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# Cross-Country Evidence on the Relationship between Societal Trust and Risk-Taking by Banks

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## Abstract

We study the relationship between societal trust and risk-taking in the banking industry. Prior literature has found that societal trust is positively related to both financial reporting conservatism and financial reporting transparency, which reduce bank managers' ability to take excessive risk. Additionally, bank managers in high-trust countries are more likely to exhibit higher pro-social behavior and, therefore, less likely to take excessive risk for personal benefit. Consistent with these arguments, we document that banks in countries with higher societal trust exhibit lower risk-taking and that these banks also experienced less financial trouble and fewer failures during the 2007–2009 financial crisis.

## I. Introduction

Recent improvements in statistical techniques and greater availability of data have enabled researchers to explore the links between various cultural variables and economic outcomes (Guiso, Sapienza, and Zingales (2006)). Examples of recent empirical studies in finance include Hilary and Hui (2009), who document that firms in counties with higher religiosity exhibit higher risk aversion, as evidenced by lower asset and equity return variability, and Chui, Titman, and Wei (2010), who find that the Hofstede (2001) individualism dimension of culture is positively related to stock-trading volume and momentum profits. Following this strand of literature, we study the relationship between societal trust and risk-taking in the international banking sector.

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We reason that trust could influence bank risk-taking through three possible channels. First, trust could be negatively related to risk-taking due to enhanced financial transparency, which affects the ability of banks to take excessive risk. Garrett, Hoitash, and Prawitt (2014) demonstrate that trust improves financial reporting quality and thereby lowers the incidence of misstated financial statements. In a similar vein, Nanda and Wysocki (2013) also document that trust is positively associated with financial reporting quality (i.e., earnings transparency and timely recognition of bad news), and Lim, Kausar, Lee, and Walker (2014) demonstrate that banks that utilize conservative accounting are characterized by more prudent, stable lending behavior in borrower selection. Taken together, the greater financial reporting quality associated with higher levels of societal trust could result in lower bank risk-taking.

Second, bank managers in high-trust societies are less likely to engage in excessive risk-taking, reciprocating the trust that society places in them. In particular, bank managers in high-trust countries are more likely to conform to social norms to avoid facing potential social sanctions. Prior research documents a positive relationship between trust and pro-social behavior that is intended to benefit others in a society (e.g., Carlo, Randall, Rotenberg, and Armenta (2010), Fehr (2009), and Simpson (2007)). In addition, Harjoto and Laksmana (2018) demonstrate that firms with greater corporate social responsibility (CSR), a proxy for pro-social behavior, do not engage in excessive risk-taking. This suggests that there could be a negative relationship between societal trust and bank risk-taking.

Third, Kanagaretnam, Khokar, and Mawani (2018) document a negative association between societal trust and both chief executive officer (CEO) total compensation and the proportion of CEO equity-based compensation. They also find that pay disparities between CEOs and average employees are lower in high-trust countries. Given that the incentives for risk-taking increase with equity-based compensation (Zingales (2015)), excessive risk-taking among bank CEOs may be muted in higher-trust societies due to reduced incentive pay.

However, another strand of literature documents a positive association between trust and individual risk-taking. For example, Guiso, Sapienza, and Zingales (2008) find that individuals who are more trusting are more likely to invest in the stock market. Mihet (2013) utilizes the Hofstede (2001) Power Distance Index as a proxy for trust and finds that trust and corporate risk-taking are positively related. Given the findings of these two streams of prior research, it is unclear a priori whether societal trust attenuates or accentuates bank risk-taking. Therefore, whether societal trust and bank risk-taking are positively or negatively related is ultimately an empirical question.

We investigate the link between societal trust and bank risk-taking using a sample of banks from 40 countries that we obtain from the BankScope (now Orbis Bank Focus) database. We conduct our empirical analysis over the 2000–2006 pre-crisis and the 2010–2012 post-crisis periods. In our main tests, we employ two measures, Z_SCORE and standard deviation of net interest margin ($\sigma$(NIM)), to measure bank risk-taking and use data from the World Values Survey (WVS) to characterize the level of trust in each country.

We document a significant negative association between societal trust and bank risk-taking during both the 2000–2006 and the 2010–2012 periods. More

specifically, banks in countries with higher societal trust exhibit lower levels of risk (i.e., they have a higher Z_SCORE and lower net interest margin volatility). This result is consistent with the view that societal trust increases financial transparency and pro-social behavior and reduces managerial rent-seeking, thereby reducing bank risk-taking. To corroborate our main risk results, which are based on accounting measures of risk-taking, we also examine the relation between societal trust and two market-based risk measures (credit default swap (CDS) spread and crash risk) for a subsample of large public banks. Consistent with our main results, we document a negative relationship between societal trust and CDS spread and two measures of crash risk in both the pre- and the post-crisis periods.

Since our prediction of a negative relationship between societal trust and risk-taking applies mainly to excessive risk-taking for banks, we repeat our main analyses employing two proxies for aggressive/abnormal risk. First, we define banks with a Z_SCORE or net interest margin volatility in the top decile as aggressive risk-takers. Second, following the methodology of Cheng, Hong, and Scheinkman (2015), we employ a 2-stage analysis: In the first stage, we control for bank-level risk-taking (i.e., normal risk) and use the residual from the first stage as the estimate of abnormal risk.[1] Consistent with our main results, we find that banks in countries with higher societal trust are associated with lower levels of aggressive risk-taking and abnormal risk. In addition, we find a significant negative relationship between trust and bank trouble/failure during the 2007–2009 financial crisis. This finding indicates that banks in more trusting countries were likely to be more stable during the crisis. It also indicates that banks in higher-trust countries experienced less value-destroying behavior, such as excessive risk-taking, in the years leading up to the crisis. An important caveat of our findings is that although our risk measures are likely to be correlated with excessive risk-taking, they may not be perfect. In particular, the distinctions between excessive risk-taking and our proxies may go beyond a simple measurement error.

We implement several sensitivity tests to ascertain the robustness of our findings. We find consistent results when we use TRUST_INDEX (Medrano (2011)) and SECRECY (Hope, Kang, Thomas, and Yoo (2008)) as alternative trust measures, and also when we control for the individualism and uncertainty avoidance cultural dimensions (Hofstede (2001)). We also modify the sample to include only banks that have total assets exceeding $100 million and exclude banks from Germany and the United States; we find that neither adjustment alters our results. In addition, our main findings hold when we use weighted regressions.[2]

[1] We use the terms "excessive," "abnormal," and "aggressive" throughout the paper to characterize atypical bank risk-taking (i.e., beyond what is considered normal in the industry). Banks that incur greater risks will receive greater returns when economic conditions are favorable. However, the risk–return paradigm is a double-edged sword; these same banks will face greater losses when economic conditions deteriorate. It is this latter perspective that not only gives these descriptive terms a negative connotation but also leads to the reduction of bank risk-taking because of societal trust.

[2] One criticism that is often levied on empirical work in this area concerns endogeneity. To address this concern, we follow the approach used by Pevzner, Xie, and Xin (2015). Specifically, we estimate 2-stage least squares regressions, instrumenting trust by a country's primary religion. Guiso et al. (2008) observe that religion is a cultural variable that is relatively constant over time and, therefore, can be viewed as exogenous. We obtain consistent results with this alternative specification.

Our study contributes to the literature in several important ways. First, we augment the nascent body of literature that focuses on the relationship between economic outcomes and cultural attributes (e.g., Chui et al. (2010), Guiso et al. (2006)). Second, our findings extend prior studies in this line of research (e.g., Garrett et al. (2014), Pevzner et al. (2015)) that find that trust influences corporate decision making. Third, our research contributes to the literature on bank risk-taking by uncovering an important identifier of bank risk: societal trust. While prior literature has mainly focused on formal institutions such as governance and regulations (e.g., Laeven and Levine (2009)), we show that cultural variables such as trust also matter. Finally, we also contribute to the stream of research on bank stability by identifying institutional factors related to the 2007–2009 global financial crisis (e.g., Fahlenbrach and Stulz (2011)). Our results document that societal trust is positively related to bank stability through its influence in reducing excessive risk-taking.

The rest of this paper is organized as follows: We discuss the relevant literature and develop our hypothesis in Section II, present the research design in Section III, describe the data in Section IV, discuss the empirical results in Section V, and make concluding remarks in Section VI.

## II. Research Background and Hypothesis

While trust is the focus of much research across academic disciplines, there is no concise definition of the term (Das and Teng (2004)). For example, Rotter ((1967), p. 651) defines trust "as an expectancy held by an individual or a group that the word, promise, verbal or unwritten statement of another individual or group can be relied upon." Gambetta ((1988), p. 217) states that "trust …is a particular level of the subjective probability with which an agent assesses that another agent or group of agents will perform a particular action." (Guiso et al. (2008), p. 2557) refer to trust as "the subjective probability individuals attribute to the possibility of being cheated."

Numerous studies in the business and economics literatures examine this cultural characteristic. For example, Guiso, Sapienza, and Zingales (2004) argue that trust is the attribute of social capital that enhances financial development in a country because it increases the use of financial contracts. La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1998) report that countries with higher levels of trust exhibit higher levels of education and civic participation and lower levels of corruption. Pevzner et al. (2015) find that corporate earnings announcements made in countries with higher levels of societal trust are viewed as more credible and therefore result in stronger market reactions.

Although our focus is on the relationship between trust and bank risk-taking, an overview of the determinants of societal trust within and across countries is informative. Empirical work in this area considers a wide variety of explanatory demographic variables. For example, La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997) demonstrate that countries dominated by hierarchical religions (i.e., Catholicism, Eastern Orthodox Christianity, and Islam) have lower levels of trust, possibly because the structure of these religions diminishes cooperation among people. Knack and Keefer (1997), La Porta et al. (1997), and

You (2012) report a positive relationship between a country's education levels and trust. Additionally, the economic performance of a country, as measured by gross domestic product (GDP) per capita, is positively related to trust (Delhey and Newton (2005), Knack and Keefer (1997)). Countries that have lower ethnic diversity (Delhey and Newton, Knack and Keefer) and income inequality (Delhey and Newton, You) also exhibit higher levels of trust. Finally, attributes that diminish the social distance among its members enhance a society's level of trust (Bjornskov (2007)).

Unlike prior research, our objective in this study is not to identify determinants of trust; instead, it is to study the relationship between trust and bank risk-taking. We argue that, at the margin, trust reduces opportunistic actions by managers and banks. Managers in countries with greater societal trust may exhibit less rent-seeking and higher pro-social behavior.

We focus on three channels through which trust may dampen the risk-taking activities of banks. First, Garrett et al. (2014) document that employee trust in management is positively associated with financial reporting quality (i.e., higher quality of accounting accruals and lower likelihood of misstated financial statements). In a related study, Nanda and Wysocki (2013) document a positive relationship between trust and financial reporting transparency (i.e., timely recognition of bad news and lack of earnings management) in an international setting. They attribute this finding to the view that individuals who are more trusting will place greater credibility in management disclosures. Prior literature also suggests that both banks' accounting conservatism (i.e., timely recognition of bad news) and financial reporting transparency directly impact banks' lending behavior. For example, Lim et al. (2014) argue that banks that are conservative in their reporting practices are likely to monitor borrowers more closely than to seek higher loan spreads. Additionally, Bushman and Williams (2012) document that delayed recognition of expected future loan losses is associated with both concerns about capital inadequacy and difficulty of raising new equity during downturns.

