Effects of National Culture on Bank Risk Taking

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Abstract

We examine the extent to which cultural differences influence bank risk taking using a sample of banks from 45 countries. We measure cultural differences using country-level indices for uncertainty avoidance and individualism developed by Hofstede (2001), which we argue are related to bank risk taking and subsequent bank financial trouble during the recent financial crisis. Consistent with our expectations, the cross-country analysis indicates that uncertainty avoidance is negatively and individualism positively related to bank risk taking. These results hold even after controlling for previously identified factors associated with bank risk taking, underscoring the importance of softer dimensions such as national culture that may influence excessive risk taking. Our exploratory analysis of the effects of national culture on bank financial trouble during the recent financial crisis indicates that cultures that encourage higher risk taking experienced more bank troubles in the form of higher propensity for incurring losses, lower capital, larger loan loss provisions or lower liquidity. Overall, our results highlight the importance of national culture in bank risk taking and subsequent bank financial trouble.

Effects of National Culture on Bank Risk Taking

1. Introduction

We examine the effects of national culture on bank risk taking using an international sample of banks. We also explore the effects of national culture on bank financial trouble during the recent financial crisis. Cross-country differences in bank risk taking are likely to be affected by differences in ownership structures, bank regulation, bank monitoring and institutional factors such as creditor rights, as well as by softer dimensions such as national culture that may influence excessive risk taking. In a global survey on factors that created the conditions for the credit/banking crisis conducted in May 2008 by PricewaterhouseCoopers and the Economist Intelligence Unit, 31% of survey participants put the blame on "monetary policy," 58% on "ineffective regulatory oversight," and an impressive 73% on "culture and excessive risk-taking" (PricewaterhouseCoopers 2008). Given these findings, an examination of the influence of national culture on bank risk taking clearly is warranted.

Recent research documents the influence of ownership structures, bank regulation, creditor rights, and information sharing on bank risk taking. More specifically, Laeven and Levine (2009) show that bank risk taking varies positively with the comparative power of shareholders within each bank. In particular, their results show that the relations between bank risk taking and capital regulations, deposit insurance policies, and restrictions on bank activities depend critically on a bank's ownership structure. In a related study, Houston et al. (2010) explore the interaction between creditor rights, information sharing and bank risk taking. They find that stronger creditor rights tend to promote greater bank risk taking. Consistent with this finding, they also document that stronger creditor rights increase the likelihood of financial crisis.

Noticeably absent from this research is the explicit recognition of differences in national culture in influencing bank risk taking. Such differences became apparent in the recent financial crisis which had a considerably larger adverse effect on banks in certain countries (for example, the US and the UK) than in others (for example, Canada and Singapore).

There is a growing body of research in economics and finance that suggests that softer dimensions such as culture can affect institutional and economic development at the macro level as well as corporate and individual decision making at the micro level. For example, Stulz and Williamson (2003) show that a country's culture measured by its principal religion predicts the cross-sectional variation in creditor rights better than a country's natural openness to international trade, language, per capita income, or origin of legal system. Guiso et al. (2009) explore the effects of "trust" and show that trade and investment flows are larger between countries that exhibit higher mutual trust. Hilary and Hui (2009), using religion as a dimension of culture, find that firms located in counties with higher levels of religiosity display lower degrees of risk exposure, as measured by variance in equity returns or return on assets. Chui et al. (2010), using an index of the individualism dimension of culture developed by Hofstede (2001) to measure cultural differences between societies, find that individualism is positively related to trading volume and volatility, and to the magnitude of momentum profits. We add to this stream of research by investigating how national culture relates to risk taking by banks and to the likelihood of banks getting into financial trouble during the recent financial crisis.

Although the management literature has used several dimensions of national culture in examining cross-country differences in foreign direct investment, disclosure practices, earnings management, and globalization to name a few, these measures have only recently been employed in finance research. In particular, the dimensions of culture developed by Hofstede (1980) have

been widely accepted since Hofstede first published his results, and have been used by many researchers in other business disciplines.[1] We focus on two dimensions of national culture identified by Hofstede (2001), uncertainty avoidance and individualism, which we argue are related to bank risk taking. Hofstede (2001, p148) notes that ''uncertainty-avoiding cultures shun ambiguous situations. People in such cultures look for structure in their organizations, institutions and relationships, which makes events clearly interpretable and predictable.'' When applied to our context, it implies that banks in high uncertainty avoidance societies are more likely to avoid high risk taking. High individualism cultures emphasize individual achievements, self-orientation and autonomy (Hofstede 2001). Risk taking incentives likely are greater in high individualism societies where concern for other stakeholders' welfare (which is an indicator of collectivism) is likely to be low, suggesting that the level of risk taking will be higher in high individualism societies. Given the call-option character of bank equity, bankers face strong incentives to lend aggressively and take on excessive risks, often ignoring prudent risk management (Merton 1977). The lower their capital base, the less they have to lose and the more they can gain through aggressive lending and other high risk activities. We posit that aggressive high risk activities by banks are more likely in societies with low uncertainty avoidance and high individualism.

Our research is related to a recent study by Griffin et al. (2009), who examine the effect of national culture on corporate risk taking for non-financial firms. They show that uncertainty avoidance is negatively and individualism is positively associated with firm-level riskiness. In contrast, we focus exclusively on banks, an industry not studied by Griffin et al. (2009). The

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[1] For example, Schultz et al. (1993) and Kachelmeier and Shehata (1997) have employed Hofstede's measures of cultural values in accounting, Franke et al. (1991), Yeh and Lawrence (1995), and Weber et al. (1996) in economics, Nakata and Sivakumar (1996) and Aaker and Williams (1998) in marketing, and Geletkanycz (1997), Tan et al. (1998) and Han et al. (2010) in management.

influence of cultural factors likely is of greater importance in industries such as banking, where information uncertainty is higher relative to industrial firms due to the greater complexity of banking operations and difficulty of assessing risk on the large and diverse portfolio of loans (Autore et al. 2009). Additionally, given the importance of banks in the national economy, it is crucial to understand how national culture may affect the risk taking behavior of banks. In addition, given the recent banking/financial crisis, we explore the influence of national culture on bank financial trouble during this crisis, which many consider was primarily due to excessive risk taking.

Following recent literature (e.g., Laeven and Levine 2009; Houston et al. 2010), our primary measure of bank risk is z-score, which equals return on assets plus capital asset ratio divided by standard deviation of asset return for each bank. Z-score measures the distance from insolvency (Roy 1952). Following these studies, we define the inverse of the probability of insolvency as the z-score, so that a higher z-score indicates that the bank is more stable. As robustness checks, we employ two alternate measures of bank risk, volatility of earnings and volatility of net interest margins, which are commonly used in prior literature (e.g., Laeven and Levine 2009; Houston et al. 2010). Higher earnings volatility and net interest margin volatility indicate higher bank risk.

We use an international bank sample from the *BankScope* database representing 45 countries over the period 2000 to 2007 to test our predictions of the relation between national culture and bank risk taking. We find, in both separate and joint tests, that the uncertainty avoidance and individualism dimensions of national culture are strongly related to all three measures of bank risk taking. More specifically, uncertainty avoidance is negatively related to, whereas, individualism is positively related to bank risk taking behavior. These results hold even

after controlling for previously identified factors associated with bank risk taking, underscoring the importance of softer dimensions such as national culture that may influence excessive risk taking. Our results are robust to several sensitivity tests including weighted OLS regressions based on bank assets, exclusion of US banks, restriction of the sample to include only commercial banks, and examination of different sample periods.

In additional tests, we explore the effect of national culture on bank financial trouble during the recent financial crisis spanning the period 2007-2008.[2] In the US, bank examiners use a rating system (commonly referred to as CAMELS ratings) based on several financial ratios and management characteristics, to identify banks that are in trouble. Because this rating or other similar ratings for troubled banks are not publicly available, we classify banks as troubled banks using publicly available data that reflect profitability, capital adequacy, asset quality and liquidity. We classify a bank as a troubled bank if it satisfies any of the following criteria in 2007 or 2008: (1) incurs a loss, (2) has a low capital ratio, (3) recognizes a large loan loss provision, and (4) has low liquidity. To ensure that these banks were not troubled prior to 2007, we delete banks that satisfy any of the above criteria in 2006. Thus, our tests relate to banks that were healthy in 2006 but are troubled in 2007 or 2008. Our evidence shows that bank financial trouble, as evidenced by the existence of any of the above four criteria, is higher in societies where uncertainty avoidance is low and where individualism is high.

Our study contributes to the literature in several ways. First, it extends prior research that examines risk taking behavior of banks. Whereas prior studies focus on institutions, regulation, governance and risk taking by banks (e.g., Laeven and Levine 2009; Houston et al. 2010), we show that, in addition to these institutional and regulatory characteristics, national culture also

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[2] It is generally accepted that the recent financial crisis in the US and UK started in 2007 (Ryan 2008). However, the financial crisis spread to other countries in 2008 (Laeven and Valencia 2010).

affects risk taking of banks. Second, our study contributes to research investigating the relation between culture and corporate and individual decision making (e.g., Hilary and Hui 2009; Chui et al. 2010). We show that cultural differences between societies have a profound influence on the level of bank risk taking, and the ability to explain bank financial trouble during the recent financial crisis. Our findings support the growing awareness among finance researchers that informal institutions such as culture matter in financial decisions, even when those decisions are made by sophisticated professional managers.

Our study is timely and relevant given the recent banking crisis that has placed particular emphasis on excessive risk taking. The recent, massive write-downs in the banking industry worldwide have led some to argue for increased regulation, while others argue that the failure of existing regulation to prevent these events indicates that additional regulation may be futile (Altamuro and Beatty 2010). By providing evidence that enhances our understanding of how various dimensions of national culture are associated with bank risk taking and bank financial trouble during the recent financial crisis, our results serve as an important input to regulators worldwide in their deliberations on the complexities and challenges of having uniform regulations on bank risk taking across countries.

The rest of this paper is organized as follows. We discuss related research on cultural dimensions and develop our predictions on the effects of cultural dimensions on bank risk taking in the next section. We present the research design and describe the data in section three. We discuss the results in section four, and provide our conclusions in the final section.

2. Uncertainty Avoidance, Individualism and Bank Risk Taking

We hypothesize that cultural factors influence the level of bank risk taking. In particular, we predict that bank managers in high uncertainty avoidance societies take less risk, whereas bank managers in high individualism societies take more risk.

