Bank Internationalization and Risk-Taking

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Abstract

This paper investigates the effects of bank internationalization on risk-taking. We find that internationalization increases bank risk-taking: the *Z*-score of US banks that engage in foreign activities is lower than that of their purely domestic peers. The results are consistent with the empirical dominance of the *market risk hypothesis*, whereby internationalization increases banks' risk due to market specific factors (competition, culture, regulatory complexity, economic and political instability, etc.) over the *diversification hypothesis*, whereby internationalization allows banks to reduce risk through increased diversification of their operations. The results continue to hold after conducting a variety of robustness tests, including accounting for endogeneity and sample selection bias. In additional tests, we find that risk-taking is more pronounced during financial crises due to a potentially higher impact of the market specific factors. These findings suggest that authorities might consider additional supervision or regulation of the activities of international banks.

JEL Classification Codes: G21, G28, L25
Keywords: Risk-taking, Internationalization, Banking, Financial Crises

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1. Introduction

Banks' risk-taking behavior shook the financial system during the recent financial crisis, emphasizing the need for both more research in this area and more attention from regulators (e.g., Laeven and Levine (2009), Levine (2012), Acharya and Naqvi (2012), Agarwal, Chang, and Yavas (2012)). A voluminous literature identifies various determinants of bank risk-taking, including regulation (Laeven and Levine (2009), Black and Hazelwood (2012), Duchin and Sosyura (2012)), bank capital (Holmstrom and Tirole (1997), Allen, Carletti, and Marquez (2011), Mehran and Thakor (2011)), competition (Keely (1990), Boyd and De Nicolo (2005), Berger, Klapper, and Turk-Ariss (2009)), bank size (Bhagat, Bolton and Lu (2012)), and governance (Laeven and Levine (2009), Berger, Imbierowicz and Rausch (2012), Beltratti and Stulz (2012)). To our knowledge, however, no prior study considers the direct link between bank internationalization and risk-taking. Further, prior work has little to say about the effects of bank internationalization during financial crises. This paper aims to fill these gaps in the literature.

There are two contrasting views on the impact of internationalization on bank risk-taking. First, the *diversification hypothesis* (Amihud and Lev (1981), DeLong (2001), Berger, DeYoung, Genay, and Udell (2000), Berger, Dai, Ongena, and Smith (2003), Delong (2001), Amihud, DeLong and Saunders (2002), Doukas and Kan (2006), Laeven and Levine (2007))[1] suggests that international banks reduce their risk because they can diversify their risk through expansion in other markets and access to global capital markets. For example, if loan returns across regions are not perfectly correlated, internationally diversified banks may be safer because they are less exposed to shocks that affect individual regions (Diamond (1984), Demsetz and Strahan (1997)).

At the same time, international banks may increase their risk due to market-specific factors. We refer to this as the *market risk hypothesis* (Winton (1999), Amihud, Delong, and Saunders (2002), Méon and Weill (2005)). The market an international bank is exposed to is inherently riskier due to a variety of local market factors (local market competition, culture, regulatory complexity, economic and political instability, disadvantage of being foreign etc.). For instance, the degree of local competition (Chari and Gupta (2008)) will affect the time it takes for a new entrant to establish its market share in a foreign market and to create lending relationships (Berger, Klapper, and Udell (2001)). Another important factor is the local culture, since it takes

[1] Other studies that consider internationalization of non-financial multinationals include Hughes, Logne, and Sweeny (1975), Rugman (1976), Amihud and Lev (1981), Errunza and Senbet (1981, 1984), Kwok and Reeb (2000), Denis, Denis, and Yost (2002), Gande, Schenzler, and Senbet (2009).

time to learn the local market's language, preferences, and informal institutions. Other market factors include the degree of regulatory, monetary, and legal complexity (Alibux (2007)), the degree of economic and political instability in the country, and the extent of market imperfections and asymmetric information problems (Buch and DeLong (2004), Gleason, Mathur, and Wiggings (2006)).[2] Support for the *market risk hypothesis* can be found in the *home field advantage hypothesis* (Berger, Deyoung, Genay, and Udell (2000)), which argues that domestic institutions are generally more efficient than institutions from foreign nations because foreign banks face organizational diseconomies in operating or monitoring an institution from a distance. For instance, operating problems may include disputes between employees in different countries or high costs and turnover in persuading managers to work abroad. As for monitoring problems, it may be difficult to evaluate the behavior and effort of managers in a distant market or compare how well they are performing relative to other institutions in that market. Inexperienced management and other agency problems between domestic headquarters and foreign subsidiaries could exacerbate this risk. In addition, the *market risk hypothesis* also finds support in the findings of Ongena, Popov and Udell (2012)) that banks may bypass strict regulations in their primary domestic country and take advantage of laxer regulation in other countries by lowering lending standards for corporate customers abroad.

This paper considers the two opposing effects of internationalization on bank risk-taking and evaluates which hypothesis (*diversification* versus *market risk*) has stronger empirical support. Our analysis is also motivated by policy considerations. As highlighted by Laeven and Levine (2009) and observed during the recent global financial crisis, the risk-taking behavior of banks can exert a first-order effect on financial and economic stability. As a consequence, international and national organizations have focused on implementing regulations to limit bank risk. In its 2012 financial stability report, the International Monetary Fund maintains that "risks to financial stability have increased, as confidence in the global financial system has become very fragile" and "there should be a global discussion on whether some risky bank activities should be directly restricted rather than just making lenders hold more capital". In addition, Ongena, Popov and Udell (2012) provide evidence implying that multinational banks may engage in regulatory arbitrage and thus circumvent local regulations by taking more risk abroad. Yet, it has not been established by researchers the direct impact of bank internationalization on the risk-taking behavior of individual banks.

[2] See also Bartov, Botnar, and Kaul (1996) and Kwok and Reeb (2000) from the international corporate finance literature.

Using a sample of 15,988 US banks for the period 1986 to 2010, we find that banks that expand into international markets have much higher risk, as captured primarily by banks' *z*-score, than banks that remain purely domestic. This result is consistent with the empirical dominance of the *market risk hypothesis* over the *diversification hypothesis,* and suggests that the additional local market risks associated with international expansion outweigh the benefits of geographical diversification. Our core evidence continues to hold after conducting a series of robustness checks, including alternative proxies for bank internationalization and risk-taking, sample variations, and alternative estimation methods. We also address potential endogeneity using omitted correlated variables analysis, instrumental variables estimation, propensity score matching procedure, and Heckman sample selection model. In each of these robustness checks, we find evidence in support of our main finding that bank internationalization is associated with an increase in bank risk-taking.

In additional analyses, we first examine the impact of internationalization on the components of *Z-Score* (*Capitalization Ratio, ROA*, and *standard deviation of ROA*) in an effort to identify the source of the increase in risk-taking associated with internationalization. We report that internationalization is associated with a higher capitalization level, which can proxy for banks' precautionary measures when expanding abroad, a higher volatility of bank earnings, which can proxy for the risk that international banks face as well as management's ability to control risk exposure and produce steady earnings over time, and lower profitability, consistent with prior empirical evidence that banks' foreign operations are less efficient compared to those of domestic rivals. Next, we examine publicly listed banks and banks in listed bank holding companies, since this subsample allows us to examine market-based risk measures. We find that international banks have a higher overall bank risk as measured by the standard deviation of stock returns, consistent with the dominance of the *market risk hypothesis* over the *diversification hypothesis*. Analysis using S&P credit ratings further suggests that international banks tend to have lower ratings compared to their purely domestic counterparts. Finally, we separately examine financial crisis periods and non-crisis periods to investigate whether internationalization affects risk-taking differently during financial crises. Our results reveal that the magnitude of the relationship between internationalization and risk-taking is higher during financial crises compared to normal times and more pronounced during market crises (those originating in the capital markets) compared to banking crises (those originating in the banking sector).