Second, there is ample evidence that individuals in more trusting societies engage in behavior that is intended to benefit others. Using data from the German Socio-Economic Panel, Fehr (2009) finds a positive relationship between trust and altruistic behavior (i.e., volunteering for clubs or social services). Carlo et al. (2010) document a positive link between trust and pro-social behavior in young adults. In addition, Lins, Servaes, and Tamayo (2017) document a positive link between trust and CSR, a proxy for pro-social behavior at the corporate level. They find that firms with high CSR levels experience significantly greater stock returns during the 2007–2009 financial crisis than those with low CSR levels; the return differential is more pronounced for companies in regions where the level of trust is higher. Harjoto and Laksmana (2018) report a positive relationship between CSR and optimal risk-taking. CSR acts as a balancing mechanism to ensure that resources are allocated to minimize both excessive risk-taking, which benefits shareholders, and excessive risk avoidance, which benefits other stakeholders. These findings suggest that banks in countries with greater societal trust should have a higher pro-social behavior and, therefore, lower levels of excessive risk-taking.

Third, trust may influence bank risk-taking through the structure of management compensation. Larcker and Tayan (2013) posit that trust, as part of the corporate governance system, will reduce the complexity of executive compensation by eliminating the need for risk-based compensation. Kanagaretnam et al. (2018) also reason that trust reduces managers' opportunistic behavior and incentives for excessive risk-taking, thereby reducing the need for equity-based compensation. Consistent with this argument, the authors find that CEO compensation and the proportion of equity-based compensation are lower in countries with higher societal trust. In other words, risk-taking induced by CEO compensation should be lower in countries with higher societal trust.

In contrast, other empirical studies document a positive relationship between trust and risk-taking. Guiso et al. (2008) observe that trust is determined by both objective attributes of the financial system (e.g., corporate governance) and subjective characteristics of the truster. They find a positive relationship between the level of trust and individuals' participation in the stock market. Mihet (2013) examines the relationship between several cultural variables and corporate risk-taking across a sample of companies from diverse industries. She utilizes the Hofstede (2001) Power Distance Index as a proxy for trust and hypothesizes that companies in countries with low power distance will incur greater risk because individuals in these countries are more trusting. Her results support this hypothesis.

In summary, because greater societal trust leads to higher financial accounting transparency and more timely recognition of bad news, it has the potential to constrain excessive risk-taking. Conversely, the lower level of perceived risk that is associated with a higher level of trust leads to increased risk-taking. Hence, whether societal trust constrains or encourages bank risk-taking is ultimately an empirical question. Our tests will provide evidence on which of the opposing factors is dominant.

While societal trust can dampen bank risk-taking through the aforementioned economic channels, it is plausible that a country's regulatory environment and court system can also produce a similar outcome. The theoretical model of Carlin, Dorobantu, and Viswanathan (2009) suggests that trust and regulation can be substitutes or complements. Aghion, Algan, Cahuc, and Shliefer (2010) demonstrate that trust and regulation are substitutes; a lower level of trust results in a higher demand for regulation, which, in turn, diminishes the development of trust. Their empirical results indicate that government regulation and trust are negatively related. Accordingly, our empirical model includes controls for a country's legal/regulatory environment that are related to bank risk-taking. These variables include creditor rights (Houston, Lin, Lin, and Ma (2010)), degree of law enforcement (Laeven and Levine (2009)), and legal origin (Cole and Ariss (2010)).[3]

[3]The new institutional economics framework of Williamson (2000) posits that the traditions and norms (e.g., trust) of a society are "embedded" (i.e., altered only over the course of centuries). The judicial environment is somewhat less fixed, requiring only decades to change. Thus, trust is a more primitive institution relative to judicial environment. Williamson (1993) indicates that trust can arise not only from the law but also from culture. The former view suggests that individuals will be more trusting in a strong legal environment, while the latter perspective suggests that trust is derived from social norms.

## III. Research Design

Our model of the relationship between societal trust and bank risk-taking relates trust to measures of risk while controlling for several bank- and country-level characteristics. We conduct separate tests for the pre- and the post-crisis periods. The model specification is as follows:

$$(1) \qquad \text{RISK} = \gamma 0 + \gamma 1 \text{TRUST} + \gamma 2 \boldsymbol{V} + \gamma 3 \boldsymbol{W} + \epsilon,$$

where RISK is one of two risk measures (described later), TRUST is a societal trust index (described later), $\boldsymbol{V}$ is a vector of bank characteristics, and $\boldsymbol{W}$ is a vector of country characteristics. Since these are bank-level regressions, we cluster the standard errors by country in all our tests.

We require measures of risk-taking (RISK) and societal trust (TRUST) to estimate the model in equation (1). We use Z_SCORE and standard deviation of net interest margin ($\sigma$(NIM)) as measures of RISK. Following prior research (Houston et al. (2010), Laeven and Levine (2009)), we compute Z_SCORE as $(-1) \times \ln((\text{CAR} + \text{ROA})/\sigma(\text{ROA}))$, where CAR is the mean ratio of capital to assets over 2000–2006 (or 2010–2012), ROA is the mean ratio of earnings before taxes and loan loss provisions to assets over 2000–2006 (or 2010–2012), and $\sigma$(ROA) is the standard deviation of ROA estimated over 2000–2006 (or 2010–2012). We use the natural logarithm of Z_SCORE because it has a skewed distribution and the negative transformation, which ensures that a higher value of Z_SCORE represents higher bank risk-taking. The second measure of risk, $\sigma$(NIM), reflects the variability of the bank's net interest margin, which is a measure of operating risk (Houston et al., Laeven and Levine). A higher $\sigma$(NIM) reflects higher risk-taking.

We construct the trust measure, TRUST, based on the responses to a WVS question that asks respondents, "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" Respondents have to choose between two answers: "Most people can be trusted" and "Can't be too careful." We code the first answer as 1 and the second as 0. We then calculate the average response by country and year. Higher values indicate higher societal trust.

The model in equation (1) includes several other variables that control for differences in bank characteristics ($\boldsymbol{V}$) and country characteristics ($\boldsymbol{W}$) that may influence the relationship between societal trust and bank risk-taking. The vector of bank characteristics, $\boldsymbol{V}$, comprises variables that have been used in prior studies (e.g., Houston et al. (2010), Kanagaretnam, Lim, and Lobo (2014), Kanagaretnam, Lobo, Wang, and Whalen (2015), Laeven and Levine (2009)). These variables include bank size (SIZE), defined as the natural logarithm of mean total assets (in U.S. dollars), and bank net interest revenue growth (REVG), each measured over 2000–2006 and 2010–2012. Other bank-specific control variables include TOOBIG, an indicator variable for whether a bank has more than 10% of its country's deposits, to control for the effect of a bank being too big to fail, and indicator variables for state-owned (SOE), listed on a public stock exchange (LISTED), and use of International Financial Reporting Standards (IFRS)

for financial reporting, to account for constraints that may be placed on banks' risk-taking.

The vector of country characteristics, $\boldsymbol{W}$, consists of variables that control for differences in economic and institutional factors across countries. We include the natural logarithm of GDP per capita in year 2000 U.S. dollars (LGDP) because income level can determine the severity of an economic shock to a country and thereby influence bank risk-taking. Bank risk-taking may increase in countries with deposit insurance due to reduced bank monitoring (Barth, Caprio, and Levine (2006)). Therefore, we include an indicator variable for deposit insurance (DI) that equals 1 if a country has deposit insurance, and 0 otherwise. Allen and Gale (2000) and Boyd and De Nicoló (2005) indicate a negative relationship between the stability of the banking sector and bank competition. We therefore include bank competition (COMP), which is measured as the sum of the squares of the market shares of a bank in each country. Houston et al. (2010) report that banks in countries with stronger creditor rights take greater risk. We control for differences in creditor rights (CR) using the index from La Porta et al. (1998), which was updated by Djankov, McLiesh, and Shleifer (2007) and ranges from 0 to 4. We also control for the strength of law enforcement (ENFORCE), which ranges from 0 to 10, with a higher value indicating more effective law enforcement (Laeven and Levine (2009)), and legal origin (COMMON), which is an indicator variable that equals 1 for a common law legal origin, and 0 otherwise. Cole and Ariss (2010) report that banks in common law countries have a larger fraction of risky loans in their asset portfolios than banks in code law countries.

As in Kanagaretnam et al. (2015), we control for differences in overall governance quality across countries by including a governance index variable (GI), which is the first principal component extracted from the variables CONTROL_OF_CORRUPTION, GOVERNMENT_EFFECTIVENESS, POLITICAL_STABILITY, REGULATORY_QUALITY, and VOICE_AND_ACCOUNTABILITY. CONTROL_OF_CORRUPTION reflects the extent to which individuals use government power opportunistically, with a higher value indicating more effective corruption control. GOVERNMENT_EFFECTIVENESS measures the quality of policy development and implementation as well as the quality and impartiality of the civil service. POLITICAL_STABILITY captures whether government policies promote competition in the marketplace. REGULATORY_QUALITY measures the perceptions of quality of policies and regulation. VOICE_AND_ACCOUNTABILITY characterizes a country's freedom of speech and democracy. We provide a more detailed description of each variable in the Appendix.

## IV. Data

We use the average of the two recent World Values Survey (waves 4 and 5) as the measure of our main variable of interest, TRUST, because our sample covers the period 2000–2012. We have data available on societal trust for a maximum of 72 countries. We use financial data from the BankScope (now Orbis Bank Focus) database and country-level variables from Demirguc-Kunt, Kane, and Laeven (2008), Kanagaretnam et al. (2014), and La Porta et al. (1998). We then merge the

trust variable, bank financial data, and other country-level variables to form our test samples.[4]

We lose 7 countries because of missing bank-level financial variables and another 25 countries because of missing data on country-level variables. These sample selection procedures result in a final sample of 40 countries (see the Appendix). This sample includes 30,783 observations for the risk-taking tests (15,872 for the pre-crisis period and 14,911 for the post-crisis period) and 12,977 observations for the troubled-bank tests (9,605 for the financial-crisis period and 3,372 for the post-crisis period).

