction terms involving UAI is significantly negatively, whereas interaction terms involving MAS, PDI, LTO and IND are all negative and statistically significant. It is noteworthy that all the interaction coefficients assume opposite signs compared to their respective individual dimensions. This provides strong evidence that bank size intensifies the effect of culture on bank leverage. For example, for large banks, the net effect of UAI on bank leverage is -0.05 ($=0.10-0.15$) as per hypothesis H2. It is also important to note the economic significance of the intermediating effect of size. For example, larger banks reduce the effect of PDI on leverage by 2.05% ($=20.14 \times 0.09/0.885$). In sum, these results are consistent with large banks having a corporate culture that outweighs national cultural norms.

[INSERT TABLE 6 ABOUT HERE]

7. Conclusion

This study investigates whether and how dimensions of national culture affect bank leverage. Using a sample of 791 domestically-listed banks in Australia, Canada, France, Germany, Italy, UK and the US over 2000-2013 period, consistent with expectations, we document that culture explains the variation in bank leverage. Specifically, we find that banks in countries with high individualism, masculinity, and indulgence take on more leverage. In contrast, banks in countries with high

uncertainty-avoidance, power distance and long-term orientation are less leveraged. These findings are robust after controlling for endogeneity and the use of various alternative measures of cultural framework and specifications of the dependent variable. Further, our analysis supports the notion that large banks have stronger corporate culture that override the influence of culture. Specifically, we find that the interaction of bank size and culture reduces the impact of culture on leverage.

Our findings imply that national culture is an important determinant of bank leverage. Although, the Basel regulatory framework has always been a 'one-size-fits-all' approach, our analysis suggests that this is not be the best form of regulation as the influence of culture on leverage differs for banks in different countries. Therefore, this calls for the regulators to re-examine the regulatory requirements based on national culture differences, to devise a more nuanced regulatory response.

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Appendix A
Table A.1: Definition of variables

The table presents the definition of variables used in the analysis. Panel A presents the alternative dependent variables. Panel B presents the independent variables, consisting of test variable, bank-level variables and macroeconomic variables.

Variables	Definition	Key References
Panel A: Dependent Variables		
Leverage ratio	One minus the ratio of equity over assets	Gropp and Heider (2010)
Tier 1 capital ratio	It is calculated as tier 1 capital divided by risk-adjusted assets and off-balance sheet exposures. Tier 1 capital includes shareholder funds and perpetual, non-cumulative preference shares. Thus, it captures the higher quality capital of the bank.	
Panel B: Independent Variables		
<i>National culture test variables</i>		
Individualism	Individualism is defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. The country mean scores from the survey questions are used to form an index that range between 0 and 100. Higher scores represent a higher level in that specific dimension. The method in calculating the culture scores are similar across all Hofstede's cultural dimensions.	Hofstede (1984)
Uncertainty-avoidance	The Uncertainty-avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity.	Hofstede (1984)
Masculinity	The Masculinity side of this dimension represents a preference in society for achievement, heroism, assertiveness and material rewards for success.	Hofstede (1984)
Power distance	This dimension expresses the degree to which the less powerful members of a society accept and expect that power is distributed unequally.	Hofstede (1984)
Long-term orientation	High long-term orientation, take a more pragmatic approach where they encourage thrift and efforts in modern education as a way to prepare for the future.	Hofstede (2001)
Indulgence	Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun.	Hofstede (2010)
<i>Bank-level variables</i>		
Proximity	Natural logarithm of the geodesic distance from bank to the local bank regulator	Uysal et al. (2008)
Profitability	Sum of the pre-tax profit and interest expense over book value of assets	Gropp and Heider (2010)
Size	Natural logarithm of book value of assets	Gropp and Heider (2010)
Market-to-book ratio	The ratio of market value of assets to book value of assets	Gropp and Heider (2010)
Risk	Natural logarithm of the annualised standard deviation of daily stock returns multiply by the ratio of market value of equity to market value of bank	Gropp and Heider (2010)

Revenue diversification index	$RDI_{i,c,t} = 1 - (SH^2_{NET_{c,i,t}} + SH^2_{NON_{c,i,t}})$ <p>SH_{NET} = the share of net operating revenue from net-interest sources, or $[NET / (NET + NON)]$ and SH_{NON} = the share of net operating revenue from non-interest sources, or $NON / (NET + NON)$ NET refers to the net interest income and NON refers to the non-interest income. RDI ranges in value between zero and 0.5. A higher RDI indicates a more diversified mix. In other words, a value of zero means that all revenue comes from a single source, while a value of 0.5 represents an even split between net interest income and non-interest income.</p>	Stiroh and Rumble (2006)
<i>Country-level variables</i>		
Capital Stringency	Adding one for each 10 questions designed to measures the extent of regulatory requirements regarding the amount of capital banks must hold. Source: Barth et al. (2013)	De Jonghe and Öztekin (2015)
Deposit Insurance Coverage	The deposit insurance coverage relative to GDP per capita	De Jonghe and Öztekin (2015)
GDP	Real GDP growth	De Jonghe and Öztekin (2015); Li et al. (2013)
Inflation	Consumer price index	De Jonghe and Öztekin (2015)
<i>Instrumental variables</i>		
Religion	The percentage of the population that is Protestant, Catholic and Muslim in 1980. Source: La Porta et al. (1999)	Li et al. (2013)
Ethical fractionalization	The possibility that two randomly selected individuals from a population belong to different ethnic groups Source: Alesina et al. (2003)	Li et al. (2013)
Continent	Continent of the country	Li et al (2013)
<i>Additional control variables for institutional quality</i>		
Governance	The sum of ranking of voice, accountability of political system, rule of law, government efficiency, regulatory quality, and control of corruption. Source: Kaufmann et al. (2011)	Beck et al. (2013)
Creditor rights	An index that aggregate creditor rights that ranges between 0 and 4. Source: Djankov et al. (2007)	Houston et al. (2010)