Our research contributes to the bank risk-taking literature by focusing on an important determinant of bank risk-taking–internationalization–that has been largely ignored by prior

research. Our study further contributes to the banking internationalization literature, which examines various determinants of bank internationalization but has less to say on the effects of internationalization.[3] In the literature on the effects of bank internationalization, Cetorelli and Goldberg (2012) find that international banks tend to have active internal capital markets that contribute to the international propagation of liquidity shocks. In two papers most related to ours, Amihud, DeLong, and Saunders (2002) examine market risk effects and stock price reactions to cross-border bank mergers and find that, on average, bank mergers do not change the risk of acquiring banks, while Méon and Weill (2005) look at European banks' exposure to macroeconomic risks and find potential risk diversification benefits from cross-border mergers. Turning to the literature on the determinants of cross-border bank expansion, the evidence implies that regulatory and cultural barriers limit the international expansion of banks (e.g., Focarelli and Pozzolo (2001, 2005), Berger, Buch, DeLong, and DeYoung (2004), Buch and Lipponer (2007), De Haas and Van Lelyveldt (2010)) and that more profitable and larger banks find it easier to overcome these barriers (Calzolari and Loranth (2011)). Our paper is distinct from these studies in that we do not limit attention to mergers only, but instead consider several forms of bank internationalization. We also do not limit attention only to listed institutions, but instead consider the full universe of commercial banks in the US. We also contribute to the recent regulatory and academic debate on proposed policy measures to increase supervision of banks' international activities (Ongena, Popov and Udell (2012)) by providing the first empirical evidence on the impact of internationalization on the risk-taking of US commercial banks.

The paper proceeds as follows. Section 2 describes the data, variables, and summary statistics. Section 3 presents the results. Robustness tests are presented in Section 4. Section 5 discusses additional analyses. Section 6 concludes.

2. Data, variables, and summary statistics

2.1 Sample banks

We acquire bank data from quarterly Call Reports, which contain financial information on all commercial banks in the US and are collected as part of the bank supervision. Our data

[3] The literature on the determinants of cross-border bank expansion (e.g., Focarelli and Pozzolo (2001, 2005), Berger, Buch, DeLong, and DeYoung (2004), Buch and Lipponer (2007), De Haas and Van Lelyveldt (2010)) finds that regulatory and cultural barriers limit the international expansion of banks, and that more profitable and larger banks find it easier to overcome these barriers (Calzolari and Loranth (2011)).

cover the period 1986:Q1 to 2010:Q4. Our initial dataset comprises 1,069,609 bank-quarter observations. We omit observations that do not refer to commercial banks according to the Call Reports Indicator, which leaves us with 969,053 observations. We next remove any bank-quarter observations that have missing or incomplete financial data on basic accounting variables such as total assets and common equity, which yields 969,017 observations, and observations that have missing or negative data for income statement variables such as interest expenses, personnel expenses, and non-interest expenses, which results in 964,150 bank-quarter observations. Following the procedure in Berger and Bouwman (2009), we further refine our sample by excluding observations with i) gross total assets (GTA) less than or equal to $25,000 million and ii) no outstanding loans or deposits (i.e., entities not engaged in deposit-taking and loan-making, which are required for banks to be considered commercial banks). These screens leave us with a final sample of 778,664 bank-quarter observations for 15,988 banks over the entire sample period. To avoid distortions in ratios that use common equity as the denominator, for all observations with total common equity less than 1% of total assets, we replace common equity with 1% of total assets. Finally, we normalize all financial variables using the seasonally adjusted GDP deflator, with 2010:Q4 as the base quarter.

2.2 Bank-level measures

2.2.1 Measures of risk-taking

Our main measure of bank risk-taking is the probability of distress (*Z-Score*), which captures the distance to default, with larger values indicating lower overall bank risk (e.g., Boyd and Runkle (1993), Boyd, De Nicolo, and Jalal (2006), Laeven and Levine (2009), Houston, Lin, Lin, and Ma (2010), Beltratti and Stulz (2012)). This measure is calculated as the sum of a bank's average *ROA* (net income as a percentage of GTA) and average *Capitalization Ratio* (equity capital over GTA) divided by *Stdv.ROA* (the volatility of *ROA*). In our main analysis we compute banks' average *ROA*, average *Capitalization Ratio*, as well as standard deviation of *ROA* over the previous 12 quarters after Berger, Klapper, and Turk-Ariss (2009) and Demirgüç-Kunt and Huizinga (2010).

In the interest of comprehensively examining the risk-taking implications of bank internationalization, we also employ several alternative measures of bank risk-taking. First, we construct *Z-Score* over 8 quarters and 20 quarters, as well as a version of *Z-Score* in which we take the log of the *Z-Score* over 12 quarters. We next use *Stdv.ROE*, the standard deviation of *ROE* over the previous 12 quarters, where *ROE* is net income as a percentage of total equity, and

Stdv.ROA, the standard deviation of *ROA* over the previous 12 quarters. We also use the accounting variable *Sharpe Ratio*, which is calculated as the risk-adjusted rate of return on equity (*ROE/Stdv.ROE*) following Demirgüç-Kunt and Huizinga (2010)) and Stiroh and Rumble (2006). Finally, we use the nonperforming loans ratio, that is *NPL Ratio*, a measure of financial stability, calculated as the bank-level ratio of impaired and nonperforming loans to total loans, following Berger, Klapper, and Turk-Ariss (2009), and *LLA Ratio*, the ratio of loan loss allowance over GTA, where higher values indicate greater risk.

2.2.2 Measures of internationalization

We construct several measures of bank internationalization following Cetorelli and Goldberg (2012). Our main measure of bank internationalization is *Foreign Assets Ratio*, which is the ratio of a bank's foreign assets over the total assets of the bank. A larger *Foreign Assets Ratio* indicates a higher degree of internationalization, while a ratio of 0 indicates that a bank has purely domestic operations.

We also specify five alternative measures of internationalization. The first is *Foreign Loans Ratio*, which is the ratio of a bank's foreign loans to the total loans of the bank, where foreign loans are loans extended by offices in the countries in which the offices are physically located. Our second alternative measure of internationalization is *Foreign Deposits Ratio*, which is the ratio of foreign deposits over total deposits, where foreign deposits are deposits taken directly by offices in the countries in which the offices are physically located. This second measure is not mentioned in Cetorelli and Goldberg (2012) but follows a similar approach as that used to construct *Foreign Loans Ratio*. For both of these ratios, larger values indicate greater bank internationalization.

Our third and fourth alternative measures of internationalization come from Call Reports data on international banks' internal funding transfers, that is, "Net Due from foreign offices" and "Net Due to foreign offices", which we refer to simply as "foreign inflows" and "foreign outflows," respectively.[4] A bank's foreign inflows and outflows reflect direct flows between the parent and its affiliates abroad. Positive values ("net due to") indicate that the head office has borrowed funds from its foreign offices, while negative values ("net due from") indicate that the head office has sent funds to affiliates outside of the US (Cetorelli and Goldberg (2012)). Based on these data, we calculate *Foreign Inflows Ratio* as the ratio of a bank's foreign total inflows to

[4] "Net Due from foreign offices" corresponds to RCON2163 and "Net Due to foreign offices" corresponds to RCON2940 in the Call Reports.

total assets, and *Foreign Outflows Ratio* as the ratio of a bank's foreign outflows over total assets. As before, larger values indicate a higher degree of internationalization. The idea is that if US parents provide financial support to foreign affiliates suffering from liquidity problems, we might see more foreign outflows—a larger foreign outflows ratio—for those banks; similarly, we might see increased foreign inflows to US parents—a larger *Foreign Inflows Ratio*—if the international affiliates are profitable and/or the parents need liquidity.