# V. Empirical Results

## A. Main Results

We report the means of the institutional variables for each country in Table 1. As expected, TRUST varies significantly across countries. Argentina, Malaysia,

TABLE 1

Institutional Variables by Country

Table 1 presents the means of the institutional variables TRUST, LGDP, DI, COMP, CR, ENFORCE, COMMON, and GI for each country. See the Appendix for variable definitions.

| Country | TRUST | LGDP | DI | COMP | CR | ENFORCE | COMMON | GI |
|---|---|---|---|---|---|---|---|---|
| Argentina | 0.17 | 8.90 | 1 | 0.05 | 1 | 5.02 | 0 | −0.42 |
| Australia | 0.48 | 9.99 | 0 | 0.08 | 3 | 6.23 | 1 | 3.55 |
| Bulgaria | 0.19 | 7.55 | 1 | 0.39 | 2 | 4.77 | 0 | 0.73 |
| Canada | 0.39 | 10.09 | 1 | 0.12 | 1 | 4.81 | 1 | 3.51 |
| Chile | 0.19 | 8.60 | 1 | 0.04 | 2 | 5.11 | 0 | 2.80 |
| China | 0.50 | 7.10 | 0 | 0.08 | 2 | 6.73 | 0 | −1.26 |
| Colombia | 0.16 | 7.69 | 1 | 0.05 | 0 | 1.80 | 0 | −0.80 |
| Finland | 0.55 | 10.11 | 1 | 0.16 | 1 | 8.06 | 0 | 4.24 |
| France | 0.19 | 10.05 | 1 | 0.02 | 0 | 6.91 | 0 | 2.87 |
| Germany | 0.31 | 10.07 | 1 | 0.02 | 3 | 6.62 | 0 | 3.30 |
| Hong Kong | 0.40 | 10.20 | 0 | 0.10 | 4 | 7.69 | 1 | 3.17 |
| India | 0.33 | 6.26 | 1 | 0.07 | 2 | 2.59 | 1 | −0.43 |
| Indonesia | 0.41 | 6.69 | 1 | 0.15 | 2 | 1.17 | 0 | −1.37 |
| Israel | 0.23 | 9.89 | 0 | 0.09 | 3 | 3.46 | 1 | 1.28 |
| Italy | 0.28 | 9.85 | 1 | 0.03 | 2 | 3.18 | 0 | 1.54 |
| Japan | 0.38 | 10.56 | 1 | 0.02 | 2 | 6.37 | 1 | 2.58 |
| Korea | 0.29 | 9.41 | 1 | 0.04 | 3 | 8.11 | 1 | 1.63 |
| Malaysia | 0.17 | 8.39 | 1 | 0.04 | 3 | 4.27 | 1 | 1.03 |
| Mexico | 0.19 | 8.68 | 1 | 0.06 | 0 | 5.39 | 0 | 0.01 |
| Morocco | 0.20 | 7.09 | 0 | 0.08 | 1 | 4.30 | 0 | −0.96 |
| Netherlands | 0.42 | 10.06 | 1 | 0.12 | 3 | 5.11 | 0 | 3.76 |
| New Zealand | 0.49 | 9.60 | 0 | 0.09 | 4 | 7.50 | 1 | 3.82 |
| Norway | 0.56 | 10.56 | 1 | 0.07 | 2 | 7.53 | 0 | 3.69 |
| Pakistan | 0.28 | 6.28 | 0 | 0.14 | 1 | 3.55 | 1 | −1.98 |
| Philippines | 0.17 | 6.91 | 1 | 0.23 | 1 | 3.42 | 1 | −0.72 |
| Poland | 0.19 | 8.45 | 1 | 0.05 | 1 | 4.27 | 0 | 1.24 |
| Russia | 0.25 | 7.66 | 1 | 0.24 | 2 | 7.53 | 0 | −1.35 |
| Singapore | 0.17 | 10.05 | 0 | 0.26 | 3 | 8.48 | 1 | 3.22 |
| Slovenia | 0.18 | 9.25 | 1 | 0.11 | 3 | 3.87 | 0 | 2.07 |
| South Africa | 0.17 | 8.11 | 0 | 0.06 | 3 | 3.93 | 1 | 1.18 |
| Spain | 0.28 | 9.67 | 1 | 0.05 | 2 | 5.54 | 0 | 2.55 |
| Sweden | 0.55 | 10.25 | 1 | 0.08 | 1 | 4.73 | 0 | 3.71 |
| Switzerland | 0.49 | 10.44 | 1 | 0.10 | 1 | 6.03 | 0 | 3.71 |
| Taiwan | 0.24 | 9.59 | 1 | 0.17 | 2 | 5.55 | 0 | 1.98 |
| Thailand | 0.41 | 7.71 | 1 | 0.96 | 2 | 6.11 | 1 | 0.08 |
| United Kingdom | 0.30 | 10.15 | 1 | 0.03 | 4 | 6.00 | 1 | 3.26 |
| United States | 0.38 | 10.49 | 1 | 0.01 | 1 | 7.33 | 1 | 2.86 |
| Uruguay | 0.25 | 8.69 | 1 | 0.11 | 3 | 3.88 | 0 | 1.55 |
| Venezuela | 0.17 | 8.49 | 1 | 0.06 | 3 | 3.97 | 0 | −2.10 |
| Vietnam | 0.47 | 6.16 | 1 | 0.60 | 1 | 6.36 | 0 | −1.29 |

[4]We winsorize each continuous control variable used in the models at the top and bottom 1% to reduce the effects of extreme values.

Philippines, Singapore, South Africa, and Venezuela have the lowest levels of TRUST, and Finland, New Zealand, Norway, and Sweden the highest. The sample composition varies across countries, with the greatest number being from the United States (19,377 observations, or 62.2%), Germany (3,310 observations, or 10.8%), and Italy (1,380 observations, or 4.5%).

We present the descriptive statistics for the bank-level variables used in the pre- and the post-crisis period risk-taking analyses in Panels A and B, respectively, of Table 2. We also report the variable mean and median, number of countries, and number of observations. Panel A presents statistics for the variables used in the

TABLE 2

Descriptive Statistics for Bank-Level Variables

Table 2 reports descriptive statistics for the bank-level dependent and control variables used in the risk-taking tests. Panels A and B report descriptive statistics for the 2000–2006 pre-crisis period and the 2010–2012 post-crisis period samples, respectively, using $\sigma$(NIM) and Z_SCORE as the measures of risk-taking. Panels C and D report descriptive statistics for the 2000–2006 pre-crisis period and the 2010–2012 post-crisis period samples, respectively, using CDS1 and CDS2 as the measures of risk-taking. Panels E and F report descriptive statistics for the 2000–2006 pre-crisis period and the 2010–2012 post-crisis period samples, respectively, using CRASH and NCSKEW as the measures of risk-taking. Panel G reports descriptive statistics for the country-level institutional variables for the sample of 40 countries. See the Appendix for variable definitions.

| Variables | Mean | Std. Dev. | P25 | Median | P75 | No. of Countries | No. of Obs. |
|---|---|---|---|---|---|---|---|
| *Panel A. Bank-Level Data for Risk-Taking Test (Pre-Crisis Period: 2000–2006)* | | | | | | | |
| $\sigma$(NIM) | 0.012 | 0.032 | 0.003 | 0.005 | 0.009 | 40 | 15,872 |
| Z_SCORE | −2.685 | 1.462 | −3.786 | −3.039 | −1.732 | 40 | 15,872 |
| SIZE | 6.208 | 2.627 | 4.445 | 5.517 | 7.066 | 40 | 15,872 |
| REVG | 0.239 | 0.436 | 0.064 | 0.098 | 0.190 | 40 | 15,872 |
| TOOBIG | 0.009 | 0.093 | 0.000 | 0.000 | 0.000 | 40 | 15,872 |
| SOE | 0.009 | 0.094 | 0.000 | 0.000 | 0.000 | 40 | 15,872 |
| LISTED | 0.071 | 0.257 | 0.000 | 0.000 | 0.000 | 40 | 15,872 |
| IFRS | 0.006 | 0.079 | 0.000 | 0.000 | 0.000 | 40 | 15,872 |
| *Panel B. Bank-Level Data for Risk-Taking Test (Post-Crisis Period: 2010–2012)* | | | | | | | |
| $\sigma$(NIM) | 0.005 | 0.008 | 0.002 | 0.003 | 0.006 | 40 | 14,911 |
| Z_SCORE | −3.112 | 1.510 | −4.212 | −3.294 | −2.080 | 40 | 14,911 |
| SIZE | 6.915 | 2.909 | 4.866 | 6.092 | 7.996 | 40 | 14,911 |
| REVG | 0.533 | 1.134 | −0.194 | 0.029 | 0.645 | 40 | 14,911 |
| TOOBIG | 0.011 | 0.105 | 0.000 | 0.000 | 0.000 | 40 | 14,911 |
| SOE | 0.013 | 0.112 | 0.000 | 0.000 | 0.000 | 40 | 14,911 |
| LISTED | 0.104 | 0.305 | 0.000 | 0.000 | 0.000 | 40 | 14,911 |
| IFRS | 0.109 | 0.312 | 0.000 | 0.000 | 0.000 | 40 | 14,911 |
| *Panel C. Bank-Level Data for CDS Test (Pre-Crisis Period: 2000–2006)* | | | | | | | |
| CDS1 | 0.005 | 0.007 | 0.002 | 0.002 | 0.004 | 22 | 415 |
| CDS2 | 0.004 | 0.007 | 0.002 | 0.002 | 0.004 | 22 | 415 |
| SIZE_C | 11.690 | 2.887 | 10.720 | 11.980 | 13.750 | 22 | 415 |
| LOANS | 0.581 | 0.209 | 0.423 | 0.608 | 0.735 | 22 | 415 |
| LEV | 0.897 | 0.097 | 0.893 | 0.925 | 0.952 | 22 | 415 |
| ΔCASH | 0.000 | 0.009 | −0.002 | 0.000 | 0.001 | 22 | 415 |
| SOE | 0.010 | 0.098 | 0.000 | 0.000 | 0.000 | 22 | 415 |
| LISTED | 0.422 | 0.494 | 0.000 | 0.000 | 1.000 | 22 | 415 |
| IFRS | 0.070 | 0.255 | 0.000 | 0.000 | 0.000 | 22 | 415 |
| *Panel D. Bank-Level Data for CDS Test (Post-Crisis Period: 2010–2012)* | | | | | | | |
| CDS1 | 0.028 | 0.045 | 0.012 | 0.018 | 0.027 | 20 | 335 |
| CDS2 | 0.027 | 0.040 | 0.012 | 0.018 | 0.028 | 20 | 335 |
| SIZE_C | 12.390 | 2.315 | 11.010 | 12.160 | 14.040 | 20 | 335 |
| LOANS | 0.537 | 0.227 | 0.385 | 0.586 | 0.691 | 20 | 335 |
| LEV | 0.914 | 0.073 | 0.894 | 0.936 | 0.959 | 20 | 335 |
| ΔCASH | 0.000 | 0.016 | −0.004 | 0.000 | 0.003 | 20 | 335 |
| SOE | 0.040 | 0.195 | 0.000 | 0.000 | 0.000 | 20 | 335 |
| LISTED | 0.517 | 0.500 | 0.000 | 1.000 | 1.000 | 20 | 335 |
| IFRS | 0.386 | 0.488 | 0.000 | 0.000 | 1.000 | 20 | 335 |