Hofstede and Bond (1988, p6) define culture as ''the collective programming of the mind that distinguishes the members of one category of people from those of another. Culture is composed of certain values, which shape behavior as well as one's perception of the world." In a recent study, Licht et al. (2005) note that value emphases are the essence of culture when seen as meanings, symbols and assumptions about what is good or bad, legitimate or illegitimate, that underlie the prevailing practices and norms in a society. Licht et al. (2005, p 234) further state that a "common postulate in cross-cultural psychology is that all societies confront similar basic issues or problems when they come to regulate human activity. The key dimensions of culture are derived from these issues, because the preferred ways of dealing with them are expressed in different societal value emphases. It is thus possible to characterize the culture of different societies by measuring prevailing value emphases on these key dimensions. This yields unique cultural profiles". In this spirit, we utilize the cultural dimensions pioneered by Hofstede (2001) for characterizing national culture.

The first cultural dimension we examine relates to uncertainty avoidance. Uncertainty is one of the key determinants of market transactions, and plays a critical role in business (Hofstede 1980, 2001). Hofstede's uncertainty avoidance index assesses the extent to which people feel threatened by uncertainty and ambiguity, and try to avoid these situations. Low uncertainty-avoidance societies socialize their people into accepting or tolerating uncertainty. Accordingly, individuals in such societies are less averse to taking risks. By contrast, people living in high

uncertainty-avoidance societies tend to have a higher level of anxiety, which may manifest in greater nervousness, emotionality, and aggressiveness. As a coping mechanism against uncertainty, these people prefer a more predictable environment. Although Hofstede (2001) states that uncertainty avoidance does not equal risk avoidance, Kwok and Tadesse (2006) develop and test arguments on how uncertainty avoidance affects the investment preference of individuals (Beugelsdijk and Frijns 2010). They show that countries scoring high on uncertainty avoidance are also characterized by a (relatively risk averse) bank-based financial system, whereas countries scoring low on uncertainty avoidance are characterized by a market-based financial system. Collectively, the above arguments suggest that the propensity for risk taking will be lower in high uncertainty avoidance societies than in low uncertainty avoidance societies. Additionally, if higher uncertainty avoidance leads to lower risk taking, then we are more likely to observe a lower incidence of bank financial trouble in countries with higher uncertainty avoidance during the crisis period.

The second cultural dimension we examine is individualism. According to Franke et al. (1991, p166), "Individualism is the tendency of individuals primarily to look after themselves and their immediate families, and its inverse is the integration of people into cohesive groups." A long-standing literature in economics and social psychology has focused on the distinction between collective (group-based) decision making and individual-based decision making, and its effect on risk behavior (Kerr et al. 1996). Shupp and Williams (2008) find that groups are more risk averse than individuals in high-risk situations, and that group decisions exhibit a smaller variance than individual decisions. Chui et al. (2010) argue that individualism, as defined by Hofstede (2001), can be linked to overconfidence, i.e., in high individualism societies more decisions are made by the individual and these decisions tend to be driven more by

overconfidence. Han et al. (2010) posit that where individualism is the dominant culture, managers will have more latitude in terms of self-governance (professionalism) and flexibility of measurement. High individualism cultures also emphasize individual achievements, self-orientation and autonomy (Hofstede 2001). Risk taking incentives may also be greater in high individualism societies where concern for other stakeholders' welfare (which is an indicator of collectivism) is likely to be low. Collectively, the above arguments suggest that the level of risk taking will be higher in high individualism societies. Additionally, if high individualism societies take higher risk, then we are more likely to observe a higher incidence of bank financial trouble in high individualism countries during the crisis period.

3. Research Design and Data

3.1 Bank risk taking

Our primary measure of risk taking is z-score, a commonly used measure in prior research (e.g., Laeven and Levin 2009; Houston et al. 2010). Z-score is a measure of bank stability and indicates the distance from insolvency. Specifically, $z = (ROA+CAR)/\sigma(ROA)$ where ROA is earnings before taxes and loan loss provision divided by assets, CAR is capital-asset ratio, and $\sigma(ROA)$ is standard deviation of ROA. ROA and capital-asset ratio are calculated as the mean over 2000–2007, and $\sigma(ROA)$ is the standard deviation of ROA estimated over the same period.[3] Z-score indicates the number of standard deviations a bank's return on assets has to drop below its expected value before equity is depleted and the bank is insolvent. Thus, a higher z-score indicates that the bank is more stable. Because z-score is highly skewed,

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[3] We require at least three years of data for each bank to calculate the standard deviation of return on assets over time. Our inferences remain unchanged when we restrict the sample to banks that have all eight years of data available.

following Laeven and Levine (2009) and Houston et al. (2010), we use the natural logarithm of z-score. For brevity, we use the label ''z-score'' when referring to the natural logarithm of z-score in the remainder of the paper.

We use two additional measures of bank risk taking to assess the robustness of our findings. The first is $\sigma(ROA)$, which measures the degree of risk taking in a bank's operations based on the volatility of its earnings over the period 2000-2007. Riskier operations lead to more volatile earnings (Laeven and Levine 2009). The second alternative bank risk measure is $\sigma(NIM)$, the volatility of net interest margin, computed as the standard deviation of net interest margin over the period 2000–2007 (Houston et al. 2010).

3.2 Regression model

In order to assess the effect of national culture on bank risk taking, we regress the z-score, our primary measure of bank risk, on national culture, bank- and country-level control variables. Our main regression specification is as follows:

$$Z_{i,k} = \alpha \, D_k + \beta \, X_{i,k} + \gamma \, W_k + \varepsilon_{i,k}, \tag{1}$$

where Z is the z-score of bank i in country k, D is a vector of variables representing the two dimensions of national culture (uncertainty avoidance (*UAI*) and individualism (*IDV*)), X is a vector of bank characteristics, W is a vector of country characteristics.

In the discussion of the results, we focus on the significance and sign of the coefficients in the vector D. A positive coefficient on *UAI* indicates that bank risk is lower in societies with higher uncertainty avoidance. A negative coefficient on *IDV* indicates that bank risk is higher in societies with higher individualism.[4]

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[4] Potential reverse causality may cause endogeneity problems. In our study, the potential for reverse causality is less of a concern than in a pure cross-country analysis because it is unlikely that risk taking by banks will affect national culture. Additionally, the indices for cultural values were developed prior to the sample period covered in this study.

3.2.1 Bank-level controls

We include several bank-level variables to control for bank characteristics that may influence the risk taking of individual banks. Consistent with Laeven and Levine (2009) and Houston et al (2010), we control for bank size (*SIZE*) measured by log of mean total assets in U.S. dollars over 2000-2007. We control for bank revenue growth (*REVG*) which is the average growth rate of bank revenue over the period 2000–2007. We also control for loan loss provision (*LLP*), non-performing loans (*NPL*), and whether the bank accounts for more than 10% of the nation's deposits (*TOOBIG*). We provide the details of these bank-level control variables in Table 1.

3.2.2 Country-level controls

We include several country-level variables in order to separate the effect of the national culture from the effects of other country characteristics that may influence bank risk taking. We present the details of these country-level controls in Table 1. The first set of controls relates specifically to the banking industry. Following Laeven and Levine (2009) and Houston et al. (2010), we control for activity restrictions by including *RESTRICT*, which is an indicator of the degree to which banks face regulatory restrictions on their activities in securities markets, insurance, real-estate, and owning shares in non-financial firms (Barth et al. 2006). Barth et al. (2006) show that the banking system is more fragile in countries where banking activities are more restricted. We also control for capital stringency (*CAPST*) in banks. *CAPST* is an index of regulatory oversight of bank capital from Barth et al. (2006). Demirguc-Kunt and Detragiache (2002) show that countries with higher deposit insurance coverage limits are more likely to suffer systemic banking crises. We therefore include a control for deposit insurance (*DI*) in the

regression. We also control for bank competition (*COMP*) which may affect the stability of the banking sector (Allen and Gale 2000; Boyd and De Nicolo 2005).

The second set of controls relates to the institutional environment in a country. We control for creditor rights (*CR*) because Houston et al. (2010) show that stronger creditor rights promote greater bank risk taking. We also control for investor protection rights (*RIGHTS*) and legal origin (*COMMON*), since shareholder protection laws in each country may affect bank risk taking (Laeven and Levine 2009) and Cole and Turk-Ariss (2010) show that banks in common law countries allocate a significantly larger portion of their assets to risky loans than banks in code law countries. Both *RIGHTS* and *COMMON* are drawn from La Porta et al. (1998). We control for GDP (by including the natural log of mean GDP over the period 2000-2007 in constant 2005 US dollars) as countries with different income levels are subject to different economic shocks and sources of volatility, which would affect bank risk taking. We next control for cash flow rights of the largest owners (*CF*) because Laeven and Levine (2009) find that bank risk taking is heightened when the large owners of banks hold more cash flow rights.[5] Finally, we control for the amount of accounting disclosure (*DISC*) which may reduce information asymmetry and hence the volatility of earnings and risk.

[Insert Table 1 here]

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[5] We use the *CF* measure developed by Laeven and Levine (2009). This measure is reported at the country level for the largest 10 banks in each county. On average, Laeven and Levine's sample accounts for 80% of the total banking system assets in each country. Consequently, employing this measure for all the banks in a country is unlikely to introduce severe measurement error.

3.3 Data

We obtain financial data for the international banks for the 2000-2007 (pre-crisis period) and 2007-2008 (crisis period) from the *BankScope* database.[6] We select sample countries from the 50 countries listed in Hofstede (2001). We drop five countries (Guatemata, Iran, Ireland, Singapore and Yugoslavia) due to insufficient data to compute bank risk and missing bank-level controls in *Bankscope*. We thus have 45 countries available for the regression analysis that controls for country fixed effects. We have 33 countries available for the regressions that include country-level institutional variables, due to missing institutional information for some countries (see Panel A, Table 2).

4. Empirical Results

4.1 Descriptive statistics

We present descriptive statistics of the national culture and other institutional variables in Panel A of Table 2. There is wide variation in the national culture values across sample countries. For example, the uncertainty avoidance index (*UAI*) is very high in Greece, Portugal and Uruguay, with an index greater than 100. On the other hand, it is very low in Denmark, Hong Kong, Jamaica and Sweden, with an *UAI* index lower than 30. We also observe wide cross-country variation in the individualism dimension of national culture (*IDV*). Western economies such as the US, Australia, the UK, Canada, and the Netherlands exhibit a higher level of individualism (*IDV* index greater than 80). By contrast, the index is lower in the South American economies such as Columbia, Costa Rica, Ecuador, Panama, Peru and Venezuela (*IDV* index

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[6] As indicated in Laeven and Valencia (2010), the recent financial crisis began in 2007 for the UK and US and spread to other countries in 2008. In sensitivity tests, we discuss the robustness of our results to different definitions of pre-crisis period (i.e., 2000 -2006 and 2000-2005).

lower than 20). Some Asian economies (e.g., Indonesia, Pakistan South Korea and Taiwan) also exhibit relatively low levels of individualism.