Finally, we calculate an alternative measure of bank internationalization using factor analysis. The variable *Degree of Internationalization Factor* reduces the five measures mentioned above (*Foreign Assets Ratio, Foreign Loans Ratio, Foreign Deposits Ratio, Foreign Inflows Ratio,* and *Foreign Outflows Ratio*) into one single index, with higher values again indicating a greater degree of bank internationalization.

2.2.3 Control variables

To isolate the role of internationalization in bank risk taking, we employ a number of control variables following prior research (e.g., Demirgüç-Kunt and Huizinga (2010)). These controls comprise bank characteristics that can be expected to affect a bank's risk outcome.

We first control for *Income Diversification* since a number of banking studies find that diversification influences risk.[5] Demirgüç-Kunt and Huizinga (2010) and Baele, De Jonghe, and Vander Vennet (2007) find that a greater reliance on non-interest income is linked to more volatile returns. Similarly, Stiroh (2006) finds a negative link between total bank risk and diversification of sources of revenue.[6] We follow Laeven and Levine (2007) and construct *Income Diversification* as 1 – ((Net Interest Income - Other Operating Income)/Total Operating Income). As per Laeven and Levine (2007), according to this measure of income diversification, firms with equal net interest and non-interest incomes are completely diversified.[7]

[5] In unreported results, we also run our regression analysis using a measure of Asset Diversification, which is calculated as 1 – ((Net Loans - Other Operating Assets)/Total Earning Assets).

[6] In a study of European banks, LePetiti, Nys, Rous and Tarazi (2008) find that increased non-interest income exposure is positively linked to (accounting and equity-based) measures of risk. Stiroh and Rumble (2006) also find that an increased share of volatile non-interest activities outweighs the diversification benefits. Berger, Hasan, Korhonen, and Zhou (2010) examine a large sample of Russian banks over the period 1999 to 2006 and find that banks face lower risk when they move from a complete diversification strategy towards less diversification.

[7] Houston, Lin, Lin, and Ma (2010) also use a diversification index in their study on creditor rights, information sharing, and bank risk-taking.

Following Demirgüç-Kunt and Huizinga (2010), we next include *Size*, measured as the natural logarithm of GTA, since prior research shows that bank size is an important determinant of international competitive success (Hirtle (1991)) and that risk-taking varies with bank size. In particular, prior work shows that larger banks have a greater capacity to absorb risk (Berger, Bouwman, Kick, and Schaeck (2012)), economies of scale in foreign exchange management (Minh To and Tripe (2002)), and more stable earnings (De Haan and Poghosyan (2012)). Also, larger banks may take higher risk due to safety net policies that can put them under the "too big to fail" umbrella (O'Hara and Shaw (1990)).

Our third control is the public status of the bank, *Listed*, since prior research (e.g., Barry, Lepetit, and Tarazi (2011), Nichols, Wahlen, and Wieland (2009)) shows that this is another factor that matters to risk-taking since banks that are publicly traded could have different risk behavior, because they tend to be more financially transparent and experience more monitoring from the capital markets. We construct *Listed* as a dummy variable that takes the value of 1 if a bank is listed on a stock exchange or is part of a bank holding company that is listed on a stock exchange, and 0 otherwise.

Fourth, we control for membership in a bank holding company, *BHC*. Such membership is expected to help a bank with foreign operations strengthen its competitive position because the holding company is required to support its affiliate banks, injecting funding into its foreign subsidiaries as needed (Berger and Bouwman (2012)).[8] Consistent with this view, Houston, James, and Marcus (1997) find that bank loan growth depends on bank holding company membership. We construct *BHC* as a dummy variable that takes the value of 1 if the bank is part of a bank holding company, and 0 otherwise.

Our fifth control is *Overhead Costs*, which captures the bank's operating cost structure. Demirgüç-Kunt and Huizinga (2010) find that banks with high overhead have higher fee income and are less stable. Following a similar definition, we construct *Overhead Costs* as the ratio of total bank operating expenses to GTA.

Finally, we control for the regulatory environment. Several studies focus on the relationship between the regulatory environment and bank risk (e.g., Laeven and Levine (2009), Berger, Imbierowicz, and Rauch (2012)). Following Berger, Imbierowicz, and Rauch (2012), we control for potential differences in bank stability that can be explained by a bank's primary

[8] Wright (2002) finds parent size to be one of the most important determinants of performance for a foreign bank operating in Australia while Minh To and Tripe (2002) find parent size to be one of the most important determinants of profits for subsidiaries in New Zealand.

federal regulator by including three proxies for a bank's regulatory environment. In our analysis, *FED* is dummy variable that equals 1 if the bank is a state-chartered Federal Reserve member and 0 otherwise, indicating that the Federal Reserve is the bank's primary federal regulator, *OCC* is a dummy variable that equals 1 if the bank has a national bank charter and 0 otherwise, indicating that the bank's primary federal regulator is the Office of the Comptroller of the Currency, and *FDIC* is a dummy variable that equals 1 if the bank is a state non-member bank, whose primary federal regulator is the Federal Deposit Insurance Corporation, and 0 otherwise. In our regressions, we omit *FDIC* to avoid perfect collinearity.

Following Demirgüç-Kunt and Huizinga (2010)), our regressions also include year fixed effects, and errors are clustered at the bank level. All independent variables are lagged by 12 quarters to avoid simultaneity bias.

2.3 Summary statistics

Figure 1 plots the evolution of the number of international US commercial banks with foreign assets, foreign loans, foreign deposits, and foreign inflows and outflows over our sample period (1986-2010). The figure shows a decline in the number of US commercial banks over the sample period, from 209 in 1986 to only 56 in 2010, which could be due to the banking sector consolidation. Our results extend those of Cetorelli and Goldberg (2012) by looking at a longer period and confirming that the decline in the number of banks continued after 2005.[9]

A similar pattern obtains in the evolution of internationalization ratios in Figure 2, with *Foreign Assets Ratio* declining from 0.23% to 0.05%, *Foreign Loans Ratio* declining from 0.21% to 0.05%, and *Foreign Inflows Ratio* declining from 0.07% to 0.01%. *Foreign Deposits Ratio* declines to a lesser degree, from 0.33% to 0.18%, which indicates that US commercial banks focus more on deposit-taking and less on loan-making over the sample period. Perhaps somewhat puzzling, *Foreign Outflows Ratio* fluctuates over the sample period, rising from 0.02% in 1986 to 0.11% in 1994 and then falling to 0.07% in 2002 before increasing slightly to 0.08% during the recent financial crisis. This latter increase may reflect parents providing financing to foreign subsidiaries during the crisis period, which could have impacted the stability of the domestic part

[9] Cetorelli and Goldberg (2012) report in their Table II that the number of global banks was 247 in 1985, 170 in 1995, and 107 in 2005. However, they include all banks in the Call Reports, rather than focus only on commercial banks, so our numbers are slightly lower due to this requirement imposed on the data. Also, because our sample period is longer, we look at trends up to 2010:Q4.

of the banking organization. The evolution of all internationalization ratios is illustrated in Figure 2.[10]

Similar to Cetorelli and Goldberg (2010), in Figure 3 we find that despite the declining number of international banks, there is an increase in the dollar amount (thousands) of US commercial banks' foreign activities over our sample period (1986-2010) using three different measures of internationalization: foreign assets, foreign loans, and foreign deposits. Figure 4 further compares the actual dollar amount (thousands) of US commercial banks' foreign activities (foreign loans, international inflows and outflows) with cross-border loans by international banks and cross-border loans by domestic banks. We find that cross-border loan volume is higher for international banks than domestic banks and larger than international loans and flows.

Figure 5 compares the risk-taking behavior (*Z-Score*) of international commercial banks versus their purely domestic peers. Given that *Z-Score* is calculated using data over the previous 12 quarters, the sample period in this figure covers the 1987 to 2010 period. This figure also depicts crisis periods, with banking crises represented by dark grey shaded areas and market crises by light grey shaded areas. The figure suggests that the *Z-Score* of international banks is lower than that of purely domestic banks each year in the sample, with the only exception being a short period prior to the subprime mortgage crisis. Further, when we look at financial crises versus normal time periods, the figure reveals an even deeper decline in *Z-Score* during financial crises, particularly during market crises (e.g., the dot-com crisis of 2000 to 2002). This result could be due to greater exposure of international banks to regional economic shocks resulting in higher overall bank risk.