*(continued on next page)*

TABLE 2 (continued)
Descriptive Statistics for Bank-Level Variables

| Variables | Mean | Std. Dev. | P25 | Median | P75 | No. of Countries | No. of Obs. |
|---|---|---|---|---|---|---|---|
| *Panel E. Bank-Level Data for Crash Risk Test (Pre-Crisis Period: 2000–2006)* | | | | | | | |
| CRASH | 0.137 | 0.345 | 0.000 | 0.000 | 0.000 | 15 | 335 |
| NCSKEW | 0.034 | 0.778 | −0.237 | 0.000 | 0.285 | 15 | 335 |
| SIZE_LAG1 | 7.971 | 3.237 | 5.480 | 7.000 | 10.980 | 15 | 335 |
| LEV_LAG1 | 0.893 | 0.074 | 0.896 | 0.910 | 0.927 | 15 | 335 |
| ROA_LAG1 | 0.014 | 0.013 | 0.008 | 0.013 | 0.019 | 15 | 335 |
| DTURN_LAG1 | 0.003 | 0.211 | 0.000 | 0.000 | 0.000 | 15 | 335 |
| SD_RET_LAG1 | 0.036 | 0.033 | 0.004 | 0.033 | 0.052 | 15 | 335 |
| AVG_RET_LAG1 | 0.001 | 0.007 | −0.001 | 0.000 | 0.002 | 15 | 335 |
| LOANS | 0.609 | 0.175 | 0.513 | 0.624 | 0.731 | 15 | 335 |
| ΔCASH | 0.000 | 0.009 | −0.003 | 0.000 | 0.003 | 15 | 335 |
| SOE | 0.018 | 0.133 | 0.000 | 0.000 | 0.000 | 15 | 335 |
| IFRS | 0.012 | 0.109 | 0.000 | 0.000 | 0.000 | 15 | 335 |
| *Panel F. Bank-Level Data for Crash Risk Test (Post-Crisis Period: 2010–2012)* | | | | | | | |
| CRASH | 0.189 | 0.393 | 0.000 | 0.000 | 0.000 | 14 | 122 |
| NCSKEW | 0.203 | 0.915 | −0.258 | 0.000 | 0.560 | 14 | 122 |
| SIZE_LAG1 | 9.948 | 3.764 | 6.506 | 9.737 | 13.100 | 14 | 122 |
| LEV_LAG1 | 0.888 | 0.069 | 0.883 | 0.905 | 0.922 | 14 | 122 |
| ROA_LAG1 | 0.014 | 0.017 | 0.005 | 0.011 | 0.019 | 14 | 122 |
| DTURN_LAG1 | −0.078 | 0.355 | 0.000 | 0.000 | 0.000 | 14 | 122 |
| SD_RET_LAG1 | 0.061 | 0.063 | 0.031 | 0.045 | 0.075 | 14 | 122 |
| AVG_RET_LAG1 | −0.001 | 0.011 | −0.002 | 0.000 | 0.000 | 14 | 122 |
| LOANS | 0.602 | 0.164 | 0.530 | 0.615 | 0.705 | 14 | 122 |
| ΔCASH | −0.001 | 0.007 | −0.003 | 0.000 | 0.002 | 14 | 122 |
| SOE | 0.025 | 0.156 | 0.000 | 0.000 | 0.000 | 14 | 122 |
| IFRS | 0.107 | 0.310 | 0.000 | 0.000 | 0.000 | 14 | 122 |
| *Panel G. Country-Level Data* | | | | | | | |
| TRUST | 0.310 | 0.129 | 0.187 | 0.280 | 0.409 | 40 | 40 |
| LGDP | 8.894 | 1.369 | 7.700 | 9.330 | 10.070 | 40 | 40 |
| DI | 0.775 | 0.423 | 1.000 | 1.000 | 1.000 | 40 | 40 |
| COMP | 0.083 | 0.043 | 0.050 | 0.080 | 0.130 | 40 | 40 |
| CR | 1.925 | 0.971 | 1.000 | 2.000 | 3.000 | 40 | 40 |
| ENFORCE | 5.342 | 1.468 | 3.950 | 5.250 | 6.675 | 40 | 40 |
| COMMON | 0.400 | 0.496 | 0.000 | 0.000 | 1.000 | 40 | 40 |
| GI | 1.456 | 1.940 | −0.425 | 1.593 | 3.240 | 40 | 40 |

risk-taking tests during the 2000–2006 pre-crisis sample period. The mean values of risk measures Z_SCORE and $\sigma$(NIM) are −2.685 and 0.012, respectively. Panel B reports statistics for the variables used in the risk-taking tests during the 2010–2012 post-crisis sample period. The mean values of Z_SCORE and $\sigma$(NIM) are −3.112 and 0.005, respectively.[5] These values are generally consistent with prior literature (Kanagaretnam et al. (2014), Laeven and Levine (2009)).

Panels C–F of Table 2 describe the distributions of variables used in the main tests that employ market-based risk measures as well as control variables used in the corresponding models. We use two measures of CDS spread: CDS1 is the average daily 5-year CDS spread for the year and CDS2 is the year-end 5-year CDS spread. Following prior literature (Callen and Fang (2015), Chen, Hong, and Stein (2001), and Hutton, Marcus, and Tehranian (2009)), we use two crash-risk measures, CRASH and NCSKEW, to measure risk-taking. About 13.7% (18.9%) of the bank–years in our sample experienced a crash event before (after) the financial crisis period. The means and medians of the variables used in the

[5]Not surprisingly, the risk-taking measures are much lower in the post-crisis period compared with the pre-crisis period. Therefore, we employ subsample analyses for the pre- and the post-crisis periods.

crash-risk tests are generally consistent with prior literature (Callen and Fang (2015), Hutton et al. (2009)). The data presented in Panel G demonstrate that there is wide variation in each of the country-level variables.

Table 3 presents the Pearson correlations for the variables used in the risk-taking and bank failure/trouble tests. As expected, both Panels A and B report a negative correlation between TRUST and the two measures of RISK, Z_SCORE and $\sigma$(NIM), in the pre- and the post-crisis periods. Additionally, Z_SCORE and $\sigma$(NIM) are positively correlated, as expected. Although the negative relations between trust and CDS spread (Panels C and D) and crash risk (Panels E and F) are weak, in untabulated results we find a strong negative correlation between TRUST and measures of aggressive/abnormal risk.

TABLE 3
Correlations between Measures of Risk-Taking and Societal Trust

Table 3 reports correlations between the risk-taking variables and the measure of trust for the samples used in the risk-taking tests. Panels A and B report correlations for the 2000–2006 pre-crisis period and the 2010–2012 post-crisis period samples, respectively, using $\sigma$(NIM) and Z_SCORE as the measures of risk-taking. Panels C and D report correlations for the 2000–2006 pre-crisis period and the 2010–2012 post-crisis period samples, respectively, using CDS1 and CDS2 as the measures of risk-taking. Panels E and F report correlations for the 2000–2006 pre-crisis period and the 2010–2012 post-crisis period samples, respectively, using CRASH and NCSKEW as the measures of risk-taking. See the Appendix for variable definitions. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

| | | A | B | C |
|---|---|---|---|---|
| *Panel A. Pearson Correlations for Trust and Accounting-Based Risk-Taking Measures in Pre-Crisis Period* | | | | |
| TRUST | A | 1.000 | | |
| $\sigma$(NIM) | B | −0.184*** | 1.000 | |
| Z_SCORE | C | −0.337*** | 0.217*** | 1.000 |
| *Panel B. Pearson Correlations for Trust and Accounting-Based Risk-Taking Measures in Post-Crisis Period* | | | | |
| TRUST | A | 1.000 | | |
| $\sigma$(NIM) | B | −0.150*** | 1.000 | |
| Z_SCORE | C | −0.107*** | 0.189*** | 1.000 |
| *Panel C. Pearson Correlations for Trust and CDS in Pre-Crisis Period* | | | | |
| TRUST | A | 1.000 | | |
| CDS1 | B | −0.021 | 1.000 | |
| CDS2 | C | −0.013 | 0.896*** | 1.000 |
| *Panel D. Pearson Correlations for Trust and CDS in Post-Crisis Period* | | | | |
| TRUST | A | 1.000 | | |
| CDS1 | B | −0.058 | 1.000 | |
| CDS2 | C | −0.065 | 0.933*** | 1.000 |
| *Panel E. Pearson Correlations for Trust and Crash Risk in Pre-Crisis Period* | | | | |
| TRUST | A | 1.000 | | |
| CRASH | B | −0.044 | 1.000 | |
| NCSKEW | C | −0.096* | 0.598*** | 1.000 |
| *Panel F. Pearson Correlations for Trust and Crash Risk in Post-Crisis Period* | | | | |
| TRUST | A | 1.000 | | |
| CRASH | B | −0.199** | 1.000 | |
| NCSKEW | C | −0.106 | 0.629*** | 1.000 |

We present the coefficient estimates and $t$-statistics for the bank risk-taking regressions in Table 4. The results indicate a significantly negative relationship between TRUST and both Z_SCORE and $\sigma$(NIM) in the pre- and the post-crisis periods. These results support our view that societal trust increases financial transparency and pro-social behavior and reduces managerial rent-seeking, thereby reducing bank risk-taking. As for the control variables, banks that are smaller and have greater net interest revenue growth take more risk. For the country-level

TABLE 4

Relation between Trust and Risk-Taking: Accounting-Based Measures of Risk-Taking

Table 4 reports estimation results of the following regression: RISK $= \gamma_0 + \gamma_1$TRUST $+ \gamma_2 \boldsymbol{V} + \gamma_3 \boldsymbol{W} + \epsilon$. RISK is one of the two accounting-based risk measures, $\sigma$(NIM) and Z_SCORE. TRUST is the societal trust index. $\boldsymbol{V}$ is a vector of bank-level control variables that includes SIZE, REVG, TOOBIG, SOE, LISTED, and IFRS. $\boldsymbol{W}$ is a vector of country-level control variables that includes LGDP, DI, COMP, CR, ENFORCE, COMMON, and GI. See the Appendix for variable definitions. We estimate the standard errors (reported in parentheses) clustered by country. *, **, and *** indicate significance at the 10%, 5%, and 1% levels (2-tailed), respectively.