Table A.2 Sample composition

This table presents the types of our 1,701 banks by each country in panel A along with mean values of our main variables including the cultural attributes in panel B.

Panel A: Types of banks by each country

	Bank Holding	Commercial	Cooperatives	Savings	Total number of banks	Total number of bank-year observations
Argentina	1	7	0	1	9	105
Australia	2	7	0	0	9	104
Austria	1	6	3	0	10	138
Bangladesh	0	23	0	0	23	321
Belgium	5	1	0	0	6	71
Brazil	2	29	0	0	31	346
Bulgaria	0	4	1	0	5	63
Canada	5	9	0	0	14	184
Chile	2	10	0	0	12	114
China	0	17	0	0	17	225
Colombia	1	13	0	0	14	167
Croatia	0	20	0	0	20	238
Czech Republic	0	3	0	0	3	34
Denmark	1	46	0	5	52	604
Ecuador	0	6	0	0	6	83
Egypt	1	12	0	0	13	149
Estonia	0	2	0	0	2	22
Finland	1	3	0	0	4	46
France	1	7	12	2	22	278
Germany	3	10	1	0	14	148
Ghana	0	4	0	0	4	55
Greece	1	11	0	1	13	156
Hong Kong	7	7	0	0	14	156
Hungary	0	3	0	0	3	24
Iceland	0	4	1	0	5	34
India	0	47	0	0	47	587
Indonesia	1	34	0	0	35	420
Iraq	0	9	0	0	9	50
Ireland	0	4	0	0	4	42
Israel	1	10	0	0	11	127
Italy	4	10	7	0	21	242
Japan	17	78	0	0	95	1198
Jordan	10	0	0	0	10	130
Kenya	1	7	1	0	9	122
Kuwait	0	5	0	0	5	59
Latvia	0	2	0	0	2	25
Lebanon	0	6	0	0	6	82
Lithuania	0	5	0	0	5	65
Luxembourg	3	3	0	0	6	73
Malawi	0	1	0	0	1	14
Malaysia	17	4	0	0	21	218
Malta	0	3	0	0	3	42
Mexico	13	1	0	0	14	145
Morocco	0	6	0	0	6	74
Namibia	0	1	0	0	1	14
Netherlands	5	4	0	0	9	112
Nigeria	3	16	0	0	19	199
Norway	2	4	0	23	29	341
Pakistan	0	21	0	0	21	249
Panama	1	1	0	0	2	7
Peru	0	8	0	0	8	98
Philippines	1	16	0	2	19	201
Poland	1	18	1	1	21	234
Portugal	3	4	0	0	7	83
Republic of Korea	4	13	0	6	23	248
Romania	0	3	0	1	4	48
Russian Federation	0	28	0	1	29	324
Saudi Arabia	0	7	0	0	7	98
Serbia	0	10	0	0	10	111
Singapore	5	4	0	0	9	109
Slovakia	0	4	0	0	4	50
Slovenia	0	6	0	0	6	72
South Africa	21	2	0	0	23	187
Spain	0	15	0	2	17	172
Sri Lanka	0	10	0	0	10	125
Sweden	2	3	0	1	6	73
Switzerland	13	7	0	1	21	237
Syrian Arab Republic	0	10	0	0	10	66
Taiwan	16	26	0	0	42	460

Thailand	1	16	0	0	17	197
Turkey	3	13	0	0	16	200
Ukraine	0	14	0	0	14	175
United Arab Emirates	0	14	0	0	14	186
UK	9	0	0	0	9	119
United Republic Of Tanzania	0	2	0	0	2	24
US	607	0	0	0	607	6262
Venezuela	1	17	0	0	18	197
Vietnam	0	9	0	0	9	107
Zambia	1	2	0	0	3	31
Total	800	827	27	47	1701	18996

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Panel B: Mean values of our main variables including the cultural attributes by each country.