Table 1 provides variable definitions and summary statistics for our sample of US commercial banks. It presents the average, median, and standard deviation across all banks in the sample for the main variables used in our analyses. The internationalization measures (*Foreign Assets Ratio, Foreign Loans Ratio, Foreign Deposits Ratio, Foreign Inflows, and Foreign Outflows*) indicate that approximately 0.1-0.3% of US commercial banks' operations are international, with some banks having very intense foreign operations during some of the bank-quarters. In terms of risk-taking, commercial banks have a mean (median) 12-quarter *Z-Score* of 36.053 (28.287), a mean *Stdv.ROA* of 0.008, a mean *Stdv.ROE* of 0.035, and a mean *NPL Ratio* (non-performing loan ratio) of 0.016. Mean (median) *Income Diversification* is 20% (21.6%) and

[10] To ensure comparability with Cetorelli and Goldberg (2010), we also show the evolution of cross-border loans in Figure 1 Panel B. However, these are not necessarily a measure of internationalization, especially if not accompanied by an actual foreign presence via, for example, foreign assets.

increases up to 42.4% for some bank-quarters. In terms of bank-level characteristics, the average commercial bank has a *Size* of 11.9, a *Capitalization Ratio* of 9%, and *Overhead Costs* of 1.621. About 70% of the commercial banks are owned by a bank holding company (*BHC*) and 14% are listed on an exchange themselves or through the bank holding company that owns them (*Listed*). Moreover, about 10.6% of the banks have *FED* as a primary regulator, 30.9% have *OCC* as a primary regulator, and 58.5% have *FDIC* as a primary regulator.

Table 2 presents the correlation coefficients among the key regression variables. This initial evidence suggests that banks with more international operations (as measured by *Foreign Assets Ratio*) is negatively correlated with *Z-Score*, suggesting that these banks have a higher likelihood of default. Furthermore, in terms of other characteristics, international banks tend to have larger *Income Diversification* (they are not purely lending institutions as they also engage in non-interest generating activities), are larger in terms of *Size*, are more likely to be publicly listed, are less likely to be a member of a bank holding company, and have higher *Overhead Costs*. In terms of the regulatory variables, banks that internationalize are more likely to have *OCC* as their primary regulator and less likely to have *FED* or *FDIC* as their primary regulator. This is due to the fact that they tend to be among the larger national chartered banks. Finally, the correlation results indicate that all three instrumental variables (*Minority Interest*, *Percent Foreign Banks*, and *State Exports Ratio*, explained in detail in Section 4.4) are positively correlated with *Foreign Assets Ratio*, our measure of internationalization.

3. Empirical results

In this section, we empirically analyze the importance of internationalization for US banks' risk-taking behavior. We begin this analysis by performing univariate tests that compare the risk-taking of international banks to purely domestic banks. We next conduct multivariate regressions in which we estimate the impact of internationalization on bank risk-taking. We then run regressions separately for normal times and financial crises.

3.1 Univariate analysis

In a first attempt aiming at evaluating the role of internationalization in bank risk-taking, we start by comparing the means and medians of our measures of bank risk (*Z-Score*, *Stdv.ROA*, *Stdv.ROE*, *Sharpe Ratio*, *NPL Ratio*, and *LLA Ratio*) for the international bank and domestic bank subsamples in Table 3. The results indicate that the mean (median) 12-quarter *Z-Score* is 29.21 (20.43) for international banks compared to 36.15 (28.41) for domestic banks. In other words, the

mean (median) *Z-Score* is 6.94 (7.97) lower for banks with international operations. These differences, which are statistically significant at the 1% level, provide initial support for the view that banks with international operations take on more risk.

This result continues to hold when we use alternative measures of risk-taking. For instance, the mean (median) 8-quarter *Z-Score* is 6.80 (8.74) lower and the mean (median) 20-quarter *Z-Score* is 6.42 (6.88) lower for international banks. Moreover, the standard deviation of ROA is larger for international banks compared to their domestic peers, with the difference in the mean (median) equal to 0.0016 (0.0006). Similarly, the mean (median) standard deviation of ROE is 0.0035 (0.0036) lower for international banks compared to purely domestic banks. The *Sharpe Ratio* is smaller for international banks compared to their domestic peers, with the difference in the mean (median) equal to -0.4910 (-0.7208). We also find that the ratio of nonperforming loans (*NPL Ratio*) and the ratio of loan loss allowances (*LLA Ratio*) are higher for international banks than domestic ones, with the difference in the mean (median) equal to 0.010 (0.006) and 0.012 (0.0068), respectively. Each of the above results indicates that international banks have riskier assets. Overall, our preliminary evidence consistently suggests that international banks take more risk relative to purely domestic banks.

3.2 Regression analysis

To examine the relationship between internationalization and bank risk-taking, we estimate several versions of the following model:

$$Risk_{it} = \alpha + \beta Internationalization_{it-12} + Controls_{it-12} + Time_t + \varepsilon_{it}, \quad (1)$$

where *Risk* stands for bank risk-taking measured by *Z-Score* and other proxies outlined in Section 2.2.1, *Internationalization* is bank internationalization measured by *Foreign Assets Ratio* and other proxies discussed in Section 2.2.2, *Controls* comprises a set of bank-level control variables, *Time* are time fixed effects, and, ε is an error term. Because risk-taking is likely correlated within a bank across time, we adjust standard errors for clustering at the bank level.[11] All independent variables are lagged by 12 quarters to ensure that they are predetermined relative to the dependent variable.[12]

[11] We consider alternative ways to adjust the standard errors for possible dependence in the residuals in section 4.3.

[12] We recognize that reverse causality might still be an issue. We address concerns about reverse causality and other sources of endogeneity in section 4.4.

The results are presented in Table 4. Model 1 reports results from regressing *Z-Score* on *Foreign Assets Ratio* (our main internationalization measure) using ordinary least squares (OLS). When considering *Z-Score* as a measure of bank risk-taking, a negative coefficient on the internationalization term means that internationalization is associated with a lower *Z-Score*, that is, an increase in bank risk-taking, while a positive one means the reverse. After controlling for bank characteristics (income diversification, size, public listing status, bank holding company ownership, overhead costs, and regulatory environment) and time fixed effects, we find that the coefficient on *Foreign Assets Ratio* is negative and statistically significantly at the 1% level. This finding indicates that bank internationalization is significantly associated with greater bank risk-taking. This finding is economically significant as well. A one standard deviation increase in *Foreign Assets Ratio* (0.0230) is associated with a decrease in *Z-Score* of 1.55 (=0.0230×67.458).[13] These results are consistent with the empirical dominance of the *market risk hypothesis* over the *diversification hypothesis*, suggesting that the additional foreign market risks taken on following international expansion outweigh the benefits of geographical diversification.

Models 2 to 7 of Table 4 report additional results after subjecting our main specification to sensitivity and subsample tests. In Model 2, we drop foreign-owned banks defined as entities in which foreign ownership exceeds 50%. In Model 3, we exclude too-big-to-fail entities defined as with GTA greater than $100 billion in constant 2010:Q4 dollars. In Model 4, we exclude the 20 most internationally active banking organizations defined as entities with the largest *Foreign Assets Ratio* in each quarter. In Models 2 to 4, we continue to find that international banks take on more risk, suggesting that our core result is not driven by foreign-owned, too-big-to-fail and the most internationally active banks. Next, we report results by bank size to assess whether our main evidence is concentrated a particular bank size interval. We defined small banks as banks with GTA less than $1 billion, medium-sized banks as banks with GTA between $1 billion and $5 billion, and large banks as banks with GTA higher than $5 billion. All size thresholds are in constant 2010:Q4 dollars. In Models 5 to 7, we continue to find that bank internationalization is associated with higher risk across all size intervals, although the magnitude of the *Foreign Assets Ratio* coefficient appears smaller in the large banks subsample.