| | Pre-Crisis Period | | Post-Crisis Period | |
|---|---|---|---|---|
| | $\sigma$(NIM) | Z_SCORE | $\sigma$(NIM) | Z_SCORE |
| Variables | 1 | 2 | 3 | 4 |
| TRUST | −0.069*** | −4.240*** | −0.011** | −2.961** |
| | (−2.97) | (−2.76) | (−2.53) | (−2.68) |
| SIZE | −0.001*** | 0.139*** | −0.000*** | 0.126*** |
| | (−2.95) | (2.88) | (−4.93) | (3.11) |
| REVG | 0.018*** | 0.559*** | 0.000*** | −0.026 |
| | (3.94) | (10.97) | (2.98) | (−0.86) |
| TOOBIG | 0.013** | 0.093 | 0.007*** | 0.759*** |
| | (2.22) | (0.51) | (4.84) | (3.19) |
| SOE | −0.000 | 0.246 | 0.000 | −0.125 |
| | (−0.03) | (1.55) | (0.07) | (−0.81) |
| LISTED | −0.001 | −0.010 | 0.000 | −0.250 |
| | (−0.77) | (−0.02) | (0.74) | (−0.77) |
| IFRS | −0.012 | −1.340*** | −0.001 | −0.680** |
| | (−1.02) | (−3.22) | (−0.49) | (−2.50) |
| LGDP | 0.005 | −0.383 | −0.001 | 0.128 |
| | (0.95) | (−1.17) | (−0.59) | (0.45) |
| DI | 0.005 | 0.479 | 0.000 | −0.302 |
| | (0.62) | (1.21) | (0.12) | (−1.07) |
| COMP | 0.201** | 8.122* | 0.019** | 3.051 |
| | (2.59) | (2.00) | (2.25) | (1.18) |
| CR | −0.001 | 0.440*** | −0.000 | 0.067 |
| | (−0.27) | (3.30) | (−0.13) | (0.59) |
| ENFORCE | 0.001 | 0.421*** | 0.001* | 0.041 |
| | (0.31) | (2.94) | (1.92) | (0.51) |
| COMMON | −0.002 | −0.803*** | 0.000 | −0.334 |
| | (−0.63) | (−3.06) | (0.19) | (−1.61) |
| GI | −0.006 | 0.123 | −0.002* | 0.095 |
| | (−1.29) | (0.54) | (−1.86) | (0.54) |
| INTERCEPT | −0.002 | −2.083 | 0.018** | −4.295* |
| | (−0.05) | (−0.65) | (2.68) | (−1.75) |
| No. of obs. | 15,872 | 15,872 | 14,911 | 14,911 |
| Adj. $R^2$ | 0.138 | 0.420 | 0.106 | 0.089 |

control variables, consistent with prior literature, banks in countries with higher bank monopoly power (COMP) exhibit higher risk levels. In summary, our main results show a significant negative relationship between societal trust and bank risk-taking in both the pre-crisis period and the post-crisis period. These results also demonstrate that the negative relationship between trust and bank risk-taking is not period specific.

In terms of economic significance, the results in column 1 of Table 4 indicate that a 1-standard-deviation increase in TRUST is related to a decrease in $\sigma$(NIM) of 0.8%. Given that the mean of $\sigma$(NIM) is 1.2%, the impact of TRUST on $\sigma$(NIM) is highly economically significant. In column 2, a 1-standard-deviation increase in TRUST is related to a decrease in Z_SCORE of 0.547, approximately 20% of the mean of Z_SCORE in the pre-crisis period. The economic significance of the coefficients in columns 3 and 4 of Table 4 is comparable.

## B. Market-Based Risk Measures

Since our main risk results are based on accounting measures, we also examine the relations between societal trust and two market-based risk measures, CDS spread and crash risk, for a subsample of large public banks. The CDS spread results are reported in Panel A of Table 5.[6] We obtain CDS data from Markit, which is widely used in CDS research. CDS maturities are negotiable, with 5 years being the most common horizon (over 85% of the CDS market). Thus, following prior research (e.g., Hasan, Liu, and Zhang (2016)), we use the 5-year CDS spread as an additional risk measure in our analysis. Consistent with our main results, we document a negative relation between societal trust and CDS spread in both the pre- and the post-crisis periods.

Next, we follow prior literature and employ two measures to proxy for crash risk (Callen and Fang (2015), Chen et al. (2001)). These measures include an indicator variable to capture crash weeks (CRASH) and negative conditional skewness of a firm's weekly returns (NCSKEW) (see the Appendix for detailed definitions of these variables).[7] To be consistent with the literature on crash risk, we include several additional controls in our crash-risk regressions.[8] The results, reported in Panel B of Table 5, again indicate a strong negative relationship between societal trust and each of these two measures of crash risk for both the pre- and the post-crisis periods.

The economic significance of the results in Panel A of Table 5 is that a 1-standard-deviation increase in TRUST is related to a decrease in CDS1 of 0.16% (column 1), approximately 31% of the mean of CDS1 in the pre-crisis period. In Panel B, a 1-standard-deviation increase in TRUST is related to a decrease in CRASH of 8.4% (column 1), which is considerable compared to the pre-crisis period mean CRASH of 13.7%.

## C. Excessive Risk-Taking

Since our prediction of a negative relationship between societal trust and risk-taking applies mainly to excessive risk-taking for banks, we repeat our main analyses employing two proxies for aggressive/abnormal risk. First, we define the top decile of banks with Z_SCORE or $\sigma$(NIM) as aggressive risk-takers and use a dummy variable to proxy for aggressive risk-taking. Consistent with the main results, the results reported in Table 6 show a strong negative association between societal trust and both proxies for aggressive risk-taking for the pre- and the post-crisis periods.

For the abnormal risk-taking tests, following Cheng et al. (2015), we employ a 2-stage model to separate excessive risk-taking from normal risk-taking. In the

[6] We match the Markit and BankScope databases based on bank name, country, and state. We then manually check the matched sample to ensure the accuracy of our matching procedure. We have 415 bank–year observations from 22 countries in the pre-crisis test and 335 bank–year observations from 20 countries in the post-crisis test.

[7] For the crash-risk regressions, we have 15 countries in the pre-crisis sample and 14 countries in the post-crisis sample.

[8] Following DeFond, Hung, Li, and Li (2014), we include SIZE_LAG1, LEV_LAG1, ROA_LAG1, DTURN_LAG1, SD_RET_LAG1, and AVG_RET_LAG1 as additional controls (see the Appendix for detailed definitions).

first stage, we regress our two main risk measures (Z_SCORE and $\sigma$(NIM)) on the bank-level controls for normal risk, which include bank type, SIZE, REVG, TOOBIG, SOE, LISTED, and IFRS. The residuals from this first-stage model proxy for abnormal risk-taking. In the second stage, we regress the abnormal risk measures on trust and other control variables. Again, the results reported in Table 7 show a robust negative association between societal trust and both proxies for abnormal risk for the pre- and the post-crisis periods.

TABLE 5

Relation between Trust and Risk-Taking: Market-Based Measures of Risk-Taking

Table 5 reports estimation results of the following regression: RISK $= \gamma_0 + \gamma_1$TRUST $+ \gamma_2 \boldsymbol{V} + \gamma_3 \boldsymbol{W} + \epsilon$. RISK is one of the two CDS-based risk measures, CDS1 and CDS2, or one of the two crash risk–based risk measures, CRASH and NCSKEW. TRUST is the societal trust index. $\boldsymbol{V}$ is a vector of bank-level control variables that includes SIZE_C, LOANS, LEV, ΔCASH,SOE, LISTED, and IFRS in Panel A, and the additional variables ROA_LAG1, D_TURN_LAG1, SD_RET_LAG1, and AVG_RET_LAG1 in Panel B. $\boldsymbol{W}$ is a vector of country-level control variables that includes LGDP, DI, COMP, CR, ENFORCE, COMMON, and GI. Panel A reports results for the two CDS-based risk measures and Panel B reports results for the two crash risk–based risk measures. See the Appendix for variable definitions. We estimate the standard errors (reported in parentheses) clustered by country. *, **, and *** indicate significance at the 10%, 5%, and 1% levels (2-tailed), respectively.

*Panel A. Credit Default Swap-Based Risk Measures*

| | Pre-Crisis Period | | Post-Crisis Period | |
|---|---|---|---|---|
| | CDS1 | CDS2 | CDS1 | CDS2 |
| Variables | 1 | 2 | 3 | 4 |
| TRUST | −0.012*** | −0.012*** | −0.065* | −0.072** |
| | (−3.59) | (−3.49) | (−1.91) | (−2.46) |
| SIZE_C | −0.000** | −0.000* | 0.003 | 0.002 |
| | (−2.39) | (−2.05) | (1.02) | (0.98) |
| LOANS | −0.002 | −0.002 | 0.045 | 0.039 |
| | (−0.59) | (−0.84) | (1.53) | (1.53) |
| LEV | −0.016* | −0.018 | −0.211 | −0.183 |
| | (−1.90) | (−1.62) | (−0.83) | (−0.83) |
| ΔCASH | 0.071 | 0.138** | −0.353 | −0.286 |
| | (1.23) | (2.42) | (−1.33) | (−1.19) |
| SOE | 0.001 | 0.001 | 0.007 | 0.007 |
| | (0.61) | (0.83) | (0.62) | (0.73) |
| LISTED | 0.001 | 0.001 | 0.009* | 0.009* |
| | (1.28) | (1.13) | (1.76) | (2.04) |
| IFRS | 0.001 | 0.001 | −0.001 | 0.003 |
| | (1.21) | (1.22) | (−0.15) | (0.46) |
| LGDP | 0.002** | 0.003*** | 0.012 | 0.011 |
| | (2.81) | (3.16) | (1.14) | (1.25) |
| DI | 0.002 | 0.003* | −0.005 | −0.005 |
| | (1.62) | (1.72) | (−0.62) | (−0.61) |
| COMP | 0.013* | 0.013 | 0.087 | 0.070 |
| | (1.90) | (1.66) | (0.73) | (0.66) |
| CR | 0.001*** | 0.001*** | 0.005* | 0.005* |
| | (3.69) | (3.86) | (1.76) | (1.85) |
| ENFORCE | 0.001*** | 0.001** | −0.000 | 0.000 |
| | (3.13) | (2.39) | (−0.04) | (0.00) |
| COMMON | 0.000 | 0.000 | −0.012 | −0.011 |
| | (0.36) | (0.59) | (−0.77) | (−0.80) |
| GI | −0.004*** | −0.003*** | −0.007 | −0.007 |
| | (−5.59) | (−4.51) | (−0.68) | (−0.85) |
| INTERCEPT | −0.003 | −0.005 | 0.072 | 0.056 |
| | (−0.29) | (−0.36) | (0.25) | (0.22) |
| No. of obs. | 415 | 415 | 335 | 335 |
| Adj. $R^2$ | 0.144 | 0.160 | 0.146 | 0.140 |

*(continued on next page)*

TABLE 5 (continued)
Relation between Trust and Risk-Taking: Market-Based Measures of Risk-Taking