Panel B of Table 2 reports the mean values of bank risk measures and other bank-level controls. The mean z-score is 3.094 for all banks in the sample with a standard deviation of 0.968. This is similar to Houston et al. (2010) and Laeven and Levine (2009) who report mean z-scores of 3.240 (with a standard deviation of 1.086) and 2.88 (with a standard deviation of 0.96), respectively. Our alternative measures of bank risk, $\sigma(ROA)$ and $\sigma(NIM)$, also exhibit considerable variation across countries.

We present correlations between the variables used in the bank risk taking regressions in Panel C of Table 2. While the three proxies for bank risk taking are highly correlated in the expected direction, the correlations between z-*score*, $\sigma(ROA)$, and $\sigma(NIM)$ are less than one, indicating that each measure may reflect different dimensions of a bank's risk taking behavior. Consistent with expectations, z-*score* is significantly and positively (negatively) associated with *UAI* (*IDV*). Additionally, $\sigma(ROA)$, and $\sigma(NIM)$ are significantly and negatively (positively) associated with *UAI* (*IDV*). The correlations among some of the country-level institutional variables are high (for example, the correlation is 0.62 between *LGDP* and *DISC*). The high correlation may induce multicolinearity in our analysis. We address this concern in two ways. First, we include country dummy variables in the regression to control country-level fixed effects. Second, we include country-level institutional variables to control the country-wide institutional effect on risk taking by banks. Our results, using both of these controls yield similar inferences, thus strengthening the reliability of our inferences.

[Insert Table 2 here]

14

4.2 Regression analysis

4.2.1 Bank risk measured by z-score

We regress the z-scores of individual banks on national culture, bank-level control variables and country-level control variables and report the results in Table 3. The first three models report results with country dummy variables in the regression to control country-level fixed effects. The next three models report results with country-level institutional variables to control the country-wide institutional effect on bank risk.

Models (1) and (2) present the results for the effects of individual culture variables, uncertainty avoidance (*UAI*) and individualism (*IDV*) respectively, on risk taking by banks, after controlling for bank characteristics and country fixed effects. A positive coefficient on *UAI* indicates that banks are more stable when the uncertainty avoidance dimension of national culture is high. A negative coefficient on *IDV* indicates that banks are less stable when the individualism dimension of national culture is high.

Consistent with our predictions, the coefficient on *UAI* is positive and significant at the 1% level while the coefficient on *IDV* is negative and significant at the 1% level in models (1) and (2). These results indicate that banks are more stable in societies where uncertainty avoidance is high and individualism is low. We next examine the economic size of the coefficient on *UAI* and *IDV*. A one standard deviation change in *UAI* (20.7) is associated with a change in z-score of 1.139 (0.055*20.7), where the mean z-score is 3.094 and the standard deviation is 0.968. Similarly, a one standard deviation change in *IDV* (24.6) is associated with a change in z-score of -0.910 (-0.037*24.6). These results clearly indicate that the economic

significance of each of these two dimensions of culture is nontrivial.[7] Overall, the evidence exhibits that national culture plays an important role in influencing risk taking by banks.

With regard to bank-level controls, we find that larger banks, higher growth banks, banks with higher loan loss provision, and banks with higher non-performing loans are less stable. These results are largely consistent with the evidence reported in earlier studies (e.g., Laeven and Levine 2009; Houston et al. 2010). We do not find a significant association between the indicator variable for very large banks (*TOOBIG*) and risk taking.

In model (3), we include the two cultural factors as well as bank-level control variables and country fixed-effects in the same regression. Again, we find that the coefficient on *UAI* is positive and significant at the 1% level, and the coefficient on *IDV* is negative and significant at the 1% level. These results suggest that, although the banking industry is highly regulated, national culture has an important, first-order effect on a bank's risk taking behavior.

In models (4) to (6), we replace the country controls with country-level institutional variables. Both the culture variables (*UAI* and *IDV*) are significant and have the expected signs. The results for the bank-level controls are similar to those reported in models (1) to (3). For the country-level control variables, as expected, the bank regulatory variables have a significant effect on bank risk taking. Specifically, the coefficients on *RESTRICT* and *CAPST* are both negative and significant. These results are largely consistent with evidence reported in earlier studies. Similar to the evidence reported in Demirguc-Kunt and Detragiache (2002), the coefficient estimate for *DI* is negative, though only significant in model (4). Moreover, greater competition jeopardizes the stability of banks, as evidenced by the negative and significant coefficient on *COMP*.

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[7] In models (3) to (6), the economic size of the coefficient on *UAI* ranges from 0.124 to 0.331, while the economic size of the coefficient on *IDV* ranges from -0.246 to -0.590.

The coefficients on *CR* and *CF* are negative and significant at the 1% level, consistent with the evidence reported in Laeven and Levine (2009) and Houston et al. (2010). We also find that banks with higher investor protection (*RIGHTS* and *COMMON*) are less stable, consistent with the evidence in prior studies (John et al. 2008; Cole and Turk-Ariss 2010). Lastly, as expected, banks are more stable in countries with higher economic growth (*LGDP*) and higher accounting disclosure (*DISC*).

[Insert Table 3 here]

4.2.1 Robustness check: Alternative measures of bank risk

As a robustness check, we use two alternative measures for bank risk, volatility of return on assets ($\sigma(ROA)$) and volatility of net interest margin ($\sigma(NIM)$), and test the associations between national culture and these alternative risk measures. Note that a higher value of $\sigma(ROA)$ or $\sigma(NIM)$ indicates higher bank risk. Consequently, we expect a negative coefficient on *UAI* and a positive coefficient on *IDV*.

We report the results in Table 4, which shows the regression results for the model with bank- and country-level institutional controls. The dependent variable for the first three models is $\sigma(ROA)$, while the dependent variable for the last three models is $\sigma(NIM)$. Consistent with the results reported in Table 3, the coefficient on *UAI* is negative and significant at the 1% and the coefficient on *IDV* is positive and significant at the 1%. These results provide additional support for our prediction that national culture has an important impact on bank risk taking. Specifically, bank risk taking is higher in societies with lower uncertainty avoidance and higher individualism. The results for the bank- and country- level controls are similar to those reported in Table 3.

[Insert Table 4 here]

4.2.1 Robustness check: Weighted OLS estimation and exclusion of US banks

Although our results are robust to several measures of bank risk, one major concern is that the results may be unduly influenced by a subset of large banks in a few key countries. We perform two additional tests to alleviate this concern. First, we re-estimate the regressions using weighted OLS regressions (the weights used are bank assets). Second, we re-estimate the OLS regressions after dropping US banks (which constitute over 20% of the observations) from the sample. These results are summarized in Table 5. Again, we find that our main inferences remain unchanged - bank risk taking is higher in societies with lower uncertainty avoidance and higher individualism.[8]

[Insert Table 5 here]

4.2.2 Other robustness tests

We conduct several additional robustness tests. Our dependent variable for these additional tests is z-score. First, we examine whether our main results hold for large banks. Large banks may be better able to diversify risk and have more stable earnings and reduced risk of insolvency. On the other hand, large banks may take greater risks, especially if they consider themselves too-big-to-fail. We define a bank as large if it is in top quartile in terms of assets in the pooled bank sample, and all other banks as small. Our unreported results indicate that for the large banks, only *IDV* is negative and significant at the 1% level, while *UAI* is not statistically significant. For the small banks, both *UAI* and *IDV* are significant in the predicted directions.

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[8] We do not conduct a country-level test (as in Houston et al. 2010) because we only have 33 valid observations at the country level and a total of 17 independent variables in the country-level regression.

These results indicate that the effect of national culture on risk taking by banks is more pronounced for small banks than for large banks.

We compute all our risk measures (z-score, σ(ROA), and σ(NIM)) in our main tests over the period 2000-2007. As our second robustness check, we re-compute these measures over two alternate time periods (i.e., 2000–2005 and 2000–2006). Our results are robust to these alternative sample period specifications.

We use 3,875 banks in our main tests. Of these banks, 43% (1,652 banks) are commercial banks, and the remaining 57% include bank holding companies, finance companies, savings banks and other types of banks. In our third robustness test, we analyze the sub-sample that includes only the commercial banks. Our untabulated results indicate that both *UAI* and *IDV* are associated significantly with bank stability in the predicted direction for the sub-sample of commercial banks.[9]

4.2.3 Moderating role of creditor rights and cash flow rights on the relation between national culture and risk taking

Houston et al. (2010) document that stronger creditor rights induce bank risk taking. Laeven and Levine (2009) find that banks are less stable when controlling shareholders also have large cash flow stakes. In this section, we test whether the association between national culture and risk taking varies with the strength of creditor rights (*CR*) and corporate governance (*CF*). We do so by including interaction terms *CR*UAI* and *CR*IDV* in models (1) to (3), and *CF*UAI* and *CF*IDV* in models (4) to (6). The dependent variable for these models is z-score. We report the estimation results in Table 6.

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[9] We also estimate a regression that includes both commercial banks and bank holding companies (516 institutions). The results with this larger bank sample are similar.

In model (1), the coefficient on *CR*UAI* is positive and significant at the 1% level, suggesting that the positive effect of *UAI* on bank stability is strengthened when creditor rights improve. In model (2), the coefficient for *CR*IDV* is negative and significant at the 5% level, suggesting that the negative effect of *IDV* on bank stability is strengthened when creditor rights improve. However, in model (3), when we include both interaction terms in the same model, only *CR*IDV* retains its significance. In models (4) and (6), the coefficient estimate for *CF*UAI* is negative and significant, while in models (5) and (6), the coefficient on *CF*IDV* is not significant. These results suggest that the positive effect of *UAI* on bank stability is weakened when the largest shareholders of the banks also have a high cash flow stake.

Overall, we find some preliminary evidence that the association between culture and bank risk taking varies with the strength of creditor rights and corporate governance of banks.