[13] To better gauge the economic impact of bank internationalization on risk-taking, we re-estimate Model 1 after replacing *Foreign Assets Ratio* with *Bank Internationalization Dummy*, that takes the value 1 if *Foreign Assets Ratio* is strictly positive, and 0 otherwise. We find that the coefficient estimate on *Bank Internationalization Dummy* is -19.551, which is statistically significant at the 1% level. This coefficient estimate is economically material: moving *Bank Internationalization Dummy* from 0 to 1 (i.e., the bank internationalizes), while all other independent variables are held at their means, decreases the *Z-Score* by 19.551, from 38.617 to 19.066. To put these figures in perspective, the mean Z-Score is 36.053 and its standard deviation is 30.754.

Turning to the bank-level control variables, we find across nearly all models in Table 4 that firm size loads positively on *Z-Score*, consistent with larger banks having better risk management skills and greater capacity to absorb losses through risk diversification (Berger, Bouwman, Kick and Schaeck (2012). We also find that *Listed* loads positively and significantly on *Z-Score*, suggesting that public status tends to be associated with less insolvency risk, consistent with the finding in Houston, Lin, Lin, and Ma (2010). We further find that being part of a BHC leads to a higher *Z-Score*, thus mitigating risk. This result is consistent with arguments in Berger and Bouwman (2012) that the holding company supports its affiliate banks by injecting funding as needed. This should help insulate bank holding company affiliates from external shocks and promote their stability. Next, *Overhead Costs* loads negatively on *Z-Score*, consistent with the finding in Demirgüç-Kunt and Huizinga (2010) that banks with high overhead are less stable. Finally, we look at the potential differences across federal bank regulators. We find that the regulatory environment matters for bank risk-taking. Specifically, we find that *FED* and *OCC* load positively and significantly on *Z-Score*, indicating that banks regulated by the Federal Reserve and the OCC take less risk than the base category, i.e., banks regulated by the FDIC. This result is consistent with Laeven and Levine (2009) and Berger and Bouwman (2012).

4. Robustness tests

4.1 Alternative measures of risk-taking

In Table 5, we examine whether our main results are sensitive to alternative measures of bank risk-taking. We first analyze, in Model 1, the sensitivity of our results to specifying the log of *Z-Score* computed over the prior 12 quarters as the dependent variable. This specification has the advantage of mitigating the impact of outliers in the raw *Z-Score*. Next we compute the *Z-Score* over alternative time intervals. Specifically, the dependent variable is the *Z-Score* computed over the previous 8 quarters in Model 2 and the *Z-Score* computed over the previous 20 quarters in Model 3. Next, in Model 4 we use as the dependent variable *Sharpe Ratio*, which is the risk-adjusted return on equity (*ROE/Stdv.ROE*). In Model 5 we use *Stdv.ROE,* which is the standard deviation of *ROE* over the previous 12 quarters, and in Model 6 we use *Stdv.ROA*, the standard deviation of *ROA* over the previous 12 quarters. In Model 7, we use *NPL Ratio*–the bank-level ratio of impaired and nonperforming loans to total loans. Finally, we report regression estimates using *LLA Ratio*, the ratio of loan loss allowance over total loans, in Model 8. All regressions include time fixed effects. Standard errors are adjusted for clustering at the bank level. For Models 1, 4, 5 and 6, the independent variables are lagged by 12 quarters since the

dependent variable is computed over the prior 12 quarters. For Model 2, the independent variables are lagged by 8 quarters, while for Model 3, the independent variables are lagged by 20 quarters. Finally, for Models 8 and 9 we lag the independent variables by 1 quarter as the dependent variables only contain contemporaneous components. In each of the eight specifications, we find that the coefficient on the *Foreign Assets Ratio* is statistically significant at the 5% level or better, reinforcing our main findings in Table 4 that bank internationalization is associated with more risk-taking.

4.2 Alternative measures of internationalization

In Table 6, we examine whether our main finding that internationalization is associated with increased bank risk-taking persists when we consider in successive regressions alternative measures of internationalization. For ease of comparison, we report again the results based on *Foreign Assets Ratio*, our primary measure of internationalization, in Model 1. Our alternative proxies for internationalization are as follows: *Foreign Loans Ratio* (the ratio of the bank's total foreign loans to the total loans of the bank) in Model 2, *Foreign Deposits Ratio* (the ratio of foreign deposits to total deposits) in Model 3, *Foreign Inflows Ratio* (the ratio of foreign inflows to total assets) in Model 4, *Foreign Outflows Ratio* (the ratio of foreign outflows to bank total assets) in Model 5, and *Degree of Internationalization* (The principal factor component obtained from a factor analysis based on the five prior proxies) in Model 6. All regressions include time fixed effects, and standard errors are adjusted for clustering at the bank level.

In each of these regressions, the coefficient on the internationalization variable is negative and statistically significant at the 1% level. Thus, the negative relation between internationalization and risk-taking (as measured by *Z-score*) that we document above is robust to using alternative measures of bank internationalization.

4.3 Alternative econometric specifications and standard errors

Table 7 reports results from employing alternative econometric specifications and estimating alternative standard errors. Model 1 reports again the results from our main specification to facilitate comparison with other specifications. In Models 2 and 3, we exploit the panel nature of our data and estimate bank fixed effect and bank random effects models, respectively. In both Models, we find support for our earlier results. Next, we use alternative methodologies to correct standard errors for heteroskedasticity and autocorrelation of the residuals. In Models 4 and 5, we estimate Newey-West and Prais-Winsten standard errors,

respectively. In Model 6, we use the Fama-MacBeth procedure and report Newey-West standard errors. In Model 7, we implement two-way clustering by bank and time (quarter-year) as suggested by Thompson (2011) and Cameron, Gelbach and Miller (2011). This model adjusts the standard errors for correlation across banks in the same quarter-year and correlation within a bank across quarter-years. Using our main risk-taking measure, the 12-quarter *Z-Score*, the results in Models 4 through 7 of Table 7 confirm our earlier evidence. In particular, we find that the coefficient on *Foreign Assets Ratio* is negative and statistically significant at the 1% level, suggesting that international banks take on more risk relative to purely domestic banks.

4.4 Endogeneity

In this section we perform several tests to address the potential endogeneity of our internationalization variable, which could bias our findings. Endogeneity is a concern when there is a violation of the assumption that the error term is uncorrelated with the explanatory variables. There are at least three generally recognized sources of endogeneity: (1) omitted correlated variables bias, (2) measurement error, and (3) reverse causality. First, internationalization and bank risk-taking may be simultaneously driven by certain variables not included in our regressions. Second, our variable of interest, internationalization, may be imperfectly measured due to difficulty observing and/or quantifying its magnitude. Third, there could be a causal link from risk-taking to bank internationalization, as the level of bank risk may affect a bank's choice of international involvement. Specifically, banks with risky assets could have incentives to internationalize in order to diversify their risk. These three potential problems may lead to correlation between our internationalization proxy and the error term, leading to spurious inferences on the effect of bank internationalization on risk-taking. Finally, a related concern is self-selection bias. Banks decide whether or not to internationalize. In other words, the internationalization decision is not random. In this case, estimates of the treatment effect of bank internationalization on risk-taking using OLS will be biased. We conduct a series of tests to address these competing explanations for our evidence. We discuss each of these tests in turn below.