*Panel B. Crash Risk–Based Risk Measures*

| | Pre-Crisis Period | | Post-Crisis Period | |
|---|---|---|---|---|
| | CRASH | NCSKEW | CRASH | NCSKEW |
| Variables | 1 | 2 | 3 | 4 |
| TRUST | −0.653*** | −1.073*** | −1.438*** | −3.520*** |
| | (−4.31) | (−4.10) | (−8.14) | (−4.12) |
| SIZE_LAG1 | −0.001 | 0.014 | 0.039*** | 0.098** |
| | (−0.14) | (0.62) | (3.19) | (2.80) |
| LEV_LAG1 | −0.100 | −0.419 | −1.164*** | 0.277 |
| | (−0.26) | (−1.02) | (−3.96) | (0.18) |
| ROA_LAG1 | 0.0460 | −2.428 | −3.879 | 8.049 |
| | (0.03) | (−0.72) | (−1.66) | (1.23) |
| DTURN_LAG1 | −0.039** | −0.226 | 0.176*** | 0.419*** |
| | (−2.68) | (−1.18) | (4.16) | (4.49) |
| SD_RET_LAG1 | 0.888 | 1.060 | 0.926*** | 2.328** |
| | (0.87) | (1.29) | (5.10) | (2.21) |
| AVG_RET_LAG1 | −1.276 | 4.624 | 5.277*** | −0.711 |
| | (−0.22) | (0.54) | (4.83) | (−0.16) |
| LOANS | 0.218 | 0.549 | 0.040 | −0.314 |
| | (1.70) | (1.70) | (0.13) | (−0.85) |
| ΔCASH | −3.900 | 1.589 | −3.736 | 2.377 |
| | (−1.73) | (0.36) | (−0.84) | (0.28) |
| SOE | −0.097* | −0.246*** | −0.043 | −1.235* |
| | (−1.93) | (−3.20) | (−0.33) | (−2.12) |
| IFRS | −0.079 | −0.504* | 0.111 | 0.638* |
| | (−0.42) | (−1.78) | (1.35) | (1.99) |
| LGDP | −0.139*** | 0.034 | −0.442*** | −0.891*** |
| | (−3.25) | (0.39) | (−8.19) | (−4.36) |
| DI | 0.254** | 1.059** | −0.090 | 0.412*** |
| | (2.33) | (2.45) | (−1.47) | (3.52) |
| COMP | 3.281*** | 10.635*** | −4.083*** | −0.937 |
| | (4.72) | (3.94) | (−4.20) | (−0.51) |
| CR | −0.133*** | −0.076 | −0.205*** | −0.692*** |
| | (−5.39) | (−1.35) | (−8.19) | (−9.08) |
| ENFORCE | −0.005 | 0.017 | 0.078* | 0.184 |
| | (−0.24) | (0.22) | (1.90) | (1.35) |
| COMMON | 0.043 | 0.039 | −0.426*** | −0.339*** |
| | (0.70) | (0.34) | (−9.18) | (−3.50) |
| GI | 0.187*** | 0.131 | 0.327*** | 0.764*** |
| | (5.42) | (1.04) | (6.88) | (4.60) |
| INTERCEPT | 1.151* | −1.536 | 5.283*** | 6.879*** |
| | (1.98) | (−1.11) | (9.65) | (4.95) |
| No. of obs. | 335 | 335 | 122 | 122 |
| Pseudo/Adj. $R^2$ | 0.036 | 0.033 | 0.290 | 0.239 |

## D. Additional Tests

Next, we examine whether societal trust in a country is systematically related to bank financial trouble and bank failure during the 2007–2009 financial crisis.[9] To do so, we follow Lel and Miller (2008) and Beltratti and Stulz (2012) and estimate the following bank-level logistic model, with standard errors clustered

[9] We hand-collect the bank-failure data for the crisis period only.

TABLE 6

Relation between Trust and Aggressive Risk-Taking

Table 6 reports estimation results of the following regression: RISK$=\gamma_0+\gamma_1$TRUST$+\gamma_2\boldsymbol{V}+\gamma_3\boldsymbol{W}+\epsilon$. RISK is one of the two risk measures, DUM_$\sigma$(NIM) and DUM_Z_SCORE, where DUM_$\sigma$(NIM) equals 1 if $\sigma$(NIM) is in the top decile of the sample distribution of $\sigma$(NIM), and 0 otherwise, and DUM_Z_SCORE equals 1 if Z_SCORE is in the top decile of the sample distribution of Z_SCORE, and 0 otherwise. TRUST is the societal trust index. $\boldsymbol{V}$ is a vector of bank-level control variables that includes SIZE, REVG, TOOBIG, SOE, LISTED, and IFRS. $\boldsymbol{W}$ is a vector of country-level control variables that includes LGDP, DI, COMP, CR, ENFORCE, COMMON, and GI. See the Appendix for variable definitions. We estimate the standard errors (reported in parentheses) clustered by country. *, **, and *** indicate significance at the 10%, 5%, and 1% levels (2-tailed), respectively.

| | Pre-Crisis Period | | Post-Crisis Period | |
|---|---|---|---|---|
| | DUM_$\sigma$(NIM) | DUM_Z_SCORE | DUM_$\sigma$(NIM) | DUM_Z_SCORE |
| Variables | 1 | 2 | 3 | 4 |
| TRUST | −4.565*** | −6.287*** | −4.179*** | −3.734** |
| | (−2.70) | (−2.78) | (−3.45) | (−2.37) |
| SIZE | −0.179*** | 0.203** | −0.130*** | 0.170*** |
| | (−4.51) | (1.99) | (−4.39) | (2.92) |
| REVG | 1.312*** | 0.647*** | 0.146** | −0.106*** |
| | (14.24) | (6.30) | (2.50) | (−3.29) |
| TOOBIG | 1.128*** | 0.560** | 1.390*** | 0.967*** |
| | (2.74) | (2.30) | (4.54) | (3.60) |
| SOE | −0.027 | 0.393 | −0.219 | −0.030 |
| | (−0.08) | (1.42) | (−0.78) | (−0.10) |
| LISTED | −0.220 | −0.679 | 0.025 | −0.609 |
| | (−1.46) | (−1.10) | (0.18) | (−0.99) |
| IFRS | 0.060 | −1.748** | −0.451 | −0.687 |
| | (0.12) | (−2.57) | (−1.40) | (−1.57) |
| LGDP | 0.026 | −0.160 | −0.214 | 0.283 |
| | (0.10) | (−0.32) | (−0.96) | (0.64) |
| DI | 0.428 | 0.348 | −0.063 | −0.202 |
| | (0.60) | (0.66) | (−0.16) | (−0.53) |
| COMP | 19.762*** | 7.570 | 4.908* | 3.683 |
| | (4.50) | (1.55) | (1.96) | (1.23) |
| CR | −0.151 | 0.577*** | −0.046 | 0.245 |
| | (−0.97) | (3.03) | (−0.39) | (1.57) |
| ENFORCE | 0.065 | 0.251 | 0.104 | 0.032 |
| | (0.57) | (1.15) | (1.14) | (0.24) |
| COMMON | −0.265 | −1.049** | −0.039 | −0.455 |
| | (−0.79) | (−2.29) | (−0.17) | (−1.35) |
| GI | −0.381* | −0.068 | −0.387** | −0.013 |
| | (−1.79) | (−0.21) | (−2.15) | (−0.05) |
| INTERCEPT | −0.255 | −2.416 | 2.445 | −5.025 |
| | (−0.10) | (−0.49) | (1.47) | (−1.33) |
| No. of obs. | 15,872 | 15,872 | 14,911 | 14,911 |
| Pseudo-$R^2$ | 0.177 | 0.258 | 0.107 | 0.073 |

by country:

$$\text{BANK\_TROUBLE (BANK\_FAILURE)} = \gamma_0+\gamma_1\text{TRUST}+\gamma_2\text{SIZE\_T}+\gamma_3\text{LOANS\_T}+\gamma_4\text{LEV\_T}+\gamma_5\text{NPL\_T}+\gamma_6\Delta\text{CASH\_T}+\gamma_7\text{SOE}+\gamma_8\text{LISTED}+\gamma_9\text{IFRS}+\gamma_{10}W+\epsilon. \quad (2)$$

In the model in equation (2), BANK_TROUBLE (BANK_FAILURE) is an indicator variable that equals 1 if the bank was in financial trouble (failed) during 2007–2009, and 0 otherwise. We classify a bank as being in financial trouble if it met at least one of the following three criteria during 2007–2009: i) ROA less than −2%, ii) equity over assets less than 6%, and iii) loan loss provision greater than 1% of gross loans. These three criteria measure profitability, balance

TABLE 7

Relation between Trust and Abnormal (Residual) Risk-Taking

Table 7 reports estimation results of the following regression: RISK $= \gamma_0 + \gamma_1$TRUST $+ \gamma_2 \boldsymbol{V} + \gamma_3 \boldsymbol{W} + \epsilon$. RISK is one of the two risk measures, ABNORMAL_$\sigma$(NIM) and ABNORMAL_Z_SCORE, where ABNORMAL_$\sigma$(NIM) is the residual from the following regression: $\sigma$(NIM) $= \gamma_0 + \gamma_1$SIZE1 $+ \gamma_2$ REVG $+ \gamma_3$TOOBIG $+ \gamma_4$ SOE $+ \gamma_5$LISTED $+ \gamma_6$IFRS $+ \epsilon$, and ABNORMAL_Z_SCORE is the residual from the following regression: Z_SCORE $= \gamma_0 + \gamma_1$SIZE1 $+ \gamma_2$REVG $+ \gamma_3$TOOBIG $+ \gamma_4$SOE $+ \gamma_5$LISTED $+ \gamma_6$IFRS $+ \epsilon$. TRUST is the societal trust index. $\boldsymbol{V}$ is a vector of bank-level control variables that includes SIZE, REVG, TOOBIG, SOE, LISTED, and IFRS. $\boldsymbol{W}$ is a vector of country-level control variables that includes LGDP, DI, COMP, CR, ENFORCE, COMMON, and GI. See the Appendix for variable definitions. We estimate the standard errors (reported in parentheses) clustered by country. *, **, and *** indicate significance at the 10%, 5%, and 1% levels (2-tailed), respectively.

| | Pre-Crisis Period | | Post-Crisis Period | |
|---|---|---|---|---|
| | ABNORMAL_$\sigma$(NIM) | ABNORMAL_Z_SCORE | ABNORMAL_$\sigma$(NIM) | ABNORMAL_Z_SCORE |
| Variables | 1 | 2 | 3 | 3 |
| TRUST | −0.069*** | −4.240*** | −0.007* | −2.513** |
| | (−2.97) | (−2.76) | (−1.87) | (−2.65) |
| SIZE | −0.001** | −0.083* | −0.000*** | −0.007 |
| | (−2.29) | (−1.72) | (−3.62) | (−0.17) |
| REVG | −0.003 | −0.126** | −0.000 | 0.008 |
| | (−0.76) | (−2.47) | (−0.54) | (0.26) |
| TOOBIG | −0.000 | 0.167 | 0.000 | −0.039 |
| | (−0.01) | (0.91) | (0.18) | (−0.21) |
| SOE | −0.006 | −0.314* | −0.001 | 0.043 |
| | (−1.24) | (−1.97) | (−1.36) | (0.27) |
| LISTED | −0.000 | 0.241 | 0.000 | 0.055 |
| | (−0.30) | (0.52) | (0.21) | (0.21) |
| IFRS | −0.030** | −2.247*** | −0.002** | −0.192 |
| | (−2.62) | (−5.40) | (−2.13) | (−0.74) |
| LGDP | 0.005 | −0.383 | 0.000 | 0.158 |
| | (0.95) | (−1.17) | (0.24) | (0.61) |
| DI | 0.005 | 0.479 | 0.001 | −0.302 |
| | (0.62) | (1.21) | (0.66) | (−1.24) |
| COMP | 0.201** | 8.122* | 0.012 | 3.040 |
| | (2.59) | (2.00) | (1.58) | (1.40) |
| CR | −0.001 | 0.440*** | 0.000* | 0.030 |
| | (−0.27) | (3.30) | (2.02) | (0.31) |
| ENFORCE | 0.001 | 0.421*** | 0.000* | 0.072 |
| | (0.31) | (2.94) | (1.69) | (0.95) |
| COMMON | −0.002 | −0.803*** | −0.001 | −0.138 |
| | (−0.63) | (−3.06) | (−1.63) | (−0.77) |
| GI | −0.006 | 0.123 | −0.002** | −0.003 |
| | (−1.29) | (0.54) | (−2.61) | (−0.02) |
| INTERCEPT | −0.010 | 2.140 | 0.004 | −0.863 |
| | (−0.23) | (0.67) | (0.65) | (−0.39) |
| No. of obs. | 15,872 | 15,872 | 14,911 | 14,911 |
| Adj. $R^2$ | 0.052 | 0.264 | 0.068 | 0.014 |

sheet strength, and asset quality. We use these criteria because bank examiners in the United States use these measures in the CAMELS rating system to identify financially troubled banks and because CAMELS ratings and other indicators of bank trouble used by bank examiners are not publicly available. To ensure that our sample comprises only banks that were healthy at the end of 2006, we exclude banks that met any one of these criteria during 2006. Since these are bank-level regressions, we cluster the standard errors by country in all our tests.