[Insert Table 6 here]

4.3 Crisis period analysis

In this section, we provide preliminary evidence on whether cultural factors help explain financial difficulties experienced by banks during the recent financial crisis spanning the period 2007-2008. Most previous studies of bank failures rely upon bank-level accounting data to predict bank failures (e.g., Meyer and Pifer 1970; Arena 2008). For example, Arena (2008) studies the relationship of bank failures and bank fundamentals during the 1990s Latin America and East Asia banking crises, and finds that individual bank conditions explain the bank failures, while macroeconomic shocks that triggered the crises primarily destabilized the weak banks ex ante. In the US, bank examiners use a rating system (commonly referred to as CAMELS ratings)

20

based on several financial ratios and management characteristics to identify banks that are in trouble. [10]

Because the CAMELS rating or other similar indicators of troubled banks are not publicly available for banks around the world, we classify banks as troubled banks using publicly available data that reflect profitability, capital adequacy, asset quality and liquidity. We use net income to measure profitability, the ratio of the total equity capital to total assets to measure capital adequacy, the ratio of loan loss provision to total loans to measure asset quality, and the ratio of liquid assets to total assets to measure liquidity.

In our exploratory analysis, we classify a bank as a troubled bank (i.e., troubled bank = 1) if it satisfies any of the following criteria in 2007/8: (1) incurs a loss (i.e., net income < 0), (2) has a low capital ratio (i.e., equity over assets < 10%), (3) recognizes a large loan loss provision (i.e., loan loss provision/total loans > 1%), and (4) has zero liquid assets. To ensure that these banks were not troubled prior to 2007, we delete banks that satisfy any of the above criteria in 2006. Thus, our tests relate to banks that were healthy in 2006 but are troubled in 2007 or 2008.

We use the following logistic model to test the association between national culture and bank financial trouble during the crisis period. Our test specification follows Lel and Miller (2008) and Beltratti and Stulz (2010).

$$\text{Troubled Bank} = \alpha_0 + \alpha_1 \text{ UAI} + \alpha_2 \text{ IDV} + \alpha_3 \text{ SIZE1}_t + \alpha_4 \text{ GROWTH}_t + \alpha_5 \text{ LOANS}_t$$

$$+ \alpha_6 \text{ LEV}_t + \alpha_7 \Delta\text{CASH}_t + \alpha_8 \text{ ALLOW}_t$$

$$+ <\text{Country-level Controls}> + e \qquad (2)$$

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[10] The most widely known rating system for banks is the CAMELS system, which stands for Capital Adequacy, Asset Quality, Management, Earnings, Liquidity, and Systematic Risk. The Uniform Financial Rating System, informally known as the CAMEL ratings system, was introduced by U.S. regulators in November 1979 to assess the health of individual banks. Following an onsite examination, bank examiners assign a score on a scale of one (best) to five (worst) for each of the five CAMEL components; they also assign a single summary measure, known as the "composite" rating. In 1996, CAMEL evolved into CAMELS, with the addition of a sixth component ("S") to summarize Sensitivity to market risk.

We include bank-level controls that may affect the financial health of banks (size, growth, loans, leverage, change in cash flow, and loan loss allowance). Table 1 provides the definitions of these variables. We also include the same set of country-level institutional variables used in the bank risk taking regression (i.e., activity restriction, capital stringency, deposits insurance, creditor rights, etc). Table 7 presents the results for the crisis period analysis. As before, the first three models regress the culture variables on the dependent variables while including country dummies and the last three models regress the culture variables on the dependent variables while including country-level institutional variables.

In our discussion of results, we focus on *UAI* and *IDV*, our main variables of interest. Panel A of Table 7 shows the results for the profitability test (i.e., troubled bank = 1 if net income < 0). We find that banks in high uncertainty avoidance societies are less likely to incur losses during the crisis period. *UAI* is negative and significant at the 1% level. In contrast, banks in high individualism societies are more likely to experience losses during the crisis period, as indicated by the positive and significant coefficient on *IDV*. The lower incidence of losses during the crisis period at banks in societies with high uncertainty avoidance and low individualism is consistent with lower risk taking in the pre-crisis period.

Panel B reports the capital adequacy test results. In separate tests using models (1) and (2), capital-to-assets ratio is significantly lower for banks in low uncertainty avoidance and high individualism countries during the crisis period. However, in the joint test that includes both cultural variables in the same regression (models 3 and 6), only the coefficient on *UAI* maintains its significance; the coefficient on *IDV* is no longer significant. These results suggest that banks in societies with high uncertainty avoidance and low individualism had higher balance sheet

22

strength (i.e., capital-to-asset ratio) during the crisis period likely due to lower risk taking in the pre-crisis period.

In Panel C where we report the results for the asset quality test, we find that loan loss provision during the crisis period is significantly higher in societies where uncertainty avoidance is low and where individualism is high. The coefficient on *UAI* is negative and significant and the coefficient on *IDV* is positive and significant (except in model 3). Higher asset quality in the crisis period in societies with high uncertainty avoidance and low individualism suggests lower risk taking in the pre-crisis period.

For the liquidity test in Panel D, we again find that the coefficient on *UAI* is negative and significant and the coefficient on *IDV* is positive and significant, indicating that banks are more likely to have zero liquid assets during the crisis period in societies where uncertainty avoidance is low and individualism is high.

Finally, in Panel E, we report results for the combined analysis. Specifically, *Troubled Bank* is coded one if the bank meets *any* one of the following four criteria: incurs a loss, has a low capital ratio, recognizes a large loan loss provision, and has no liquid assets. According to the results reported in Panel E of Table 7, the incidence of troubled banks is significantly lower in societies with high uncertainty avoidance and low individualism. These results again confirm our expectations that banks in societies with high uncertainty avoidance and low individualism had a lower incidence of financial trouble during the crisis period, most likely due to lower risk taking in the pre-crisis period.

[Insert Table 7 here]

5. Conclusion

The primary research question addressed in this paper is whether and how the two important dimensions of national culture, uncertainty avoidance and individualism, influence bank risk taking. We address this question by analyzing a sample of banks from 45 countries over two sample periods, one spanning the pre-financial crisis (i.e., the period 2000-2007) and the other spanning the financial crisis (i.e., the period 2007-2008). We examine the relation between the two dimensions of national culture and three proxies for bank risk taking during the pre-financial crisis period. Consistent with our predictions, we find that banks in high uncertainty avoidance societies take less risk whereas banks in high individualism societies take more risk. These results hold even after controlling for previously identified factors associated with bank risk taking. Our results indicate that culture has an important effect on bank risk taking, despite the banking industry being highly regulated.

Our exploratory analysis on the effects of national culture on bank financial trouble during the crisis period provides some interesting insights. We find that banks in cultures that encourage higher risk taking experienced more financial trouble in the form of lower profitability, capital adequacy, asset quality and liquidity. These results again confirm our expectation that banks in societies with high uncertainty avoidance and low individualism had a lower incidence of financial trouble during the crisis period, likely due to lower risk taking in the pre-crisis period.

Our study is timely given the recent banking crisis that has placed particular emphasis on restricting excessive risk taking by banks. By providing evidence that enhances our understanding of how the uncertainty avoidance and individualism dimensions of national culture are associated with bank risk taking, our results will inform regulators worldwide on the complexities and challenges of having uniform regulations on risk taking across countries.

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Table 1: Variable definitions

Risk-taking measures

z-score   =   equals log of (ROA+CAR)/σ(ROA) where ROA is earnings before taxes and loan loss provision divided by assets, CAR is capital-asset ratio, and σ(ROA) is the standard deviation of ROA. The ROA and capital-asset ratio are calculated as the mean over 2000–2007, and σ(ROA) is the standard deviation of ROA estimated over the time period 2000–2007. Higher z-score implies more stability.

σ(ROA)   =   volatility of earnings over the period 2000-2007.

σ(NIM),   =   volatility of net interest margin over the period 2000–2007.

National Culture variables

UAI   =   measure of uncertainty avoidance from Hofstede (2001).

IDV   =   measure of individualism from Hofstede (2001).

Firm-level variables

SIZE   =   log of total assets in US$, averaged over 2000-2007.

REVG   =   growth in net interest revenue, averaged over 2000-2007.

LLP   =   loan loss provision scaled by total loans, averaged over 2000-2007

NPL   =   non-performing loans scaled by total loans, averaged over 2000-2007.

TOOBIG   =   an indicator that the bank is too big to fail. It equals one if the bank's share of the country's total deposit is more than 10%, and zero otherwise.

Country-level variables

RESTRICT   =   an indicator of the degree to which banks face regulatory restrictions on their activities in securities markets, insurance, real-estate, and owning shares in non-financial firms. The indicator potentially ranges from 0 to 4, where higher values indicate greater restrictions. Data from Barth et al. (2006).

CAPST   =   Capital stringency is an index of regulatory oversight of bank capital from Barth et al. (2006).

DI   =   An indicator variable that equals one if the country has deposit insurance, and zero otherwise (Demirguc-Kunt et al. 2008).

COMP   =   competition index, measured by the Herfindahl–Hirschman Index, which is equal to the sum of the squares of the market shares (deposits) of each individual bank in individual countries. The index is calculated over the period 2000-2007 and it ranges from zero to one with a higher value indicating greater monopoly power.

CR   =   index aggregating different creditor rights: the absence of automatic stay in reorganization, the requirement for creditors' consent or minimum dividend for a debtor to file for reorganization, secured creditors are ranked first in

reorganization, and the removal of incumbent management upon filing for reorganization. The index ranges from 0 to 4. Data originally from La Porta et al. (1998) and updated in Djankov et al. (2007).

RIGHTS = an index of the legal protection of shareholders across countries from La Porta et al. (1998). This index ranges from zero to six, where larger values indicate greater legal protection of shareholder rights.

COMMON = indicator equals one if the legal orign is common and zero otherwise (La Porta et al. 1998).

LGDP = log of mean GDP over the period 2000-2007, in constant 2005 US dollars.

CF = cash flow rights of the largest shareholder of the bank, as reported in Laeven and Levine (2009).

DISC = disclosure index reported in La Porta et al. (1998).

Crisis period Variables

Troubled Banks = defined as a troubled bank if it satisfies any of the following criteria in 2007 or 2008: (1) incurs a loss (i.e., net income < 0), (2) has a low capital ratio (i.e., equity over assets < 10%), (3) recognizes a large loan loss provision (i.e., loan loss provision/total loans > 1%), and (4) zero liquid assets. To ensure that these banks were not troubled prior to 2007, banks that satisfy any of the above criteria in 2006 were deleted from the sample. Thus, sample banks in the tests relate to banks that were healthy in 2006 but are troubled in 2007 or 2008.

SIZE1 = log of total assets in year 2006.

GROWTH = growth in total assets from the beginning to the end of the year 2006.

LOANS = total loans scaled by total assets at the end of 2006.

LEV = total liabilities divided by total assets at the end of year 2006.

ΔCASH = change in annual cash flows (income before taxes and loan loss provisions) scaled by total assets at the end of year 2006.