Omitted correlated variables. One potential concern is that failure to control for certain determinants of risk-taking can cause them to appear in the error term. If these omitted variables are correlated with bank internationalization, our results become biased. Although we saturate the regressions in Table 3 with several bank-level controls to alleviate the concern about endogeneity stemming from correlated omitted variables, we examine whether our earlier results are sensitive

to sequentially adding controls for other determinants of bank risk-taking.[14] Specifically, we control for: 1) mergers and acquisitions activity (*Merger*), which we capture using a dummy variable that takes the value of 1 starting the time period in which a bank acquires another institution and 0 otherwise, because bad acquisitions can both reduce value and increase bank default risk (Furfine and Rosen (2006)); 2) the degree of competition in the market (*HHI Deposits*), which we measure using the Herfindahl-Hirschman Index (HHI) of market concentration based on the bank's weighted market share of deposits in the Metropolitan Statistical Areas (MSA) or rural counties in which it operates, because prior research shows that competition can affect bank risk (Boyd and De Nicolo (2005), Houston, Lin, Lin, and Ma (2010));[15] 3) the degree of competition in the market squared (*HHI Deposits_sq*) since Martinez-Miera and Repullo (2010) suggest a possible nonlinear relationship between market power and bank risk, 4) "too big to fail" banks (*TBTF*) as in Houston, Lin, Lin, and Ma (2010), which we capture using a dummy variable that takes the value of 1 in all quarters in which a bank has GTA greater than or equal to $100 billion (in constant 2010:Q4 dollars), because banks that view themselves as too big to fail and hence pursue too-big-to-fail policies may have greater incentives to take on risk;[16] 5) the growth rate of real bank assets (*Assets Growth*) and the growth rate of loans (*Loan Growth*) to proxy for growth opportunities (Laeven and Levine (2007), Demirgüç-Kunt and Huizinga (2010)), because Demirgüç-Kunt and Huizinga (2010) suggest that fast-

[14] Note that in Model 2 of Table 7, we control for bank fixed effects. This specification controls for unobservable time-invariant bank characteristics that might drive both internationalization and risk-taking.

[15] HHI is the sum of the squares of the market shares (deposits) of each individual bank. We use the bank deposit data from the FDIC Summary of Deposits for the period 2005 to 2010 combined with data from Berger and Bouwman (2009) for the period 1986 to 2004. The "competition-fragility" view (Keeley (1990), Demsetz, Saidenberg and Strahan (1996), Carletti and Hartmann (2003)) argues that more banking competition erodes market power and increases bank instability. The rationale is that a high degree of competition decreases bank profit margins and franchise value, which encourages risk-taking behavior and ultimately results in a decrease in bank loan portfolio quality and an increase in bank fragility. Alternatively, the "competition-stability" view (Boyd and De Nicolo (2005)) argues that lower competition is associated with financial instability since banks with market power charge higher interest rates on loans to earn more rents, making it difficult for customers to repay the loans. This second view predicts an increase in moral hazard and adverse selection problems, an increase in the volume of non-performing loans, and greater bank instability. Some authors (Boyd, De Nicolo, and Jalal (2006)) find that risk decreases with banking concentration, while others (Martinez-Miera and Repullo (2010)) find a U-shaped relationship between market power and risk-taking.

[16] In the wake of the subprime crisis, there has been widespread discussion of the disproportionate risks taken by large banks that follow too-big-to-fail policies: the failure of large and highly interconnected institutions could lead to a disproportionate increase in systemic risk. In recent work, Bhagat, Bolton and Lu (2012) look at the relation between bank size and risk-taking and find that size is positively correlated with risk-taking measures even after controlling for other observable firm characteristics such as market-to-book ratio, corporate governance, and ownership structure, consistent with too-big-to-fail policies distorting the risk incentives of financial institutions.

growing banks might have different income and funding strategies as well as different risk and return outcomes than slower-growing banks; 6) fee income (*Fee Income*), which we capture using the ratio of non-interest income over total operating income, because Demirgüç-Kunt and Huizinga (2010) show that banking strategies that rely largely on generating non-interest income could be very risky; 7) non-deposit funding (*Nondeposit Funding*), which is the ratio of nondeposit funding to total deposits, since Demirgüç-Kunt and Huizinga (2010) show that greater reliance of bank funding on non-deposit sources tends to induce more risk; and 8) liquidity creation (*Liquidity Creation*), from Berger and Bouwman (2009), which is standardized by bank GTA, because higher liquidity risk may be associated with increased financial fragility.

The results reported in Panel A of Table 8 indicate that adding the above controls does not materially affect our previous finding that internationalization is associated with an increase in banks' overall risk. All additional controls load with the predicted sign.

Instrumental variables. We use instrumental variable techniques (2SLS, GMM and LIML) to extract the exogenous component of bank internationalization in assessing the influence of internationalization on risk-taking. We employ several instrumental variables previously used in the literature. A proper instrument for internationalization should satisfy the requirements of relevance and exogeneity, that is, the IV must correlate with bank internationalization but not with the error term in the risk-taking regression.

Our first instrument is bank-level *Minority Interest* after Dimitrov and Tice (2006) and Li, Qiu, and Wan (2011). This variable is a dummy equal to 1 if a bank reports non-zero minority interest in consolidated subsidiaries on its balance sheet, and 0 otherwise. As argued by Dimitrov and Tice (2006) and Li, Qiu, and Wan (2011), this variable indicates that, at some point time, the parent bank acquired a majority stake in another institution. Since some acquisitions result in internationalization (cross-border acquisitions are one of the most effective ways to enter a foreign market), *Minority Interest* should be correlated with internationalization.[17] However, *Minority Interest* is unlikely to be correlated with a bank's current risk-taking profile, as such acquisitions might have been carried several years ago (Li, Qiu, and Wan (2011)).

Our second instrument for bank internationalization, also after Li, Qiu, and Wan (2011), is *State Exports Ratio*, which is the ratio of the state's foreign exports to total US exports in a given year. A bank becomes familiar with international companies located within its geographical

[17] Li, Qiu, and Wan (2011) note that since the mid-1990s, over 15% of M&A deals initiated by US acquirers have involved a target company based in a foreign country.

area in its role as creditor and can learn from their international experience, which can lower its foreign entry costs (Li, Qiu, and Wan (2011)). Thus, a high level of state exports can positively impact a bank's decision to internationalize. At the same time, it is unlikely that the level of state exports would affect a bank's risk profile. To construct this instrument, we obtain information on banks' headquarters from the Call Report and manually collect state export data from the US Census Bureau (data are available starting with 1995).

Our third instrument is *Fraction of International Banks*, which is the fraction of international banks in each quarter after Campa and Kedia (2002). A larger fraction indicates a higher degree of internationalization in the banking industry. Campa and Kedia (2002) and Li, Qiu, and Wan (2011) note that this measure captures an industry's propensity to engage in global diversification. We expect that the fraction of international banks is positively related to *Foreign Assets Ratio*, but there is no reason to believe that the industry's tendency to internationalize would directly impact the risk-taking behavior of individual banks.

The results of the IV regressions are reported in Panel B of Table 8. We report the first-stage regression results in Model 1 and the second-stage results for the 2SLS, GMM and LIML specifications in Models 2 and 3, respectively. To facilitate comparisons, we also include the OLS results from Model 1 of Table 3 in the last column.

The first-stage regression indicates that the three instrumental variables (minority interest, state export ratio, and fraction of international banks) are positively related to internationalization, and the first-stage *F*-test of excluded instruments indicates that the instruments are collectively valid. The second-stage regressions (2SLS, GMM and LIML) indicate that bank internationalization is associated with greater risk. It is worth noting that after controlling for potential endogeneity, the effect of internationalization on bank risk-taking becomes more pronounced than when using OLS, as the magnitude of the coefficient on internationalization increases and remains highly significant.