We use all the banks in the BankScope database with available financial information for the troubled (failed) bank analysis. Our sample for this crisis-period analysis consists of 9,605 banks, of which 28% (or 2,689 banks) are classified as troubled. We include bank-level control variables measured at the end of

2006 (i.e., SIZE_T, LOANS_T, LEV_T, NPL_T, and ΔCASH_T) that may affect a bank's financial health, as well as country-level control variables in the model in equation (2).

Following Kanagaretnam et al. (2014), we hand-collect data on failed banks primarily from government and central bank reports. We have data on failed banks from 40 countries. For the failed bank analysis, our sample has 12,314 banks, of which 1.4% (or 172 banks) failed.

We report the results of estimating the model in equation (2) for bank trouble during the financial crisis in column 1 and for bank failure in column 2 of Table 8. The results indicate that TRUST is negatively associated with BANK_TROUBLE (BANK_FAILURE) during the 2007–2009 crisis period. The bank-level control variables SIZE_T, LOANS_T, NPL_T, and LISTED are significantly positively related to BANK_TROUBLE (BANK_FAILURE). These results indicate that banks in higher-trust countries were less likely to experience financial trouble (failure) during the 2007–2009 crisis period, likely due to their lower levels of risk-taking in the pre-crisis years.

We also examine the relationship between societal trust and bank trouble in the post-crisis period and report the results in column 3 of Table 8. Consistent with the results in Panel A, we document a significantly negative relationship between TRUST and BANK_TROUBLE_POST in the post-crisis period.

In a separate test, we check the validity of the modified Z_SCORE as a measure of risk by examining the relations between societal trust and the components of Z_SCORE and also test how effective pre-crisis Z_SCORE is at predicting bank trouble (bank failure) in the crisis period. Untabulated results show that societal trust has a strong negative association with two of the three components ($\sigma$(ROA) and negative CAR) of Z_SCORE, indicating that societal trust reflects lower risk through not only the composite Z_SCORE but also its individual components. We also find that pre-crisis Z_SCORE has a strong positive association with crisis-period performance (i.e., bank trouble and bank failure) for our sample banks. This is additional evidence of the usefulness of Z_SCORE as an effective risk measure for banks.

## E. Evidence of Potential Economic Channels

In developing our prediction, we reason that trust could influence bank risk-taking through three possible channels. In particular, we argue that potential channels such as accounting transparency, managerial reciprocity, and compensation-related incentives can all drive the result between trust and risk-taking. In this section, we provide some preliminary empirical evidence (untabulated) on these economic channels. First, we find that trust is negatively associated with bank earnings management to just meet or beat the prior year's earnings and is also positively associated with bank accounting conservatism as proxied by timely recognition of bad news (i.e., losses, loan loss provisions, and loan charge-offs). These results lend support to our argument that societal trust enhances bank accounting transparency. Second, we document a positive relationship between societal trust and social CSR scores of banks (which cover CSR activities in the areas of employees, supply chain, customers, community, and philanthropy) obtained from

TABLE 8

Relation between Trust and Bank Trouble/Failure

Table 8 reports estimation results of the following logistic model: BANK_TROUBLE (BANK_FAILURE) $= \gamma_0 + \gamma_1$TRUST $+ \gamma_2 \boldsymbol{V} + \gamma_3 \boldsymbol{W} + \epsilon$. BANK_TROUBLE (BANK_FAILURE) is an indicator variable that equals 1 if the bank was in financial trouble (failed) during the period 2007–2009, and 0 otherwise. TRUST is the societal trust index. $\boldsymbol{V}$ is a vector of bank-level variables that includes SIZE_T, LOANS_T, LEV_T, NPL_T, ΔCASH_T, SOE, LISTED, and IFRS. $\boldsymbol{W}$ is a vector of country-level variables that includes LGDP, DI, COMP, CR, ENFORCE, COMMON, and GI. See the Appendix for variable definitions. We estimate the standard errors (reported in parentheses) clustered by country. *, **, and *** indicate significance at the 10%, 5%, and 1% levels (2-tailed), respectively.

| | Financial-Crisis Period (2007–2009) | | Post-Crisis Period (2010–2012) |
|---|---|---|---|
| | Troubled Banks | Failed Banks | Troubled Banks |
| Variables | 1 | 2 | 3 |
| TRUST | −2.984*** | −5.155** | −1.688* |
| | (−3.78) | (−2.36) | (−1.82) |
| SIZE_T | 0.262*** | −0.072 | −0.019 |
| | (7.67) | (−0.81) | (−0.59) |
| LOANS_T | 1.327*** | 4.357*** | 0.313 |
| | (7.43) | (19.73) | (0.27) |
| LEV_T | 0.803 | 3.988** | 2.162** |
| | (0.84) | (2.52) | (2.13) |
| NPL_T | 9.997*** | −1.901 | −0.693* |
| | (2.61) | (−0.33) | (−1.69) |
| ΔCASH_T | 2.260 | 0.962 | 0.627 |
| | (1.57) | (0.43) | (0.47) |
| SOE | −0.605 | −0.242 | 0.008 |
| | (−1.39) | (−0.24) | (0.03) |
| LISTED | 0.195** | −1.115*** | 0.177 |
| | (2.29) | (−3.11) | (1.45) |
| IFRS | 1.053* | −0.232 | −0.272* |
| | (1.71) | (−0.27) | (−1.65) |
| LGDP | 0.537** | 0.098 | 0.015 |
| | (2.27) | (0.21) | (0.12) |
| DI | −0.337 | −0.100 | 0.275 |
| | (−0.84) | (−0.10) | (1.41) |
| COMP | −1.448 | −0.305 | 1.202 |
| | (−1.46) | (−0.07) | (0.77) |
| CR | −0.250 | 0.439 | 0.039 |
| | (−0.87) | (1.41) | (0.49) |
| ENFORCE | 0.139 | 0.148 | −0.033 |
| | (0.86) | (0.96) | (−0.67) |
| COMMON | 0.108 | −0.722 | −0.040 |
| | (0.43) | (−1.30) | (−0.26) |
| GI | −0.466*** | −0.354 | −0.180 |
| | (−2.69) | (−1.19) | (−1.48) |
| INTERCEPT | −7.914*** | −9.065** | −2.433 |
| | (−4.20) | (−2.05) | (−1.28) |
| No. of obs. | 9,605 | 12,314 | 7,715 |
| Pseudo-$R^2$ | 0.113 | 0.085 | 0.010 |

the Sustainalytics database.[10] This is direct evidence that trust is positively associated with banks' pro-social behavior. Third, we find that societal trust is negatively associated with CEO equity incentive compensation. This reaffirms the argument that excessive risk-taking by bank CEOs may be muted in higher-trust societies due to reduced incentive pay.

[10]These data are available at http://www.sustainalytics.com/.

### F. Sensitivity Analyses

We conduct a series of tests to ensure the robustness of our main conclusions and discuss the untabulated results only for the main variable of interest, TRUST. First, following Nanda and Wysocki (2013), we also use the alternative trust measurements, TRUST_INDEX (Medrano (2011)) and SECRECY (Hope et al. (2008)) in our analysis. Our results are robust to using these alternate measures of trust. Second, since our sample observations are not evenly distributed across countries, we employ a weighted regression method to determine whether our inferences still hold. The results are consistent with those of the unweighted regressions. Third, because larger banks are characterized by higher technical efficiency (Miller and Noulas (1996)), shorter and less exclusive relationships (Berger, Miller, Petersen, Rajan, and Stein (2005)), and lower propensity to engage in corrupt lending practices (La Porta and Lopez-de Silanes (2003)), we include only banks with total assets greater than $100 million, $300 million, and $500 million. Our results are robust to these sensitivity tests. Fourth, because U.S. and German banks comprise a large majority of our sample (almost 75%), we repeat our main analysis after dropping the U.S. and German banks and find consistent results. Fifth, we include two cultural dimensions identified by Hofstede (2001), individualism and uncertainty avoidance, as additional control variables in our regressions, since previous research documents that culture influences both risk-taking and financial transparency (Kanagaretnam, Lim, and Lobo (2011), Kanagaretnam et al. (2014), Kwok and Tadesse (2006), and Mihet (2013)). Our results are robust to inclusion of these additional control variables.

## VI. Conclusion

Our primary objective is to examine the relationship between country-level societal trust and bank risk-taking. Prior literature finds a positive relationship between societal trust and both financial reporting conservatism (timely recognition of bad news) and financial reporting transparency, which constrain bank managers' ability to take excessive risk. We argue that societal trust could also reduce bank managers' incentives to take excessive risk for personal gain during growth periods. In addition, the positive link between societal trust and pro-social behavior could also diminish bank risk-taking.

We measure the societal trust of a country using data from the World Values Survey and find a negative relationship between societal trust and bank risk-taking during both the 2000–2006 pre-crisis period and the 2010–2012 post-crisis period. As corroborating evidence, we also examine the relations between societal trust and two market-based risk measures, CDS spread and crash risk, for a subsample of large public banks. Consistent with our main results, we document a negative relation between societal trust and CDS spread and two measures of crash risk in both the pre- and the post-crisis periods. Since our prediction of a negative relation between societal trust and risk-taking applies mainly to excessive risk-taking among banks, we re-examine our main analyses, employing two proxies for aggressive/abnormal risk. Again, we document that banks in countries with higher societal trust are associated with lower levels of aggressive/abnormal risk.

In addition, we find that banks in higher-trust countries were less likely to experience trouble/failure during the 2007–2009 financial crisis.

Our study contributes to the nascent body of literature that finds that cultural attributes can influence corporate decision making. We also add to the traditional stream of banking research on risk-taking by uncovering an important identifier of bank risk: societal trust. Whereas prior literature has mainly focused on formal institutions such as governance and regulations (e.g., Laeven and Levine (2009)), we show that cultural variables such as trust also matter.