	Leverage	IDV	UAI	MA S	PDI	LT O	IN D	Proxi mity	Profit	MTB	Size (US\$ in mln)	Risk	RDI	CapStri ngency	Deposit	Inf	GDP
Argentina	0.865	46	86	56	49	20	62	46.48	0.0489	1.913	6305	-5.205	0.399	6.248	2.380	9.033	2.123
Australia	0.937	90	51	61	36	21	71	414.3	0.0479	115.7	226346	-6.423	0.427	7.029	2.433	2.882	3.055
Austria	0.934	55	70	79	11	60	63	146.8	0.0313	0.966	65956	-8.201	0.231	6.174	1.252	2.100	1.167
Bangladesh	0.924	20	60	55	80	47	20	83.70	0.0132	11.15	858.9	-3.882	0.136	4.720	1.950	6.487	4.230
Belgium	0.678	75	94	54	65	82	57	4.996	0.0299	1.060	208013	-5.995	0.0656	5.915	1.225	2.177	0.979
Brazil	0.860	38	76	49	69	44	59	970.8	0.0912	1.475	40414	-5.857	0.252	5.379	2.598	6.813	2.327
Bulgaria	0.868	30	85	40	70	69	16	1.265	0.0397	1.127	1186	-5.658	0.224	7.714	6.133	5.674	4.949
Canada	0.869	80	48	52	39	36	68	867.6	0.0455	182.9	170641	-6.459	0.332	4.457	1.904	1.987	2.078
Chile	0.866	23	86	28	63	31	68	0.466	0.0499	6.929	5319000	-6.149	0.117	5.825	0	3.063	2.987
China	0.950	20	30	66	80	87	24	628.7	0.0150	1.649	356391	-5.105	0.149	4.524	0	2.327	8.830
Colombia	0.885	13	80	64	67	13	83	3.598	0.0640	1.012	15600000	-6.347	0.208	5.156	2.432	5.356	3.019
Croatia	0.873	33	80	40	73	58	33	90.32	0.0221	5.609	2309	-4.662	0.284	5.500	2.509	2.888	2.283
Czech	0.922	58	74	57	57	70	29	2.080	0.0104	4.314	25987	-4.275	0.413	4.529	0.126	2.570	2.777
Denmark	0.880	74	23	16	18	35	70	298.4	0.0171	1.581	13194	-5.149	0.141	5.374	0.892	2.117	0.586
Ecuador	0.841	8	67	63	78	.	.	186.4	0.0271	27.97	1436	-6.761	0.114	9	3.533	8.072	2.624
Egypt	0.877	25	80	45	70	7	4	16.80	0.0415	1.841	2935	-5.002	0.180	6.074	0	7.847	2.276
Estonia	0.900	60	60	30	40	82	16	0.768	0.0329	1.045	11281	-6.215	0.266	5.409	13.15	4.120	6.302
Finland	0.914	63	59	26	33	38	57	85.41	0.0348	0.987	23487	-7.047	0.253	4.891	1.398	1.916	1.261
France	0.868	71	86	43	68	63	48	683.8	0.0431	93.23	274110	-6.072	0.420	6.716	2.722	1.702	1.287
Germany	0.897	67	65	66	35	83	40	195.2	0.0288	137.2	289687	-6.161	0.342	6.932	1.457	1.623	1.190
Ghana	0.873	15	65	40	80	4	72	2.465	0.0632	1.259	586.4	-5.307	0.209	7.145	0	15.44	3.880
Greece	0.897	35	100	57	60	45	50	24.08	0.0149	1.028	31856	-6.241	0.138	5.244	2.128	3.015	0.496
Hong Kong	0.859	25	29	57	68	61	17	0.705	0.00793	2.312	35010	-4.654	0.215	5.513	1.494	1.510	3.495
Hungary	0.895	80	82	88	46	58	31	0.307	0.0620	1.068	2.755000	-5.848	0.285	6.750	1.374	6.030	3.124
Iceland	0.933	60	50	10	30	28	67	1.101	0.00554	10.04	11714	-4.464	0.327	6	0.633	5.234	2.453
India	0.937	48	40	56	77	51	26	598.1	0.0195	5.787	17594	-3.957	0.313	7.252	2.823	6.773	5.272
Indonesia	0.886	14	48	46	78	62	38	71.21	0.0565	40.52	27500000	-5.503	0.101	7.048	62.12	7.516	4.001
Iraq	0.711	30	85	70	95	25	17	4.674	0.0112	243.5	45515	-4.463	0.202	8	0	9.713	3.568
Ireland	0.948	70	35	68	28	24	65	1.531	0.00944	1.016	131571	-6.774	0.111	4.938	1.048	2.952	2.016
Israel	0.936	54	81	47	13	38	.	50.64	0.0315	1.121	30034	-5.962	0.340	6.449	0	2.096	1.818
Italy	0.884	76	75	70	50	61	30	397.5	0.0508	142.0	118922	-6.221	0.380	4.874	3.942	2.197	0.0687
Japan	0.946	46	92	95	54	88	42	358.0	9.35e-05	0.923	82441	-6.278	0.176	5.125	2.590	-	0.919
Jordan	0.874	30	65	45	70	16	43	57.59	0.0430	1.009	4868	-6.211	0.375	7.769	5.963	4.255	2.104
Kenya	0.863	25	50	60	70	.	.	444.0	0.00383	20.10	1134	-3.863	0.197	6.516	2.004	10.24	1.702
Kuwait	0.880	25	80	40	90	.	.	0.918	0.0413	0.964	15556	-6.520	0.256	7.559	0	3.331	0.994
Latvia	0.914	70	63	9	44	89	13	2.401	0.0246	0.979	1465	-7.150	0.387	6.280	2.797	4.858	5.545
Lebanon	0.927	40	50	65	75	14	25	2.240	0.0530	0.928	11800000	-9.430	0.160	7.878	0.517	3.574	0.994
Lithuania	0.898	60	65	19	42	82	16	57.46	0.0275	1.186	2811	-6.141	0.272	4.231	8.285	2.869	6.096
Luxembourg	0.781	60	70	50	40	64	56	2.191	0.0515	1.046	38955	-6.393	0.307	7	0.617	2.400	1.219
Malawi	0.837	30	50	40	70	.	.	493.3	0.00169	57.63	328.7	-4.108	0.210	6.571	0	14.35	1.515
Malaysia	0.582	26	36	50	100	41	57	2.291	0.0205	10.61	11690	-4.693	0.0809	4.078	5.859	2.203	3.226
Malta	0.922	59	96	47	56	47	66	0.522	0.0357	1.036	4496	-6.611	0.217	6.571	2.569	2.356	1.257
Mexico	0.851	30	82	69	81	24	97	45.56	0.0469	2.741	24787	-4.948	0.122	5.597	88.67	4.661	0.898
Morocco	0.914	46	68	53	70	14	25	294.9	0.0151	2.376	11271	-4.767	0.323	5.757	2.939	1.713	3.406
Namibia	0.315	30	45	40	65	35	.	1.515	0.185	12.07	218.0	-4.871	0.0180	4.857	0	5.983	2.986
Netherlands	0.832	80	53	14	38	67	68	34.47	0.0425	1.222	116236	-6.585	0.0972	6.643	1.173	2.080	0.842
Nigeria	0.868	30	55	60	80	13	84	510.4	0.0439	1.004	627714	-5.893	0.170	6.332	0.812	11.98	3.732
Norway	0.897	69	50	8	31	35	55	257.7	0.0367	1.421	4159	-6.090	0.172	7.540	4.493	1.938	0.779
Pakistan	0.910	14	70	50	55	50	.	833.7	0.0108	8.774	3161	-3.852	0.127	8.209	0	8.852	2.034
Panama	0.894	11	86	44	95	.	.	4.913	0.0536	0.892	4999	-8.825	0.330	4.571	0	1.460	4.443
Peru	0.894	16	87	42	64	25	46	6.140	0.0460	1.335	5142	-5.944	0.302	4.357	7.117	2.667	4.170
Philippines	0.830	32	44	64	94	27	42	3.773	0.0280	4.269	109597	-5.236	0.287	6.284	2.459	4.366	3.070
Poland	0.892	60	93	64	68	38	29	84.34	0.0508	1.484	11978	-4.864	0.377	5.175	1.350	3.343	3.771
Portugal	0.848	27	99	31	63	28	33	498.4	0.0396	1.380	25012	-6.947	0.259	7.036	2.800	2.475	0.219
Rep of Korea	0.832	18	85	39	60	100	29	83.03	0.0451	0.966	27800000	-6.251	0.160	5.363	2.468	2.962	3.771