ALLOW = allowance for loan loss scaled by total assets at the end of year 2006.

Table 2: Descriptive statistics

Panel A: Institutional Variables

Country	IDV	UAI	CAPST	RESTRICT	DI	COMP	CF	RIGHTS	CR	COMMON	GDP	DISC
Argentina	46	86	3	8.75	1	0.09	0.47	4	1	0	4,620	45
Australia	90	51	3	8	0	0.07	0.01	4	3	1	34,966	75
Austria	55	70	5	5	1	0.16	0.4	2	3	0	37,944	54
Belgium	75	94	4	9	1	0.08	0.54	0	2	0	35,744	61
Brazil	38	76	5	10	1	0.05	0.23	3	1	0	5,313	54
Canada	80	48	4	7	1	0.12	0	5	1	1	37,029	74
Chile	23	86	3	11	1	0.12	0.24	5	2	0	7,640	52
Colombia	13	80	-	-	1	0.12	0.32	3	0	0	2,979	50
Costa Rica	15	86	-	-	-	0.87	-	-	1	0	4,588	-
Denmark	74	23	2	8	1	0.12	0.15	2	3	0	47,815	62
Ecuador	8	67	-	-	1	0.11	0.52	2	0	0	2,586	-
El Salvador	19	94	-	-	-	0.18	-	-	3	0	2,890	-
Finland	63	59	4	7	1	0.19	0.36	3	1	0	37,555	77
France	71	86	2	6	1	0.02	0.4	3	0	0	34,172	69
Germany	67	65	1	5	1	0.02	0.32	1	3	0	34,446	62
Greece	35	112	3	9	1	0.08	0.33	2	1	0	20,338	55
Hong Kong	25	29	-	-	1	0.09	0.35	5	4	1	25,417	69
India	48	40	3	10	1	0.06	0.31	5	2	1	738	57
Indonesia	14	48	5	14	1	0.48	0.64	2	2	0	1,351	-
Israel	54	81	3	13	0	0.10	0.41	3	3	1	18,842	64
Italy	76	75	4	10	1	0.03	0	1	2	0	30,062	62
Jamaica	39	13	-	-	-	0.11	-	-	2	1	3,258	-
Japan	46	92	4	13	1	0.02	0.11	4	2	0	33,362	65
Korea	18	85	3	9	1	0.07	0.26	2	3	0	17,962	62
Malaysia	26	36	3	10	0	0.03	0.3	4	3	1	5,264	76
Mexico	30	82	4	12	1	0.07	0.58	1	0	0	7,222	60
Netherlands	80	53	3	6	1	0.12	0.17	2	3	0	37,421	64
New Zealand	79	49	-	-	-	0.23	-	-	4	1	24,383	70
Norway	69	50	-	-	1	0.09	0.05	4	2	0	64,737	74
Pakistan	14	70	-	-	0	0.08	0.49	5	1	1	684	-
Panama	11	86	-	-	-	0.06	-	-	4	0	5,248	-
Peru	16	87	3	8	1	0.10	0.55	3	0	0	2,993	38
Philippines	32	44	1	7	0	0.23	0.26	3	1	0	1,174	65
Portugal	27	104	3	9	1	0.09	0.18	3	1	0	16,500	36
South Africa	65	49	4	8	1	0.07	0.15	5	3	1	4,754	70
Spain	51	86	4	7	1	0.04	0.18	4	2	0	25,740	64
Sweden	71	29	3	9	1	0.08	0.09	3	1	0	39,609	83
Switzerland	68	58	3	5	1	0.10	0.23	2	1	0	49,738	68
Taiwan	17	69	2	12	0	0.17	0.15	3	2	0	15,603	65
Thailand	20	64	4	9	1	0.72	0.45	2	2	1	2,897	64
Turkey	37	85	1	12	1	0.05	0.53	2	2	0	4,583	51
United Kingdom	89	35	3	5	1	0.06	0.02	5	4	1	36,598	78
Uruguay	36	100	-	-	-	0.14	0	2	3	0	5,454	31
USA	91	46	4	12	1	0.01	0	5	1	1	42,002	71
Venezuela	12	76	3	10	1	0.06	0.32	1	3	0	5,593	40

Panel B: Banks' characteristics

Country	N	z-score	σ(ROA)	σ(NIM)	LLP	NPL	REVG	SIZE	TOOBIG
Argentina	85	1.370	0.089	0.057	0.09	0.26	-0.06	6.52	0.00
Australia	2	3.792	0.006	0.005	0.01	0.00	5.04	7.03	0.00
Austria	6	3.227	0.002	0.002	0.00	0.03	0.51	10.51	0.00
Belgium	3	3.120	0.003	0.003	0.00	0.04	0.10	8.25	0.00
Brazil	133	2.255	0.031	0.067	0.06	0.11	0.63	7.95	0.00
Canada	53	3.258	0.008	0.006	0.04	0.04	0.34	8.28	0.09
Chile	14	3.289	0.008	0.009	0.01	0.01	0.35	7.51	0.00
Colombia	20	2.475	0.018	0.014	0.02	0.06	0.24	8.28	0.00
Costa Rica	38	3.317	0.006	0.013	0.01	0.08	0.35	4.68	0.00
Denmark	80	2.646	0.007	0.008	0.01	0.02	0.53	8.86	0.03
Ecuador	23	2.887	0.012	0.017	0.02	0.09	0.67	5.34	0.09
El Salvador	18	2.911	0.010	0.017	0.02	0.05	0.13	6.34	0.00
Finland	9	2.825	0.012	0.010	0.01	0.02	0.81	8.14	0.00
France	205	3.113	0.007	0.006	0.01	0.06	0.17	8.22	0.00
Germany	30	2.971	0.002	0.001	0.00	0.03	1.81	11.14	0.00
Greece	3	2.648	0.011	0.005	0.01	0.37	0.50	8.16	0.00
Hong Kong	1	3.040	0.022	0.027	0.12	0.05	0.10	8.16	0.00
India	80	1.960	0.009	0.006	0.01	0.09	2.46	12.09	0.01
Indonesia	49	2.564	0.013	0.014	0.01	0.17	0.54	9.38	0.02
Israel	16	3.332	0.003	0.002	0.01	0.08	0.08	10.52	0.13
Italy	413	3.657	0.005	0.009	0.01	0.09	0.14	5.40	0.00
Jamaica	12	2.969	0.009	0.011	0.01	0.08	1.86	10.84	0.17
Japan	728	3.149	0.004	0.003	0.01	0.08	0.23	7.63	0.00
Korea	31	2.917	0.004	0.004	0.01	0.03	0.87	10.80	0.00
Malaysia	66	3.131	0.009	0.007	0.01	0.17	0.78	9.69	0.00
Mexico	32	2.347	0.017	0.022	0.02	0.03	1.30	10.55	0.00
Netherlands	1	2.624	0.009	0.010	0.00	0.04	0.07	7.51	0.00
New Zealand	3	3.055	0.009	0.009	0.00	0.02	3.43	11.71	0.67
Norway	56	3.550	0.003	0.003	0.00	0.01	0.58	8.79	0.04
Pakistan	27	2.195	0.014	0.013	0.02	0.16	0.64	11.27	0.04
Panama	17	3.263	0.006	0.006	0.01	0.03	1.57	7.03	0.00
Peru	21	2.560	0.013	0.017	0.02	0.06	0.83	8.61	0.05
Philippines	10	2.650	0.015	0.016	0.01	1.18	5.09	6.89	0.00
Portugal	9	3.131	0.005	0.006	0.01	0.03	0.24	8.05	0.00
South Africa	24	1.263	0.014	0.019	0.02	0.06	2.87	11.28	0.00
Spain	6	2.991	0.005	0.004	0.01	0.02	1.46	7.83	0.00
Sweden	58	3.599	0.005	0.006	0.00	0.03	0.30	8.36	0.03
Switzerland	309	3.120	0.005	0.002	0.00	0.03	0.22	6.51	0.00
Taiwan	58	3.094	0.011	0.005	0.04	0.13	0.38	6.57	0.02
Thailand	41	2.561	0.015	0.010	0.01	0.15	0.60	5.06	0.00
Turkey	46	1.956	0.034	0.049	0.04	0.11	4.25	14.99	0.00
United Kingdom	23	3.245	0.011	0.008	0.01	0.13	0.18	6.62	0.00
Uruguay	18	1.888	0.033	0.038	0.05	0.07	1.19	8.52	0.11
USA	954	3.447	0.007	0.006	0.00	0.01	0.19	7.81	0.00
Venezuela	44	2.268	0.025	0.053	0.05	0.29	1.11	13.81	0.02

	z-score	σ(ROA)	σ(NIM)	UAI	IDV	LLP	NPL	REVG	SIZE	TOOBIG	CF	COMP	RESTRICT	CAPST	DI	CR	RIGHTS	COMMON	LGDP	DISC
z-score	1.00																			
σ(ROA)	**-0.83**	1.00																		
σ(NIM)	**-0.56**	**0.82**	1.00																	
UAI	**0.09**	**-0.07**	**-0.07**	1.00																
IDV	**-0.30**	**0.23**	**0.24**	**-0.52**	1.00															
LLP	**-0.17**	**0.22**	**0.22**	0.07	**-0.12**	1.00														
NPL	**-0.10**	**0.14**	**0.10**	0.08	**-0.15**	**0.18**	1.00													
REVG	**-0.13**	**0.15**	**0.14**	-0.03	**-0.12**	0.02	**0.07**	1.00												
SIZE	**-0.24**	**0.16**	**0.17**	**-0.10**	**-0.16**	0.00	-0.01	**0.28**	1.00											
TOOBIG	-0.02	0.00	0.02	**-0.05**	-0.03	-0.01	-0.01	**0.11**	**0.17**	1.00										
CF	**-0.38**	**0.31**	**0.30**	0.26	**-0.66**	0.11	0.12	0.14	0.28	0.03	1.00									
COMP	**-0.11**	**0.15**	**0.17**	-0.01	**-0.43**	0.03	**0.06**	0.03	**-0.11**	0.04	**0.48**	1.00								
RESTRICT	**-0.09**	**0.08**	0.02	**0.14**	**-0.09**	-0.01	-0.01	-0.02	**0.07**	-0.03	**-0.38**	**-0.18**	1.00							
CAPST	**-0.12**	**0.08**	0.04	0.03	**0.11**	0.00	-0.05	**-0.15**	**-0.23**	-0.03	**-0.48**	-0.03	**0.57**	1.00						
DI	0.03	-0.04	-0.03	**0.10**	**0.35**	-0.03	**-0.11**	-0.05	-0.09	-0.05	**-0.18**	**-0.10**	-0.04	**0.28**	1.00					
CR	**-0.05**	0.05	0.05	**0.09**	**-0.33**	0.00	**0.06**	**0.10**	**0.11**	0.04	**-0.13**	0.05	**0.22**	0.01	**-0.22**	1.00				
RIGHTS	0.02	0.03	**0.05**	**-0.30**	**0.28**	-0.01	**-0.07**	-0.03	**0.14**	-0.01	**-0.31**	**-0.29**	**0.47**	**0.26**	-0.04	**-0.22**	1.00			
COMMON	**-0.08**	0.02	0.03	**-0.68**	**0.51**	-0.05	**-0.09**	0.01	**0.13**	0.02	**-0.36**	**-0.10**	**0.26**	**0.24**	**-0.13**	**-0.17**	**0.70**	1.00		
LGDP	**0.40**	**-0.48**	**-0.53**	**-0.09**	**0.69**	**-0.14**	**-0.16**	**-0.21**	**-0.27**	-0.05	**-0.65**	**-0.42**	-0.03	0.05	**0.30**	**-0.14**	**0.09**	0.02	1.00	
DISC	**0.35**	**-0.36**	**-0.41**	**-0.51**	**0.58**	**-0.17**	**-0.13**	**-0.11**	**-0.13**	-0.01	**-0.45**	**-0.14**	0.02	**0.08**	**-0.12**	**-0.20**	**0.40**	**0.45**	**0.62**	1.00