We acknowledge that the following caveats apply to our study. First, whereas the societal trust variable is determined at the country level, the other variables in the study (i.e., risk-taking and bank-level controls) are calculated at the individual bank level. Second, although we document a consistent negative relationship between societal trust and bank risk-taking (using both accounting- and market-based risk measures), the relationship is one of association and does not imply causation.

## Appendix. Variable Definitions

*Trust Variables*

TRUST: We construct the measure of trust based on the World Values Survey question, which asks respondents, "Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?" Respondents have to choose between two answers: "Most people can be trusted" and "Can't be too careful." We code the first answer as 1 and the second as 0, then calculate the average response by country and year. A higher value indicates higher societal trust. *Source*: World Values Survey.

*Alternative Measures of Trust*

TRUST_INDEX: Trust Index was calculated by 100 + (%most people can be trusted) – (%cannot be too careful). *Source:* www.jdsurvey.net.

SECRECY: Inverse measure of trust, which is calculated by the sum of uncertainty avoidance (UA) and power distance (PD) and minus individualism (IND). All the information of UA, PD, and IND scores are from Hofstede (2001). *Source:* Hope et al. (2008), Hofstede (2001).

*Accounting-Based Measures*

Z_SCORE: $(-1) \times \ln((\text{CAR} + \text{ROA})/\sigma(\text{ROA}))$, where CAR is the mean ratio of capital to assets over 2000–2006 (or 2010–2012), ROA is the mean ratio of earnings before taxes and loan loss provisions to assets over 2000–2006 (or 2010–2012), and $\sigma$(ROA) is the standard deviation of ROA estimated over 2000–2006 (or 2010–2012). We use the natural logarithm of Z_SCORE because it has a skewed distribution, and we use the negative transformation to ensure that a higher value of Z_SCORE represents higher bank risk-taking.

$\sigma$(NIM): Standard deviation of net interest margin estimated over 2000–2006 (2010–2012) for the pre- (post-) crisis period.

*Bank Trouble or Failure*

BANK_TROUBLE: Indicator variable equal to 1 if the bank experienced financial trouble during 2007–2009 (financial-crisis period), and 0 otherwise. We define a troubled bank as a bank that met one or more of the following criteria during the financial-crisis period: i) ROA is less than −2%; ii) equity/assets is less than 6%; iii) loan

loss provisions/total loans is larger than 1%. Additionally, we eliminate banks that were troubled in 2006 to ensure that they were not in trouble before 2007.

BANK_FAILURE: Indicator variable equal to 1 if the bank failed during the financial crisis period (2007–2009), and 0 otherwise.

BANK_TROUBLE_POST: Indicator variable equal to 1 if the bank experienced financial trouble during 2010–2012 (post-crisis period), and 0 otherwise. We define a troubled bank as a bank that met one or more of the following criteria during the financial-crisis period: i) ROA is less than −2%; ii) equity/assets is less than 6%; iii) loan loss provisions/total loans is larger than 1%. Additionally, we eliminate banks that were troubled in 2009 to ensure that they were not in trouble before 2010.

*Aggressive Risk-Taking*

DUM_$\sigma$(NIM): Indicator variable equal to 1 if $\sigma$(NIM) is in the top decile of the sample, and 0 otherwise.

DUM_Z_SCORE: Indicator variable equal to 1 if Z_SCORE is in the top decile of the sample, and 0 otherwise.

*Abnormal (residual) Risk-Taking*

ABNORMAL_$\sigma$(NIM): Following Cheng et al. (2015), we estimate ABNORMAL_$\sigma$(NIM) using the residuals from the following regression:

$$\sigma(\text{NIM}) = \gamma_0 + \gamma_1 \text{SIZE} + \gamma_2 \text{REVG} + \gamma_3 \text{TOOBIG} + \gamma_4 \text{SOE} + \gamma_5 \text{LISTED} + \gamma_6 \text{IFRS} + \epsilon.$$

ABNORMAL_Z_SCORE: Following Cheng et al. (2015), we estimate ABNORMAL_Z_SCORE using the residuals from the following regression:

$$\text{Z\_SCORE} = \gamma_0 + \gamma_1 \text{SIZE} + \gamma_2 \text{REVG} + \gamma_3 \text{TOOBIG} + \gamma_4 \text{SOE} + \gamma_5 \text{LISTED} + \gamma_6 \text{IFRS} + \epsilon.$$

*CDS Measures*

CDS1: Average of the daily CDS spread over a year based on 5-year CDS spreads. A value of 0.0001 represents 1 basis point.

CDS2: CDS spread at the end of a year based on 5-year CDS spreads. A value of 0.0001 represents 1 basis point.

*Crash Risk Measures*

CRASH: Indicator variable equal to 1 if a firm experiences one or more crash weeks during the year, and 0 otherwise. Following prior literature (Callen and Fang (2015), Chen et al. (2001), and Hutton et al. (2009)), we identify a crash week as a week in which the firm-specific weekly return falls 3.09 standard deviations below its mean value (a frequency of 0.1%) for the year. We estimate firm-specific weekly returns ($W_{j\theta}$) as the natural log of 1 plus the residual from the following regression:

$$R_{j\tau} = \alpha_j + \beta_{1j} R_{m,\theta-2} + \beta_{2j} R_{m,\theta-1} + \beta_{3j} R_{m,\theta} + \beta_{4j} R_{m,\theta+1} + \beta_{5j} R_{m,\theta+2} + \varepsilon_{j\theta},$$

where $R_{j\theta}$ is the return on stock $j$ in week $\theta$ and $R_{m,\tau}$ is the return on the Center for Research in Security Prices (CRSP) value-weighted market index in week $\theta$. To control the nonsynchronous trading, we include lead and lag returns on the market index. The firm-specific return for firm $j$ in week $\theta$, $W_{j\theta}$, is defined as $W_{j\theta} = \ln(1 + \varepsilon_{j\theta})$.

NCSKEW: Negative conditional skewness of a firm's weekly returns over the year. Following prior literature (Callen and Fang (2015), Chen et al. (2001), and

Hutton et al. (2009)), we calculate NCSKEW for firm $j$ in year $t$ as

$$\text{NCSKEW}_{jt} = -\left[n(n-1)^{3/2}\sum W_{j\theta}^3\right] \Big/ \left[(n-1)(n-2)\left(\sum W_{j\theta}^2\right)^{3/2}\right],$$

where $W_{j\theta}$ is defined as previously. The numerator is the third moment of $W_{j\theta}$ over fiscal year $t$, and the denominator is the standard deviation of $W_{j\theta}$ raised to the third power. To make higher NCSKEW represent higher crash risk, we multiply this ratio by $-1$.

**Control Variables**

*Risk-Taking Test Controls*

SIZE: Average of the natural logarithm of total assets over 2000–2006 (2010–2012) (i.e., pre- (post-) crisis period).

REVG: Average of net interest revenue growth rate over 2000–2006 (2010–2012) (i.e., pre- (post-) crisis period).

TOOBIG: Indicator variable equal to 1 if the bank's deposits comprise more than 10% of the country's total deposits during 2000–2006 (2010–2012) (i.e., pre- (post-) crisis period), and 0 otherwise.

*Troubled and Failed Bank Test Controls*

SIZE_T: Natural logarithm of total assets at the end of 2006 (2009) for the pre- (post-) crisis analysis.

LOANS_T: Total loans divided by total assets at the end of 2006 (2009) for the pre- (post-) crisis analysis.

LEV_T: Ratio of total liabilities to total assets at the end of 2006 (2009) for the pre- (post-) crisis analysis.

NPL_T: Ratio of nonperforming loans to total loans, averaged over 2000–2006 (2010–2012) for the pre- (post-) crisis analysis.

$\Delta$CASH_T: Annual cash flow (income before taxes and loan loss provisions) changes divided by total assets at the end of 2006 (2009) for the pre- (post-) crisis analysis.

*CDS Test Controls*

SIZE_C: Natural logarithm of total assets at the end of year $t$.

LOANS: Total loans divided by total assets at the end of year $t$.

LEV: Ratio of total liabilities to total assets at the end of year $t$.

$\Delta$CASH: Annual cash flow (income before taxes and loan loss provisions) change divided by total assets at the end of year $t$.

*Crash Risk Test Controls*

SIZE_LAG1: Natural logarithm of total assets at the end of year $t-1$.

LEV_LAG1: Ratio of total liabilities to total assets at the end of year $t-1$.

ROA_LAG1: Earnings before taxes and loan loss provisions divided by assets year $t-1$.

DTURN_LAG1: Change in average monthly stock turnover from year $t-1$ to year $t$.

SD_RET_LAG1: Standard deviation of firm-specific weekly returns over year $t$.

AVG_RET_LAG1: Mean of firm-specific weekly returns over year $t-1$.

*Other Controls*

SOE: Indicator variable equal to 1 if the bank is state-owned, and 0 otherwise.

LISTED: Indicator variable equal to 1 if the bank is listed, and 0 otherwise.

IFRS: Indicator variable equal to 1 if the bank adopts IFRS during the year, and 0 otherwise.

*Country-Level Control Variables*

LGDP: Natural logarithm of gross domestic product (GDP) per capita, in 2000 U.S. dollars. *Source:* World Development Indicators, https://datacatalog.worldbank.org/dataset/world-development-indicators.

DI: Indicator variable equal to 1 if the country has deposit insurance, and 0 otherwise. *Source:* Demirguc-Kunt et al. (2008).

COMP: The sum of the squares of the market share (deposits) of each bank in each country over 2000–2006.

CR: Creditor rights index that ranges from 0 to 4. It includes 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. *Source:* La Porta et al. (1998), Djankov et al. (2007).

ENFORCE: Enforcement index that ranges from 0 to 10. A higher value indicates higher law enforcement. *Source:* Economic Freedom of the World: 2010 Annual Report, https://www.fraserinstitute.org/studies/economic-freedom-of-the-world-2010-annual-report.

COMMON: Indicator variable equal to 1 if the country's legal origin is common law, and 0 otherwise. *Source:* La Porta et al. (1998).

GI: First principal component of the following five variables: CONTROL_OF_CORRUPTION, GOVERNMENT_EFFECTIVENESS, POLITICAL_STABILITY, REGULATORY_QUALITY, and VOICE_AND_ACCOUNTABILITY. More specifically, CONTROL_OF_CORRUPTION refers to the corruption perceptions, including both petty and grand forms of corruptions. GOVERNMENT_EFFECTIVENESS refers to perceptions of the quality of public services, the quality of the civil service, the degree of its independence from political pressures, the quality of policy formulation, and the credibility of government's commitment to such policies. POLITICAL_STABILITY refers to the perceptions of the likelihood of political instability and motivated violence. REGULATORY_QUALITY refers to the perceptions of the ability of government to formulate and implement sound policies and regulations that promote private sector development. VOICE_AND_ACCOUNTABILITY refers to perceptions of the extent to which a country's citizens are able to participate in selecting their government, freedom of expression, freedom of association, and a free media. *Source:* Worldwide Governance Indicators (2011). More details can be found on the Worldwide Governance Indicators Web site, http://info.worldbank.org/governance/WGI/#doc.

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