Romania	0.882	30	90	42	90	52	20	137.2	0.0441	1.319	5047	-4.897	0.338	.	0	.	.
Russian	0.853	39	85	36	93	81	20	925.8	0.0260	5.938	139889	-4.186	0.318	7.346	2.294	11.03	4.643
Saudi Arabia	0.878	25	80	60	95	36	52	50.75	0.0171	2.130	23855	-4.679	0.391	4.643	0	2.748	2.549
Serbia	0.691	25	92	43	86	52	28	55.84	0.00389	14.75	569.1	-3.804	0.241	.	0	.	.
Singapore	0.576	20	8	48	74	72	46	3.282	0.0341	1.788	24446	-4.978	0.120	7.404	0.212	2.067	3.285
Slovakia	0.926	52	51	100	100	77	28	47.94	0.0322	0.953	6598	-7.464	0.309	5.400	3.952	4.170	4.006
Slovenia	0.910	27	88	19	71	49	48	58.71	-0.00429	7.313	3031	-6.770	0.344	7.167	2.405	4.199	1.903
South Africa	0.695	65	49	63	49	34	63	129.0	0.0271	7.088	32801	-4.444	0.164	7.080	0	5.898	1.710
Spain	0.926	51	86	42	57	48	44	273.0	0.0112	1.034	184094	-6.623	0.218	8.855	1.713	2.888	0.888
Sri Lanka	0.902	35	45	10	80	45	.	1.899	0.0664	5.722	102279	-6.017	0.105	6.179	0.0646	9.649	4.849
Sweden	0.950	71	29	5	31	53	78	20.05	0.0191	1.577	240339	-5.073	0.354	3.521	0.645	1.425	1.564
Switzerland	0.754	68	58	70	34	74	66	167.9	0.0249	1.212	148497	-5.856	0.197	6.954	0.688	0.675	1.054
Syria	0.819	35	60	52	80	30	.	2.082	0.00224	10.26	750.3	-4.813	0.279	4.591	0	9.145	2.629
Taiwan	0.909	17	69	45	58	93	49	28.90	0.0144	1.270	803411	-6.337	0.215	.	0	.	.
Thailand	0.898	20	64	34	64	32	45	7.630	0.0311	0.994	606162	-6.102	0.329	5.822	6.986	2.569	3.756
Turkey	0.863	37	85	45	66	46	49	277.1	0.0863	1.015	36126	-5.702	0.192	5.598	6.207	13.38	2.907
Ukraine	0.869	25	95	27	92	55	18	86.83	0.0211	3.112	1465	-4.049	0.227	5.006	1.961	10.34	4.844
UAE	0.831	25	80	50	90	.	.	111.0	0.0235	2.096	13628	-4.561	0.283	4.914	0	.	-2.274
UK	0.900	89	35	66	35	51	69	158.6	0.0357	158.9	762572	-6.206	0.361	6.218	2.378	2.268	1.730
Tanzania	0.907	25	50	40	70	34	38	0.855	0.000426	192.5	1076	-4.447	0.374	4.500	0.776	8.340	3.438
US	0.904	91	46	62	40	26	68	1132	0.0301	123.7	26725	-6.047	0.320	6.644	3.560	2.412	1.929
Venezuela	0.884	12	76	73	81	16	100	58.16	0.0709	1.150	6039	-5.982	0.348	4.127	1.287	20.84	1.971
Vietnam	0.910	20	30	40	70	57	35	542.6	0.0691	36.25	38700000	-6.013	0.0862	7	2.562	8.234	5.235
Zambia	0.894	35	50	40	60	30	42	274.8	0.0404	1.757	1431	-4.316	0.247	6	0	14.09	4.156
Total	0.885	57.77	59.3	55.2	55.0	44.0	53.8	550.1	0.0299	53.47	1494000	-5.747	0.257	6.218	4.566	3.880	2.302