Propensity score matching analysis. To confront the issue of self-selection bias, we use propensity score matching (PSM) analysis, developed by Rosenbaum and Rubin (1983), closely following Lawrence, Minutti-Meza, and Zhang (2012).[18]

[18] As noted by Lawrence, Minutti-Meza, and Zhang (2012), PSM has important advantages such as:1) the ability to produce samples in which the treated and untreated entities are similar, thus providing a natural framework to estimate the effects of treatment and firm-level characteristics; 2) the independence from an explicit functional form (opposite from Heckman selection models) and 3) the ability to estimate more

PSM analysis involves matching observations based on the probability of undergoing the treatment, which in our case is the probability of choosing to internationalize. More specifically, PSM estimates the effect of internationalization on a bank's risk-taking by comparing the bank's current risk (*Z-Score*) with the risk that the bank would have observed if it had not expanded into foreign markets. This quasi-experiment is conducted by matching each international bank with a domestic bank sharing similar characteristics as indicated by their propensity scores. The effect of internationalization is calculated as the average difference between the international group and the matched control group. To estimate a bank's propensity score (or probability of internationalizing), we use a probit model in which the dependent variable is a dichotomous internationalization measure that takes a value of 1 if the bank has strictly positive foreign assets, and 0 otherwise and the independent variables are bank characteristics from our main model and the instrumental variables *Minority Interest*, *State Exports Ratio*, and *Percent International Banks* defined above, as well as year fixed effects.

We use several matching techniques. First, we use one-to-one matching without replacement, which matches each bank in the international (treated) group to the nearest domestic (untreated) control bank. This technique ensures that we do not have multiple domestic banks assigned to the same international bank, which can lead to a smaller control group than the treated group. Second, we use one-to-one matching with replacement, which performs a similar matching to the first method with the only difference being that each treated bank can be matched to the nearest control bank even if the latter is used more than once (Dehejia and Wahba (2002)). Finally, we use nearest-neighbor matching with n=2 and replacement, and nearest-neighbor matching with n=3 and replacement, which match each international bank with the 2 and 3 domestic banks with the closest propensity scores, respectively.[19] In these models, the internationalization effect is calculated as the average difference between international banks' risk and the mean risk of their matched neighbors.

Panel B of Table 8 reports both univariate results and regression estimates of the effect of internationalization on bank risk-taking using the propensity-score matched samples. In the

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directly the treatment effects as well as the ability to alleviate the potential nonlinearities related to the treatment effects when the underlying functional form is nonlinear.

[19] In unreported tests, we compare the means of the bank characteristics used in the selection models across the samples of international banks and domestic banks to assess the effectiveness of our propensity matching procedure. Reassuringly, these results indicate that the distributions of the bank characteristics are statistically indistinguishable at conventional levels between the international and domestic samples.

univariate tests, we report *t*-statistics for the difference in risk-taking between the treated and control groups for each of the four PSM techniques. Using one-to-one matching without replacement, we find that *Z-Score* is 7.05 lower for international banks than for the control group. Using the other three techniques, we obtain differences in *Z-Score* of 6.99, 5.19, and 5.27, respectively. All these differences are statistically significant at the 1% level.

Turning to the regression analysis, we regress the risk-taking measure on *Foreign Assets Ratio* and all control variables used in the main regression specification as well as time fixed effects. Again, the standard errors are adjusted for clustering at the bank level. The results for all four regression models confirm our prior finding that international banks take more risk. In all matched samples (Models 1 to 4), we continue to find a negative and statistically significant coefficient on *Foreign Assets Ratio,* indicating that international banks take more risk compared to their domestic peers consistent with the *market risk hypothesis*. We notice that the regression coefficients on *Foreign Assets Ratio* become larger as the sample size increases, especially when we use matching with more neighbors. This evidence from samples matched on their propensity scores helps dispel the competing explanation that our earlier results spuriously reflect differences in the characteristics of international banks and purely domestic banks rather than the effect of internationalization per se on risk-taking.

Heckman's (1979) two-stage self-selection model. Another approach that addresses self-selection bias is Heckman's (1979) two-step procedure. This approach controls for self-selection bias induced by banks choosing to expand into foreign markets by incorporating the internationalization decision into the econometric estimation. In the first step, we use of probit model to regress a dummy variable that equals 1 if *Foreign Assets Ratio* is strictly positive, and 0 otherwise on all control variables from our main specification and the instrumental variables used in Panel B of Table 8 (*Minority Interest*, *State Export Ratio*, and *Fraction of International Banks*). In the second stage, *Z-Score* is the dependent variable and we include the self-selection parameter (inverse Mills' ratio) estimated from the first stage.

While controlling for potential self-selection bias, the results of the two-step estimation model continue to suggest that internationalization is associated with an increase in bank risk. The results are reported in Panel D of Table 8. In the selection equation, the three instrumental variables are positively related to bank internationalization. In the outcome equation, the internationalization variable enters significantly negatively, suggesting a lower *Z-Score* for international banks. The self-selection model, thus, reinforces our prior results.

5. Additional analyses

5.1 Z-Score decomposition

We seek to shed light on the channels through which bank internationalization affects risk-taking by decomposing *Z-Score* into its components: *ROA*, *Capitalization Ratio* and *Stdv.ROA*. In Table 9, we report results of regressions of the three components of *Z-Score* on *Foreign Assets Ratio*. The regressions include time fixed effects, and standard errors are adjusted for clustering at the bank level. For ease of comparison, in Model 1 we report regression results with *Z-Score* as the dependent variable.

We find that the impact of bank internationalization on *Z-Score* is the net effect of several factors influencing risk. First, as shown by the regression estimates reported in Model 2, we find that bank internationalization is associated with lower profitability as measured by *ROA*, consistent with findings in DeYoung and Noelle (1996), Peek, Rosengren, and Kasirye (1999), and Berger, DeYoung, Genay, and Udell (2000).[20] Our result is also consistent with Goetz, Laeven and Levine (2012) who find that bank geographical diversification across US states is detrimental to bank performance.

Second, as shown in Model 3, we find that bank internationalization is associated with increased *Capitalization Ratio*, which works to reduce bank risk. This is consistent with the finding in Cetorelli and Goldberg (2012) for small banks. This may be due to precautionary measures taken by banks when expanding abroad as well as regulatory and legal requirements designed to avoid bank runs.

Third, as shown in the regression estimates reported in Model 4, we find that bank internationalization is associated with increased volatility in bank profitability as measured by *Stdv.ROA*. This result is expected as banks expanding abroad often face unanticipated difficulties and risky operating environments in the host countries.

Taken together, the results show that while the equity capital effect works to increase banks' *Z-Score* and, hence, decrease bank risk, this effect is not strong enough to offset the effects of lower profitability and higher volatility of returns of international banks.

5.2 Listed banks

[20] These studies compare the performance of domestic and foreign-owned banks in the US and suggest that the underperformance of foreign banks is due to these banks operating under an inefficient input mix (e.g., heavier reliance on purchased funds) or encountering difficulties in adapting their customer service and delivery systems to the US market.

In Table 10, we investigate whether our main results are sensitive to examining the subsample of publicly listed banks. To do so, we aggregate banks in the Call Reports at the bank holding company level and merge the resulting sample with CRSP (to obtain stock returns) and Compustat (to obtain S&P credit ratings). An advantage of focusing on listed banks is that we can analyze the impact of bank internationalization on risk-taking using several measures of market-based risk. We first employ the 12-quarter *Z-Score* as our dependent variable for this subsample of banks in Model 1. Despite the dramatic drop in the number of observations (29,953 observations on listed banks compared to 600,953 observations for the full sample), we find that our core evidence persists in this reduced subsample of banks.

Then, we construct two measures of bank market risk based on stock returns. First, we estimate the market model for each bank using daily stock returns over the fiscal year. Specifically, we regress each bank's stock returns on the CRSP value-weighted index returns and construct *Idiosyncratic Risk* as the standard deviation of the regression's residuals. Second, we compute *Total Bank Risk* as the standard deviation of bank daily stock returns over the fiscal year. We consider *Idiosyncratic Risk* and *Total Bank Risk* as our measures of bank risk in Model 2 and Model 3, respectively.