Panel A reports the country-level institutional variables. Panel B reports banks' characteristics by country. Panel C presents Pearson correlation between variables used in the bank risk-taking regression model. Definitions of the variables are shown in Table 1. In panel C, correlation coefficient is bold when it is significance at the 1% level (two-tailed).

Table 3: National culture and risk-taking of banks

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
			Dependent variable: z-scores			
Constant	-1.783	3.496	3.212	1.229	1.643	1.666
	(-4.24)***	(19.61)***	(16.56)***	(3.46)***	(4.47)***	(4.54)***
UAI	0.055		0.016	0.007		0.006
	(9.84)***		(8.02)***	(5.23)***		(4.32)***
IDV		-0.037	-0.024		-0.012	-0.010
		(-9.70)***	(-7.01)***		(-5.53)***	(-4.68)***
SIZE	-0.035	-0.034	-0.059	-0.030	-0.045	-0.039
	(-4.93)***	(-4.78)***	(-8.27)***	(-4.29)***	(-6.26)***	(-5.40)***
REVG	-0.005	-0.001	-0.005	-0.007	-0.006	-0.006
	(-2.20)**	(-0.42)	(-2.00)**	(-3.01)***	(-2.66)***	(-2.79)***
LLP	-0.927	-0.924	-1.055	-1.138	-1.158	-1.124
	(-4.60)***	(-4.59)***	(-5.13)***	(-5.43)***	(-5.53)***	(-5.37)***
NPL	-0.074	-0.096	-0.108	-0.059	-0.042	-0.052
	(-1.44)	(-1.89)*	(-2.07)**	(-1.10)	(-0.79)	(-0.98)
TOOBIG	0.165	0.106	0.209	0.144	0.185	0.173
	(1.00)	(0.65)	(1.25)	(0.67)	(0.86)	(0.81)
RESTRICT				-0.041	-0.047	-0.031
				(-4.27)***	(-5.07)***	(-3.16)***
CAPST				-0.118	-0.145	-0.175
				(-3.98)***	(-4.64)***	(-5.48)***
DI				-0.313	0.052	-0.002
				(-3.50)***	(0.47)	(-0.02)
COMP				-0.319	-0.166	-0.972
				(-1.45)	(-4.54)***	(-3.74)***
CR				-0.126	-0.197	-0.190
				(-5.31)***	(-7.22)***	(-3.96)***
RIGHTS				-0.200	-0.244	-0.247
				(-11.19)***	(-11.90)***	(-12.06)***
COMMON				-0.429	-0.604	-0.726
				(-6.35)***	(-6.84)***	(-7.84)***
LGDP				0.160	0.260	0.219
				(5.23)***	(8.22)***	(6.63)***
CF				-1.610	-1.765	-2.109
				(-7.09)***	(-7.42)***	(-8.43)***
DISC				0.020	0.018	0.021
				(5.83)***	(5.40)***	(6.04)***
Country Dummies	Yes	Yes	Yes	No	No	No
Adj R² (%)	31.29	31.26	28.26	26.19	26.26	26.62
N	3,875	3,875	3,875	3,593	3,593	3,593

Dependent variable for the regression is the z-scores. Detailed definitions of the variables are shown in Table 1. '*', '**', and '***' denote significance at 10%, 5%, and 1% levels (two-tailed), respectively.

Table 4: National culture and alternative measures of risk-taking

	Dependent variable: σ(ROA)			Dependent variable: σ(NIM)		
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Constant	1.167	0.245	0.177	3.198	2.235	2.157
	(2.65)***	(0.54)	(0.39)	(7.31)***	(4.90)***	(4.82)***
UAI	-0.021		-0.018	-0.023		-0.021
	(-12.04)***		(-10.41)***	(-13.71)***		(-11.99)***
IDV		0.028	0.023		0.030	0.024
		(10.52)***	(8.63)***		(11.27)***	(9.15)***
SIZE	-0.017	0.020	0.004	-0.011	0.030	0.011
	(-1.96)**	(2.27)**	(0.42)	(-1.30)	(3.32)***	(1.20)
REVG	0.011	0.009	0.010	0.007	0.004	0.005
	(3.94)***	(3.19)***	(3.54)***	(2.28)**	(1.47)	(1.86)*
LLP	2.390	2.460	2.358	2.376	2.459	2.343
	(9.20)***	(9.43)***	(9.16)***	(9.21)***	(9.45)***	(9.18)***
NPL	0.203	0.158	0.188	0.054	0.004	0.038
	(3.07)***	(2.39)**	(2.88)***	(0.82)	(0.06)	(0.58)
TOOBIG	-0.287	-0.387	-0.352	-0.021	-0.129	-0.089
	(-1.08)	(-1.45)	(-1.34)	(-0.08)	(-0.49)	(-0.34)
RESTRICT	-0.006	0.029	0.017	0.043	0.015	0.067
	(-0.51)	(2.56)***	(1.38)	(3.65)***	(1.30)	(5.60)***
CAPST	0.091	0.132	0.220	0.065	0.100	0.201
	(2.49)**	(3.39)***	(5.62)***	(1.80)*	(2.59)***	(5.18)***
DI	0.511	0.355	-0.196	0.547	0.379	-0.197
	(4.61)***	(2.57)***	(-1.43)	(4.96)***	(2.75)***	(-1.45)
COMP	0.536	1.521	0.948	1.307	0.908	0.253
	(1.97)**	(4.76)***	(2.96)***	(4.84)***	(2.85)***	(0.80)
CR	0.062	0.229	0.207	0.033	0.144	0.120
	(2.12)**	(6.73)***	(6.18)***	(1.13)	(4.26)***	(3.60)***
RIGHTS	0.096	0.195	0.203	-0.028	0.075	0.085
	(4.32)***	(7.60)***	(8.06)***	(-1.29)	(2.94)***	(3.40)***
COMMON	0.260	0.571	0.932	0.133	0.427	0.840
	(3.10)***	(5.19)***	(8.19)***	(1.60)	(3.90)***	(7.44)***
LGDP	-0.401	-0.657	-0.534	-0.533	-0.813	-0.672
	(-10.57)***	(-16.65)***	(-13.15)***	(-14.13)***	(-20.68)***	(-16.69)***
CF	1.450	1.562	2.582	1.049	1.074	2.239
	(5.16)***	(5.28)***	(8.39)***	(3.76)***	(3.64)***	(7.33)***
DISC	-0.036	-0.030	-0.037	-0.043	-0.036	-0.044
	(-8.37)***	(-7.11)***	(-8.80)***	(-10.18)***	(-8.68)***	(-10.67)***
Country Dummies	No	No	No	No	No	No
Adj R^2 (%)	32.07	31.44	33.44	37.42	36.39	38.83
N	3,593	3,593	3,593	3,593	3,593	3,593

Dependent variable for the regression is the standard deviation of earnings ($\sigma(ROA)$) and standard deviation of net interest margin ($\sigma(NIM)$). Detailed definitions of the variables are shown in Table 1. '*', '**', and '***' denote significance at 10%, 5%, and 1% levels (two-tailed), respectively.

Table 5: Robustness check:
Weighted OLS regressions for all countries and OLS regressions excluding banks in the US

	Weighted by bank assets			Excluding US banks		
	Dependent variable: z-scores					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Constant	1.888	2.194	2.237	1.129	1.455	1.588
	(5.23)***	(6.00)***	(6.13)***	(2.97)***	(3.74)***	(4.06)***
UAI	0.007		0.005	0.006		0.005
	(4.85)***		(3.75)***	(3.89)***		(3.01)***
IDV		-0.013	-0.011		-0.012	-0.011
		(-6.28)***	(-5.47)***		(-5.28)***	(-4.66)***
SIZE	-0.035	-0.049	-0.045	-0.032	-0.049	-0.044
	(-5.03)***	(-6.98)***	(-6.29)***	(-3.84)***	(-5.76)***	(-5.10)***
REVG	-0.006	-0.005	-0.006	-0.006	-0.005	-0.005
	(-3.34)***	(-2.76)***	(-2.92)***	(-2.47)**	(-1.97)**	(-2.17)**
LLP	-1.280	-1.307	-1.277	-1.021	-1.037	-1.010
	(-5.45)***	(-5.57)***	(-5.45)***	(-4.59)***	(-4.68)***	(-4.56)***
NPL	-0.028	-0.014	-0.021	-0.057	-0.040	-0.051
	(-0.57)	(-0.28)	(-0.43)	(-1.02)	(-0.73)	(-0.91)
TOOBIG	0.141	0.171	0.168	0.121	0.123	0.162
	(0.84)	(1.02)	(1.00)	(0.54)	(0.54)	(0.72)
RESTRICT	-0.035	-0.036	-0.024	-0.049	-0.063	-0.040
	(-3.77)***	(-4.09)***	(-2.60)***	(-3.72)***	(-5.72)***	(-3.04)***
CAPST	-0.116	-0.153	-0.178	-0.122	-0.173	-0.183
	(-4.19)***	(-5.24)***	(-5.97)***	(-3.92)***	(-5.17)***	(-5.45)***
DI	-0.472	-0.094	-0.133	-0.305	0.077	0.029
	(-5.34)***	(-0.87)	(-1.23)	(-3.26)***	(0.66)	(0.24)
COMP	-0.443	-1.321	-0.118	-0.363	-0.273	-1.077
	(-1.77)*	(-4.84)***	(-4.02)***	(-1.55)	(-4.69)***	(-3.87)***
CR	-0.165	-0.244	-0.238	-0.146	-0.256	-0.214
	(-7.05)***	(-9.07)***	(-8.86)***	(-4.16)***	(-7.26)***	(-5.65)***
RIGHTS	-0.199	-0.235	-0.244	-0.202	-0.254	-0.252
	(-10.57)***	(-11.52)***	(-11.91)***	(-10.83)***	(-11.83)***	(-11.75)***
COMMON	-0.435	-0.632	-0.745	-0.508	-0.891	-0.831
	(-6.41)***	(-7.62)***	(-8.45)***	(-4.55)***	(-6.87)***	(-6.34)***
LGDP	0.164	0.271	0.233	0.187	0.322	0.251
	(5.73)***	(9.22)***	(7.48)***	(4.31)***	(8.29)***	(5.54)***
CF	-1.639	-1.840	-2.153	-1.594	-1.868	-2.088
	(-7.22)***	(-7.98)***	(-8.79)***	(-6.67)***	(-7.46)***	(-8.01)***
DISC	0.015	0.014	0.017	0.018	0.013	0.018
	(4.44)***	(4.38)***	(4.98)***	(3.98)***	(3.12)***	(4.09)***
Country Dummies	No	No	No	No	No	No
Adj R^2 (%)	26.86	27.18	27.45	26.99	27.34	27.56
N	3,593	3,593	3,593	2,639	2,639	2,639