Table 1: Summary statistics

Panel A of this table presents sample descriptive statistics for bank leverage, test variables and bank-level and country-level determinants of bank leverage. Leverage refers to bank's book leverage. IDV is Hofstede's individualism. UAI is Hofstede's uncertainty avoidance. MAS is Hofstede's masculinity. PDI is Hofstede's power distance. LTO is Hofstede's long-term orientation. IND is Hofstede's indulgence. Distance is measured by the geodesic distance between each bank and their local bank regulator in kilometres (km). Profit is profitability; MTB is market to book ratio; Size is measure by the book value of total assets in USD millions. Risk is measured by the natural logarithm of the annualised standard deviation of daily stock returns multiply by the ratio of market value of equity to market value of bank. The Revenue Diversification Index (RDI) is measured by 1 minus the sum of the share of net operating revenue from net interest sources and the share of net operating revenue from non-interest sources; CapitalStringency is an index that indicates the strength of capital regulation. Deposit is the deposit insurance coverage relative to GDP per capita. GDP growth is real GDP growth rate. Inflation rate is consumer price index. All bank-level variables are winsorised at the 1st and 99th percentile. Panel B shows the pairwise correlation matrix with coefficients significant at 1% level or better are bolded.

Panel A: Descriptive statistics						
Variables	Observations	Mean	Median	SD	Min	Max
Leverage	18,996	0.885	0.912	0.121	0.141	0.987
<i>National culture test variables</i>						
IDV	18,996	57.77	60	29.06	8	91
UAI	18,996	59.28	49	20.40	8	100
MAS	18,996	55.16	62	18.36	5	100
PDI	18,996	54.91	54	20.14	11	100
LTO	18,525	43.91	35	23.48	4	100
IND	17,944	53.78	63	19.21	4	100
<i>Bank-level variables</i>						
Proximity (Km)	18,872	550.1	253.4	934.3	0.0380	9366
Profit	16,097	0.0299	0.0276	0.0410	-2.826	1.833
MTB	16,023	53.47	1.958	92.87	0.0233	546.7
Size (US\$ in mils)	18,996	1.494e+06	3466	8.275e+06	44.95	6.780e+07
Risk	14,798	-5.747	-5.943	1.228	-9.531	-2.023
RDI	17,675	0.257	0.298	0.178	-0.203	0.500
<i>Country-level variable</i>						
CapStringency	18,377	6.218	6	1.700	2	10
Deposit	18,996	4.566	2.385	13.66	0	105.9
Inf	18,117	3.880	2.826	4.281	-1.311	25.87
GDP	18,328	2.302	2.317	2.833	-7.082	10.10

Panel B: Correlation matrix

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Leverage	1.000														
2	IDV	0.106	1.000													
3	UAI	0.025	-0.456	1.000												
4	MAS	0.103	0.173	0.172	1.000											
5	PDI	-0.152	-0.757	0.368	-0.025	1.000										
6	LTO	-0.004	-0.444	0.412	0.102	0.244	1.000									
7	IND	-0.006	0.548	-0.362	0.096	-0.565	-0.566	1.000								
8	Proximity	0.162	0.750	-0.285	0.398	-0.526	-0.313	0.438	1.000							
9	Profit	-0.098	-0.019	-0.001	-0.119	0.049	-0.144	0.109	-0.048	1.000						
10	Size	0.204	-0.358	0.310	0.263	0.147	0.503	-0.197	-0.203	-0.037	1.000					
11	Risk	-0.256	-0.218	-0.102	-0.144	0.286	0.000	-0.230	-0.201	-0.129	-0.239	1.000				
12	RDI	0.194	0.261	-0.021	0.083	-0.099	-0.176	0.086	0.205	-0.008	-0.063	-0.089	1.000			
13	CapStringency	0.006	0.156	-0.131	-0.069	-0.103	-0.134	0.051	0.117	-0.040	-0.098	-0.055	0.066	1.000		
14	Deposit	-0.013	-0.149	-0.013	-0.002	0.154	0.005	0.042	-0.085	0.083	0.168	0.027	-0.102	0.119	1.000	
15	Inf	-0.047	-0.413	0.108	-0.183	0.443	-0.122	-0.073	-0.309	0.193	-0.103	0.240	-0.079	0.041	0.075	1.000
16	GDP	-0.001	-0.205	-0.083	-0.077	0.267	0.088	-0.265	-0.164	0.045	0.005	0.138	-0.010	-0.047	0.029	0.194

Table 2: Culture and bank leverage

This table presents the pooled-OLS estimates of the regression equation (3) below with bank leverage ratio as the dependent variable.

$$Leverage_{i,c,t} = \alpha_0 + \sum_{i=1}^{n=6} \gamma_i Culture_i + \sum_{i=1}^{n=6} \omega_i BankControls_{i,c,t-1} + \sum_{i=1}^{n=4} \delta_i CountryControls_{c,t} + \mu_t + \varepsilon_{i,c,t}$$

The definitions of variables are shown in Table A.1 of Appendix. t-statistics are reported in parentheses. The coefficients of IDV, UAI, MAS, PDI, LTO, IND and Proximity are multiplied by 100 for readability. Superscripts *, **, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Coeff.	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
γ_1	IDV (H1: +)	0.03***(3.54)						0.03**(2.19)
γ_2	UAI (H2: -)		-0.01(-0.943)					0.01(1.27)
γ_3	MAS (H3: +)			-0.05***(-7.38)				-0.01(-1.11)
γ_4	PDI (H4: -)				-0.07***(-8.41)			-0.13***(-7.78)
γ_5	LTO (H5: -)					-0.05***(-7.36)		-0.12***(-13.04)
γ_6	IND (H6+)						-0.06***(-8.72)	-0.19***(-15.06)
ω_1	Proximity	0.75***(12.28)	0.88***(17.61)	1.05***(20.30)	0.75***(15.63)	0.83***(16.94)	1.02***(18.87)	0.80***(13.82)
ω_2	Profit	-0.78***(-5.56)	-0.77***(-5.60)	-0.82***(-5.66)	-0.77***(-5.59)	-0.82***(-5.63)	-0.74***(-5.16)	-0.76***(-5.14)
ω_3	MTB (x10 ⁻²)	-0.01***(-6.56)	-0.01***(-6.70)	-0.01***(-6.76)	-0.01***(-6.69)	-0.01***(-6.54)	-0.01***(-6.69)	-0.01***(-6.26)
ω_4	Size	0.01***(14.70)	0.01***(15.20)	0.01***(15.21)	0.01***(14.95)	0.01***(17.65)	0.004***(12.47)	0.01***(18.57)
ω_5	Risk	-0.02***(-17.34)	-0.02***(-17.81)	-0.02***(-17.61)	-0.02***(-16.08)	-0.02***(-17.76)	-0.03***(-19.35)	-0.02***(-17.11)
ω_6	RDI	0.14***(19.15)	0.15***(20.76)	0.15***(20.80)	0.15***(20.78)	0.14***(19.79)	0.16***(20.92)	0.13***(17.70)
δ_1	CapStringency	0.001(1.21)	0.001(1.58)	0.001(1.07)	0.001(0.99)	0.001(1.25)	-0.0001(-0.17)	-0.003***(-3.40)
δ_2	Deposit	0.0002**(2.17)	0.0001*(1.70)	0.0001(1.41)	0.0002***(3.04)	9.25e-05(1.22)	0.0003***(3.72)	0.001***(6.36)
δ_3	Inf	0.01***(10.83)	0.005***(11.12)	0.005***(10.95)	0.006***(12.48)	0.004***(9.86)	0.004***(9.59)	0.006***(11.13)
δ_4	GDP	0.004***(8.22)	0.003***(7.32)	0.004***(7.64)	0.005***(10.13)	0.004***(7.56)	0.003***(5.16)	0.003***(6.31)
α_0	Constant	0.65***(48.63)	0.66***(49.23)	0.68***(53.22)	0.70***(57.45)	0.68***(50.59)	0.69***(53.94)	0.85***(47.23)
	Year FE?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Adjusted. R ²	0.22	0.22	0.23	0.23	0.23	0.24	0.28
	Observations	13,831	13,831	13,831	13,831	13,621	13,183	13,183
	Mean VIF	2.73	2.61	2.62	2.64	2.66	2.71	34.51

Table 3: Culture and bank leverage – 2SLS estimation

This table presents the results from instrumental variable analysis using 2SLS regression estimation. The dependent variable in the second stage is bank leverage ratio. F-test refers to a test of joint significance of the excluded instruments in the first stage regression. Hansen J-statistics refers to the test of overidentifying restrictions under the null that the error term is uncorrelated with the instruments. The definitions of variables are in Table A.1 of Appendix. The coefficients on IDV, UAI, MAS, PDI, LTO, IND and Proximity are scaled by 100 for readability. Superscripts *, **, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively. Note, the Stock-Yogo critical value at 5% is 18.37. Panel A reports the results for the first three cultural variables (IDV, UAI and MAS), while Panel B reports the estimates for the remaining three cultural variables (PDI, LTO and IND).