The first three models report results for the regressions using weighted OLS regressions (the results are weighted by bank assets). The last three models report results after dropping US banks (which constitute over 20% of the observations) from the sample. Detailed definitions of the variables are shown in Table 1. '*', '**', and '***' denote significance at 10%, 5%, and 1% levels (two-tailed), respectively.

Table 6: Interaction effect creditor rights and cash flow rights on the relation between national culture and risk-taking

	Moderating role of creditor rights			Moderating role of cash flow rights		
	Dependent variable: z-scores					
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Constant	0.844	0.9464	0.923	-0.727	-0.198	-0.807
	(2.57)***	(2.88)***	(2.79)***	(-2.19)**	(-0.60)	(-2.38)**
UAI	0.003		0.003	0.008		0.009
	(2.22)**		(1.81)*	(4.77)***		(4.53)***
IDV		-0.010	-0.008		-0.006	0.003
		(-3.56)***	(-2.84)***		(-2.42)**	(1.18)
SIZE	-0.031	-0.039	-0.037	-0.042	-0.050	-0.040
	(-4.34)***	(-5.41)***	(-5.04)***	(-6.25)***	(-7.00)***	(-5.34)***
REVG	-0.007	-0.007	-0.007	-0.005	-0.006	-0.005
	(-3.11)***	(-2.82)***	(-2.85)***	(-2.19)**	(-2.39)**	(-2.29)**
LLP	-1.135	-1.124	-1.111	-1.055	-1.195	-1.049
	(-5.42)***	(-5.38)***	(-5.32)***	(-5.03)***	(-5.66)***	(-4.99)***
NPL	-0.054	-0.043	-0.049	-0.016	-0.027	-0.021
	(-1.01)	(-0.81)	(-0.92)	(-0.30)	(-0.49)	(-0.40)
TOOBIG	0.140	0.189	0.186	0.300	0.250	0.291
	(0.66)	(0.89)	(0.87)	(1.40)	(1.16)	(1.36)
RESTRICT	-0.034	-0.024	-0.019	-0.071	-0.070	-0.069
	(-3.59)***	(-2.37)**	(-1.79)*	(-7.79)***	(-7.93)***	(-7.19)***
CAPST	-0.094	-0.132	-0.142	-0.119	-0.020	-0.127
	(-3.24)***	(-4.42)***	(-4.67)***	(-3.49)***	(-0.65)	(-3.53)***
DI	-0.383	-0.071	-0.096	-0.155	-0.121	-0.226
	(-4.14)***	(-0.64)	(-0.85)	(-1.71)*	(-1.08)	(-1.98)**
COMP	-0.626	-1.347	-1.175	-0.569	-1.188	-0.418
	(-2.92)***	(-4.14)***	(-3.48)***	(-2.72)***	(-4.50)***	(-1.50)
CR	-0.660	-0.260	-0.173	-0.187	-0.084	-0.184
	(-4.78)***	(-1.51)	(-0.62)	(-6.90)***	(-3.46)***	(-6.66)***
RIGHTS	-0.188	-0.228	-0.224	-0.231	-0.248	-0.210
	(-10.24)***	(-9.26)***	(-9.01)***	(-12.32)***	(-9.97)***	(-8.35)***
COMMON	-0.421	-0.693	-0.714	-0.593	-0.612	-0.493
	(-5.75)***	(-5.63)***	(-5.66)***	(-7.40)***	(-5.27)***	(-4.23)***
LGDP	0.217	0.320	0.292	0.390	0.312	0.367
	(7.19)***	(8.09)***	(7.58)***	(10.71)***	(9.34)***	(8.93)***
CF	-1.036	-1.158	-1.310	1.568	-0.232	-1.805
	(-4.99)***	(-5.86)***	(-6.12)***	(6.94)***	(-1.43)	(-6.03)***
DISC	0.018	0.015	0.016	0.008	0.019	0.009
	(5.11)***	(4.42)***	(4.70)***	(2.00)**	(5.35)***	(2.09)**
CR*UAI	0.006		-0.001			
	(2.54)***		(-0.10)			
CR*IDV		-0.005	-0.006			
		(-2.06)**	(-1.98)**			
CF*UAI				-0.024		-0.025
				(-7.87)***		(-7.85)***
CF*IDV					0.004	-0.003
					(1.35)	(-1.05)
Adj R^2 (%)	26.39	26.83	26.86	26.45	25.15	26.44
N	3,593	3,593	3,593	3,593	3,593	3,593

This table report results on whether the association between national culture and risk taking varies with the strength of creditor rights (*CR*) and corporate governance (*CF*). The interaction terms *CR*UAI*, *CR*IDV* are included in models (1) to (3), and *CF*UAI*, *CF*IDV* are included in models (4) to (6). The dependent variable for these models is z-score. Detailed definitions of the variables are shown in Table 1. '*', '**', and '***' denote significance at 10%, 5%, and 1% levels (two-tailed), respectively.

Table 7: National culture and troubled banks

Panel A: Profitability Test

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Constant	-2.260	-6.452	-4.759	-9.800	-14.062	-11.124
	(10.72)***	(14.06)***	(13.67)***	(33.75)***	(84.59)***	(40.89)***
UAI	-0.023		-0.028	-0.031		-0.022
	(9.53)***		(12.03)***	(52.47)***		(13.64)***
IDV		0.044	0.047		0.034	0.016
		(3.33)*	(5.76)**		(41.04)***	(5.31)**
SIZE1	0.130	0.137	0.131	0.138	0.134	0.133
	(27.51)***	(31.29)***	(28.07)***	(30.69)***	(28.69)***	(28.09)***
GROWTH	-0.018	-0.016	-0.008	0.046	0.049	0.045
	(0.02)	(0.01)	(0.00)	(0.12)	(0.14)	(0.12)
LOANS	0.157	0.159	0.156	-0.024	-0.018	-0.030
	(0.63)	(0.67)	(0.63)	(0.02)	(0.01)	(0.02)
LEV	-0.069	-0.390	-0.173	-0.115	-0.355	-0.143
	(0.01)	(0.46)	(0.08)	(0.02)	(0.28)	(0.04)
ΔCASH	0.712	0.965	0.732	-0.027	-0.596	-0.291
	(0.04)	(0.08)	(0.04)	(0.00)	(0.01)	(0.00)
ALLOW	7.479	6.737	7.028	8.821	8.308	8.878
	(11.19)***	(9.89)***	(10.20)***	(9.10)***	(11.90)***	(10.58)***
RESTRICT				0.236	0.263	0.244
				(66.06)***	(51.84)***	(66.24)***
CAPST				-0.306	-0.486	-0.382
				(5.98)**	(12.82)***	(8.47)***
DI				0.733	0.854	0.646
				(3.16)*	(4.89)**	(2.62)
CR				0.069	0.140	0.075
				(0.73)	(3.91)**	(0.95)
RIGHTS				0.341	0.466	0.465
				(15.13)***	(19.78)***	(19.42)***
COMMON				0.426	1.472	0.851
				(1.61)	(25.22)***	(5.55)**
LGDP				1.070	0.960	1.071
				(71.46)***	(51.67)***	(70.61)***
DISC				-0.074	-0.045	-0.076
				(19.75)***	(7.85)***	(20.18)***
Country Dummies	Yes	Yes	Yes	No	No	No
Pseudo R^2 (%)	20.02	19.88	20.50	15.47	15.09	15.72
Percent of troubled banks	13.63	13.63	13.63	14.70	14.70	14.70
N	4,379	4,379	4,379	3,953	3,953	3,953

Table 7 (continued)