Panel A: Estimates for the first three cultural variables (IDV, UAI and MAS)							
Coeff.	Independent Variables	IDV(H1: +)		UAI(H2: -)		MAS(H3: +)	
		1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
γ_i	Culture		0.09**(2.05)		-0.08***(-2.83)		0.07**(2.02)
ρ_1	Protestant	0.26**(2.25)		-0.24***(-6.42)		-0.19***(-6.55)	
ρ_2	Muslim	3.82**(2.31)		-0.02(-0.02)		-8.76***(-44.41)	
ρ_3	Catholic	0.02(0.74)		0.15***(3.57)		-0.28***(-22.67)	
ρ_4	Ethnic	7.81*** (3.81)		-24.13***(-12.68)		-8.21***(-3.76)	
ρ_5	Continent	-7.23***(-5.94)		5.52*** (10.42)		4.81*** (22.08)	
β_1	Proximity	-0.03(-0.27)	0.17*(1.8)	0.27(1.43)	0.002*(1.67)	0.17*** (3.76)	0.002*(1.82)
	Controls and Year FE?	Yes	Yes	Yes	Yes	Yes	Yes
	Observations	7,062	7,062	7,062	7,062	7,062	7,062
	F-test (first-stage)	167.58		350.05		4252.70	
	C-D Wald F-statistics	2060.74**		3154.62**		23333.53**	
	Hansen J-statistic		0.0738*		0.1700		0.0842*
	Hausman-Wu χ^2		0.4474		0.2069		0.4234
Panel B: Estimates for the remaining three cultural variables (PDI, LTO and IND)							
Coeff.	Independent Variables	PDI(H4: -)		LTO(H5: -)		IND(H6: +)	
		1st stage	2nd stage	1st stage	2nd stage	1st stage	2nd stage
γ_i	Culture		-0.16***(-3.88)		-0.03(-1.35)		0.0373(1.21)
ρ_1	Protestant	-0.24***(-9.69)		0.18***(2.83)		-0.12***(-13.27)	
ρ_2	Muslim	5.43*** (14.47)		-4.0***(-9.11)		6.75*** (34.05)	
ρ_3	Catholic	0.04*(1.88)		0.20*** (8.94)		-0.37***(-34.59)	
ρ_4	Ethnic	-0.37(-0.23)		-45.96***(-9.85)		30.42*** (63.65)	
ρ_5	Continent	2.13*** (8.37)		15.78*** (29.06)		-8.62***(-61.76)	
β_1	Proximity	0.21**(2.18)	0.001(1.58)	-0.24***(-2.92)	0.002*(1.75)	-0.06(-1.23)	0.0019*(1.91)
	Controls and Year FE?	Yes	Yes	Yes	Yes	Yes	Yes
	Observations	7,062	7,062	7,062	7,062	7,062	7,062
	F-test	763.80		969.25		8194.20	
	C-D Wald F-statistics	6279.54**		8674.74**		46786.74**	
	Hansen J-statistic		0.8501		0.0731*		0.0187**
	Hausman-Wu χ^2		0.2556		0.9577		0.1730

Table 4: Culture and bank leverage – Robustness checks 1

This table presents the estimates of the following regression equation (3) with bank leverage ratio as the dependent variable.

$$\text{Leverage}_{i,c,t} = \alpha_0 + \sum_{i=1}^{n=6} \gamma_i \text{Culture}_i + \sum_{i=1}^{n=6} \omega_i \text{BankControls}_{i,c,t-1} + \sum_{i=1}^{n=4} \delta_i \text{CountryControls}_{c,t} + \mu_t + \varepsilon_{i,c,t}$$

The definitions of variables are in Table A.1 of Appendix. *t*-statistics are reported in parentheses. The coefficients of IDV, UAI, MAS, PDI, LTO, IND and Proximity are scaled by 100 for readability. Panel A reports the pooled-OLS results for model augmented by two additional country-level variables: Governance and CreditorRights. Panel B reports the generalized least squares estimation of the basic model, excluding the two additional country-level variables. Superscripts *, **, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Coeff.	Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Augmented country-specific controls (governance and creditor rights)							
γ_1	IDV (H1: +)	0.10***(6.09)					
γ_2	UAI (H2: -)		-0.07***(-6.27)				
γ_3	MAS (H3: +)			0.04**(2.49)			
γ_4	PDI (H4: -)				-0.15***(-7.94)		
γ_5	LTO (H5: -)					-0.06***(-5.84)	
γ_6	IND (H6+)						0.07***(4.05)
δ_5	Governance	0.0001(1.20)	-0.0000(-0.69)	0.0001**(2.22)	-0.0001(-1.23)	0.0000(0.23)	-0.0001(-1.04)
δ_6	CreditorRights	0.01***(6.98)	0.01***(4.45)	0.01***(4.84)	0.0003(0.20)	0.01***(8.87)	0.01***(7.89)
Panel B: Generalized least squares (GLS) estimations							
γ_1	IDV (H1: +)	0.06***(3.37)					
γ_2	UAI (H2: -)		-0.06***(-4.72)				
γ_3	MAS (H3: +)			0.03(1.47)			
γ_4	PDI (H4: -)				-0.15***(-5.69)		
γ_5	LTO (H5: -)					-0.04***(-3.83)	
γ_6	IND (H6+)						0.08***(4.58)
For both panels							
	Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes
	Year FE?	Yes	Yes	Yes	Yes	Yes	Yes
	Observations	13,831	13,831	13,831	13,831	13,621	13,183

Table 5: Culture and bank leverage – Robustness checks 2

This table presents the estimation results of the base equation 3. In Panel A (Panels B and C) with Tier 1 capital (bank leverage ratio) as the dependent variable. The definitions of variables are in Table A.1 of Appendix. We run pooled-OLS regressions with t-statistics reported in parentheses. The coefficients on IDV, UAI, ASSERT (MAS), PDI, FO (LTO) and IND are scaled by 100 for readability. Panel B reports the estimates for GLOBE as alternative proxy of culture, while Panel C reports the estimates of Tang and Koveos (2008) as an alternative proxy of culture. Superscripts *, **, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Panel A: Tier 1 capital ratio as alternative dependent variable							
Coeff.	Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
γ_1	IDV (H1: +)	-0.09***(-3.08)					
γ_2	UAI (H2: -)		0.03*(1.78)				
γ_3	MAS (H3: +)			0.05*** (3.77)			
γ_4	PDI (H4: -)				0.07*** (3.10)		
γ_5	LTO (H5: -)					0.04** (2.25)	
γ_6	IND (H6+)						-0.01(-0.53)
Panel B: GLOBE cultural framework as an alternative proxy							
Coeff.	Independent Variable	(1)	(2)	(3)	(4)	(5)	
		IDV	UAI	ASSERT	PDI	FO	
γ_1	IDV (H1: +)	0.68*(1.73)					
γ_2	UAI (H2: -)		-0.40(-0.76)				
γ_3	ASSERT (H3: +)			2.42*** (3.21)			
γ_4	PDI (H4: -)				-2.31***(-4.31)		
γ_5	FO (H5: +)					1.94*** (3.63)	
Panel C: Tang and Koveos (2008) cultural framework as an alternative proxy							
Coeff.	Independent Variable	(1)	(2)	(3)	(4)	(5)	
		IDV	UAI	MAS	PDI	LTO	
γ_1	IDV	0.06*** (3.91)					
γ_2	UAI		-0.07***(-7.69)				
γ_3	MAS			0.07*** (2.66)			
γ_4	PDI				-0.09***(-6.56)		
γ_5	LTO					-0.03***(-2.59)	
	Additional Controls?	Yes	For all panels Yes		Yes	Yes	Yes
	Year FE?	Yes	Yes	Yes	Yes	Yes	Yes

Table 6: Culture and bank leverage – Effect of bank size

This table presents the pooled-OLS estimates with base model augmented by a series of interaction terms involving national culture and Largebank dummy, with t-statistics reported in parentheses. Largebank is a dummy variable that equals 1 if bank's size is more than the median bank size of that particular year, and 0 otherwise. The definitions of variables are in Table A.1 of Appendix. The coefficients on IDV, UAI, MAS, PDI, LTO and IND are scaled by 100 for readability. Superscripts *, **, *** indicate statistical significance at 10%, 5%, and 1% levels, respectively.

Coeff.	Independent Variable	(1)	(2)	(3)	(4)	(5)	(6)
γ_1	IDV	0.01(0.83)					
ζ_1	IDV \times Largebank	0.003(0.27)					
γ_2	UAI		0.10***(7.32)				
ζ_2	UAI \times Largebank		-0.15***(-9.98)				
γ_3	MAS			-0.14***(-11.96)			
ζ_3	MAS \times Largebank			0.14***(9.49)			
γ_4	PDI				-0.12***(-8.31)		
ζ_4	PDI \times Largebank				0.09***(6.25)		
γ_5	LTO					-0.07***(-5.17)	
ζ_5	LTO \times Largebank					0.05***(3.41)	
γ_6	IND						-0.12***(-9.33)
ζ_6	IND \times Largebank						0.06***(4.72)
	Additional Controls?	Yes	Yes	Yes	Yes	Yes	Yes
	Year FE?	Yes	Yes	Yes	Yes	Yes	Yes
	Adjusted R ²	13,831	13,831	13,831	13,831	13,621	13,183
	Observations	0.234	0.244	0.246	0.245	0.239	0.256

Highlights

- Banks in countries with high individualism borrow more.
- Banks in countries with high uncertainty-avoidance, power distance and LT orient borrow less.
- Findings are robust to endogeneity, alternative proxies for culture and capital.

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