Panel B: Capital adequacy test

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Constant	-3.574	-5.282	-3.249	-2.950	-6.068	-3.996
	(10.55)***	(23.73)***	(8.41)***	(1.70)	(9.40)***	(2.83)*
UAI	-0.021		-0.030	-0.019		-0.012
	(4.87)**		(19.81)***	(11.36)***		(2.79)*
IDV		0.027	0.005		0.021	0.011
		(3.16)*	(0.52)		(9.97)***	(1.77)
SIZE1	0.130	0.113	0.132	0.138	0.136	0.136
	(15.20)***	(11.87)***	(15.66)***	(14.55)***	(13.45)***	(13.77)***
GROWTH	0.196	0.149	0.189	0.275	0.260	0.266
	(1.13)	(0.57)	(1.02)	(2.51)	(2.08)	(2.24)
LOANS	-0.337	-0.268	-0.313	-0.395	-0.373	-0.388
	(1.79)	(1.07)	(1.54)	(2.35)	(2.07)	(2.25)
LEV	3.198	3.448	3.226	3.730	3.700	3.689
	(9.48)***	(10.64)***	(9.70)***	(7.01)***	(6.99)***	(6.98)***
ΔCASH	-1.243	-1.530	-1.322	-2.278	-2.567	-2.348
	(0.90)	(1.28)	(0.99)	(3.36)*	(4.17)**	(3.60)*
ALLOW	-1.503	-2.471	-1.765	-1.251	-2.070	-1.435
	(0.68)	(1.76)	(0.93)	(0.52)	(1.34)	(0.68)
RESTRICT				0.100	0.110	0.099
				(5.56)**	(5.71)**	(4.94)**
CAPST				-0.094	-0.180	-0.137
				(0.53)	(1.70)	(0.99)
DI				-0.699	-0.782	-0.779
				(2.12)	(2.71)*	(2.68)*
CR				-0.195	-0.123	-0.166
				(3.56)*	(1.66)	(2.64)
RIGHTS				0.348	0.418	0.398
				(12.57)***	(15.87)***	(14.04)***
COMMON				0.283	-0.602	-0.157
				(0.43)	(1.88)	(0.08)
LGDP				0.253	0.215	0.248
				(2.32)	(1.68)	(2.20)
DISC				-0.068	-0.044	-0.064
				(12.21)***	(7.88)***	(9.72)***
Country Dummies	Yes	Yes	Yes	No	No	No
Pseudo R^2 (%)	16.24	16.62	16.02	12.49	12.40	12.67
Percent of troubled banks	24.57	24.57	24.57	23.92	23.92	23.92
N	1,815	1,815	1,815	1,534	1,534	1,534

Table 7 (continued)

Panel C: Asset quality test						
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Constant	-0.319	-3.148	0.772	-5.222	-9.718	-6.502
	(0.11)	(11.92)***	(0.14)	(8.39)***	(33.10)***	(12.52)***
UAI	-0.016		-0.044	-0.037		-0.026
	(2.77)*		(3.45)*	(62.29)***		(18.87)***
IDV		0.031	0.007		0.039	0.018
		(4.32)**	(0.18)		(54.64)***	(9.85)***
SIZE1	0.137	0.149	0.146	0.147	0.146	0.143
	(33.13)***	(39.12)***	(35.36)***	(37.84)***	(36.11)***	(34.99)***
GROWTH	-0.177	-0.149	-0.152	-0.159	-0.178	-0.170
	(1.66)	(1.29)	(1.33)	(1.32)	(1.63)	(1.50)
LOANS	0.281	0.275	0.270	0.155	0.146	0.130
	(1.70)	(1.69)	(1.62)	(0.45)	(0.42)	(0.32)
LEV	-1.259	-1.353	-1.310	-1.800	-2.047	-1.855
	(5.04)**	(5.85)**	(5.40)**	(8.26)***	(10.66)***	(8.70)***
ΔCASH	-0.668	-0.655	-0.665	6.826	5.494	6.270
	(0.27)	(0.25)	(0.27)	(5.30)**	(2.83)*	(4.19)**
ALLOW	1.951	2.034	2.004	21.090	18.111	21.528
	(2.44)	(2.56)	(2.52)	(4.70)**	(4.50)**	(4.81)**
RESTRICT				0.134	0.141	0.132
				(28.98)***	(23.07)***	(25.93)***
CAPST				0.457	0.292	0.381
				(16.06)***	(4.96)**	(10.50)***
DI				0.253	0.319	0.120
				(0.32)	(0.59)	(0.08)
CR				-0.120	-0.079	-0.113
				(1.90)	(1.13)	(1.93)
RIGHTS				0.291	0.434	0.427
				(11.47)***	(21.05)***	(19.96)***
COMMON				0.890	1.933	1.308
				(5.49)**	(33.03)***	(11.73)***
LGDP				0.728	0.558	0.723
				(25.35)***	(16.98)***	(25.05)***
DISC				-0.068	-0.034	-0.072
				(20.33)***	(5.03)**	(20.57)***
Country Dummies	Yes	Yes	Yes	No	No	No
Pseudo R^2 (%)	22.45	22.54	22.56	16.50	15.88	16.89
Percent of troubled banks	18.81	18.81	18.81	18.62	18.62	18.62
N	3,779	3,779	3,779	3,481	3,481	3,481

Table 7 (continued)

Panel D: Liquidity test						
	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Constant	7.214	-2.803	9.292	6.307	-5.731	-7.548
	(26.44)***	(4.95)**	(20.49)***	(0.06)	(0.98)	(0.63)**
UAI	-0.074		-0.109	-0.113		0.010
	(31.44)***		(44.88)***	(34.65)***		(0.13)
IDV		0.091	0.010		0.144	0.151
		(62.42)***	(0.41)		(75.28)***	(58.85)***
SIZE1	-0.541	-0.527	-0.537	-0.555	-0.585	-0.588
	(70.30)***	(61.30)***	(70.47)***	(101.37)***	(113.43)***	(105.25)***
GROWTH	-0.137	-0.122	-0.156	-0.102	-0.147	-0.148
	(0.26)	(0.22)	(0.32)	(0.16)	(0.26)	(0.26)
LOANS	0.613	0.646	0.650	0.542	0.593	0.593
	(3.11)*	(3.57)*	(3.45)*	(2.68)*	(2.96)*	(2.95)*
LEV	-0.687	-1.015	-0.634	-0.144	0.012	-0.011
	(0.51)	(1.11)	(0.47)	(0.02)	(0.00)	(0.00)
ΔCASH	-5.514	-5.399	-5.506	-4.509	-5.084	-5.142
	(3.46)*	(3.36)*	(3.50)*	(3.71)*	(4.23)**	(4.22)**
ALLOW	-7.327	-8.058	-8.794	-5.705	-5.762	-5.922
	(1.69)	(1.78)	(2.22)	(1.20)	(1.11)	(1.15)
RESTRICT				0.674	0.724	0.727
				(10.18)***	(44.36)***	(37.73)***
CAPST				1.145	-0.636	-0.642
				(1.32)	(2.73)*	(2.43)
DI				-1.945	0.905	0.984
				(0.42)	(1.18)	(1.13)
CR				-1.279	-1.016	-1.046
				(0.88)	(19.09)***	(15.53)***
RIGHTS				-0.321	0.623	0.624
				(0.44)	(3.50)*	(3.48)*
COMMON				0.210	3.679	3.975
				(0.00)	(7.81)***	(4.74)**
LGDP				0.750	-0.389	-0.420
				(0.14)	(0.46)	(0.50)
DISC				-0.180	-0.035	-0.016
				(3.81)**	(0.64)	(0.04)
Country Dummies	Yes	Yes	Yes	No	No	No
Pseudo R^2 (%)	68.10	66.55	67.60	65.78	67.37	67.38
Percent of troubled banks	16.39	16.39	16.39	17.50	17.50	17.50
N	2,940	2,940	2,940	2,715	2,715	2,715

Table 7 (continued)

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
Panel E: Combined test						
Constant	1.168	-4.073	-1.050	-1.654	-8.427	-4.660
	(0.96)	(8.99)***	(1.63)	(0.43)	(18.50)***	(3.49)*
UAI	-0.054		-0.044	-0.040		-0.020
	(6.92)***		(29.81)***	(30.68)***		(5.93)***
IDV		0.050	0.037		0.050	0.036
		(3.84)**	(28.28)***		(48.95)***	(17.32)***
SIZE1	0.094	0.093	0.089	0.112	0.106	0.103
	(6.41)***	(6.32)***	(5.69)***	(8.39)***	(6.84)***	(6.65)***
GROWTH	-0.003	0.004	0.002	0.162	0.124	0.148
	(0.00)	(0.00)	(0.00)	(0.42)	(0.30)	(0.39)
LOANS	-0.311	-0.324	-0.321	-0.383	-0.411	-0.423
	(1.10)	(1.19)	(1.17)	(1.40)	(1.72)	(1.78)
LEV	0.309	0.368	0.388	-0.343	-0.373	-0.342
	(0.29)	(0.41)	(0.47)	(0.31)	(0.39)	(0.33)
ΔCASH	3.154	3.172	3.090	1.609	1.244	1.313
	(1.49)	(1.50)	(1.45)	(0.43)	(0.02)	(0.26)
ALLOW	1.506	1.490	1.416	8.788	6.191	7.679
	(0.22)	(0.22)	(0.20)	(0.83)	(0.88)	(0.83)
RESTRICT				0.139	0.131	0.120
				(8.89)***	(6.50)***	(6.17)***
CAPST				0.583	0.397	0.455
				(9.49)***	(4.50)**	(6.07)**
DI				-1.036	-1.224	-1.279
				(3.48)*	(4.92)**	(5.65)**
CR				-0.400	-0.289	-0.352
				(9.76)***	(7.26)***	(9.76)***
RIGHTS				0.592	0.729	0.716
				(25.07)***	(37.69)***	(36.11)***
COMMON				-0.097	2.144	1.420
				(0.04)	(18.39)***	(5.94)**
LGDP				0.739	0.669	0.691
				(12.31)***	(11.38)***	(11.30)***
DISC				-0.114	-0.060	-0.095
				(28.12)***	(12.04)***	(19.13)***
Country Dummies	Yes	Yes	Yes	No	No	No
Pseudo R^2 (%)	32.45	32.57	32.71	27.28	28.32	28.95
Percent of troubled banks	43.88	43.88	43.88	44.47	44.47	44.47
N	1,388	1,388	1,388	1,212	1,212	1,212

Table 7 (continued)

The classification of banks troubles is based on publicly available data that reflect profitability, capital adequacy, asset quality and liquidity. Net income is used to measure profitability, the ratio of the total equity capital to total assets to measure capital adequacy, the ratio of the loans loss provisions to total loans to measure asset quality, and the ratio of liquid assets to total assets to measure liquidity. The bank is defined as a troubled bank if it satisfies any of the following criteria in 2007/8: (1) incurs a loss (i.e., net income < 0), (2) has a low capital ratio (i.e., equity over assets < 10%), (3) recognizes a large loan loss provision (i.e., loan loss provision/total loans > 1%), and (4) has zero liquid assets. To ensure that these banks were not troubled prior to 2007, banks were deleted that satisfy any of the above criteria in 2006. Thus, the tests relate to banks that were healthy in 2006 but are troubled in 2007 or 2008.

Panel A shows the results for the profitability test. Panel B shows the results for the capital adequacy test. Panel C shows the results for the asset quality test. Panel D shows the results for the liquidity test. Pane E reports results for the combined analysis. Specifically, *Troubled Bank* is coded one if the bank meets *any* one of the following criteria: incurs a loss, has a low capital ratio, recognizes a large loan loss provision and has no liquid assets.

Detailed definitions of the variables are shown in Table 1. '*', '**', and '***' denote significance at 10%, 5%, and 1% levels (two-tailed), respectively.