Finally, we create two measures of bank market risk based on credit ratings. First, we convert the long-term issuer credit ratings compiled by Standard & Poor's (S&P) to an ordinal scale. More specifically, we create *S&P Domestic Long-Term Issuer Credit Rating* by assigning a value of 8 if the bank has an S&P rating of AAA, 7 if AA, 6 if A, 5 if BBB, 4 if BB, 3 if B, 2 if CCC, and 1 if CC. Second, we create a dummy variable, *S&P Investment Grade versus Speculative Bonds*, equal to 1 if the bank has a credit rating of BBB or higher, and 0 otherwise. Higher values of these two variables indicate lower risk. We consider the effect of internationalization on *S&P Domestic Long-Term Issuer Credit Rating* in Model 4 and *S&P Investment Grade versus Speculative Bonds* in Model 5. We employ an ordered Probit analysis and a simple Probit analysis with time fixed effects for Models 4 and 5, respectively. Consistent with our findings above, the results in Table 10 indicate that international public banks have higher standard deviation of stock returns and lower credit ratings than purely domestic public banks.

5.3 Internationalization and risk-taking during financial crises

In Table 11, we examine the effect of internationalization and bank risk-taking during financial crises to investigate whether internationalization affects risk-taking differently during

financial crises. More specifically, we examine the effect of internationalization on risk-taking for normal time periods in Model 1 and for financial crises in Model 2; we then examine this effect separately for banking crises (those originating in the banking sector) and market crises (those originating in the capital markets) in Models 3 and 4, respectively. In each of these models, we use our main measure of internationalization, *Foreign Assets Ratio*. For financial crises, we follow the definitions in Berger and Bouwman (2012). Specifically, we define two banking crises: the credit crunch (1990:Q1-1992:Q4) and the subprime lending crisis (2007:Q3-2009:Q4), and three market crises: the stock market crash (1987:Q4), the Russian debt crisis / LTCM bailout (1998:Q3-1998:Q4) and the dot.com bubble and September 11 terrorist attack (2000:Q2-2002:Q3). We create dummy variables to reflect a financial crisis, a banking crisis and a market crisis. The results suggest that the magnitude of the impact of bank internationalization on risk-taking is slightly higher during financial crises compared to normal times as indicated by the coefficient on *Foreign Assets Ratio* in Model 2. Furthermore, when splitting financial crises into banking crises and market crises, we find that the internationalization effect on risk-taking is much more pronounced during market crises as indicated in Model 4. This may be due to the higher exposure of banks to international shocks during market crises, while during banking crises banks might receive capital injections which help them absorb risk.

6. Concluding remarks

This paper offers the first assessment of the role of internationalization in bank risk taking using US bank data. We find strong, robust evidence that risk-taking is higher for banks that engage in international operations than for purely domestic banks. To identify the effect of bank internationalization on risk-taking, we employ a number of econometric procedures that control for the endogeneity of bank internationalization. The data consistently suggest that internationalization is associated with an increase in bank overall risk. This evidence is consistent with international banks that expand into new markets taking on more risk in an effort to increase their market share.

The paper contributes primarily to two interrelated strands of research. First, this paper contributes to the literature on bank risk-taking by introducing internationalization as a factor influencing risk and sets the ground for further research on bank internationalization. Though some policymakers, practitioners, and researchers point to the benefits of geographical risk diversification resulting from the internationalization of banks, our results are consistent with the empirical dominance of the *market risk hypothesis* over the *diversification hypothesis*.

Specifically, our results suggest that the additional local market risks taken on following international expansion outweigh the benefits of geographical diversification. Our analysis of the impact of bank internationalization during financial crises also contributes to work on the design of appropriate policies toward banks during crises to ensure financial system stability and avoid harmful cross-border spillovers. Second, this paper contributes to the broader literature on internationalization by examining risk-taking within one industry rather than across a number of very different industries. After controlling for endogeneity and other possible explanations for our results, we continue to find that bank internationalization contribute to an increase in risk-taking in an industry in which risk-taking is highly monitored by a large number of stakeholders.

References

Acharya, V. V., Naqvi, H., 2012. The seeds of a crisis: A theory of bank liquidity and risk-taking over the business cycle. Journal of Financial Economics 106, 349-366.

Agarwal, S., Chang Y., Yavas A., 2012, Adverse selection in mortgage securitization. Journal of Financial Economics, forthcoming.

Alibux, A.N.R.N., (2007), Cross-border mergers and acquisitions in the European banking sector. Dissertation. Erasmus University of Rotterdam.

Allen, F., Carletti E., Marquez R., 2011. Credit market competition and capital regulation. Review of Financial Studies 24, 983-1018.

Amihud Y, Lev, B., 1981. Risk reduction as a managerial motive for conglomerate mergers. Bell Journal of Economics 12, 605–617.

Amihud, Y., DeLong, G., Saunders, A., 2002. The effects of cross-border bank mergers on bank risk and value. Journal of International Money and Finance 21, 857–877.

Baele, L., De Jonghe, O., Vander Vennet, R., 2007. Does the stock market value bank diversification? Journal of Banking and Finance 31, 1999-2023.

Barry, T.A., Lepetit, L., Tarazi, A., 2011. Ownership structure and risk in publicly held and privately owned banks. Journal of Banking and Finance 35, 1327–1340.

Bartov, E., Bodnar, G., Kaul, A., 1996. Exchange rate variability and the riskiness of US multinational firms: Evidence from the breakdown of Bretton Woods. Journal of Financial Economics 42, 105-132.

Beltratti, A., Stulz, R. 2012. The credit crisis around the globe: Why did some banks perform better? Journal of Financial Economics 105, 1-17.

Berger, A.N., 1998. The efficiency effects of bank mergers and acquisitions: A preliminary look at the 1990s data. In: Amihud, Y., Miller, G. (Eds.), Bank Mergers and Acquisitions. Kluwer Academic, Boston, pp. 79–111.

Berger, A.N., 2007. International comparisons of banking efficiency. Financial Markets, Institutions & Instruments 16, 119-144.

Berger, A.N., 2007. Obstacles to a global banking system: “Old Europe” versus “New Europe”. Journal of Banking and Finance 31, 1955-1973.

Berger, A.N., Bouwman, C.H.S., 2009. Bank liquidity creation. Review of Financial Studies 22, 3779-3837.

Berger, A. N., Bouwman, C.H.S., 2012. How does capital affect bank performance during financial crises. Journal of Financial Economics, forthcoming.

Berger, A.N., Bouwman, C.H.S., Kick, T., Schaeck, K., 2012. Bank risk taking and liquidity creation following regulatory interventions and capital support. Unpublished working paper. University of South Carolina.

Berger, A.N., Buch, C. M., DeLong, G., DeYoung, R., 2004. Exporting financial institutions management via foreign direct investment mergers and acquisitions. Journal of International Money and Finance 23, 333-366.

Berger, A.N., Dai, Q., Ongena, S., Smith, D.C., 2003. To what extent will the banking industry be globalized? A Study of bank nationality and reach in 20 European nations. Journal of Banking and Finance 27, 383–415.

Berger, A.N., Demsetz, R.S., Strahan, P.E., 1999. The consolidation of the financial services industry: Causes, consequences, and implications for the future. Journal of Banking and Finance 23, 135–194.

Berger, A.N., DeYoung, R., 2006. Technological progress and the geographic expansion of the banking industry. Journal of Money, Credit and Banking 38, 1483-1513.

Berger, A.N., DeYoung, R., Genay, H., Udell, G.F., 2000. The globalization of financial institutions: Evidence from cross-border banking performance. Brookings-Wharton Papers on Financial Services 3, 23–158.

Berger, A.N., Klapper, L., Turk-Ariss, R., 2009. Bank competition and financial stability. Journal of Financial Services Research 35, 99-118.

Berger, A.N., Klapper, L.F., Udell, G.F., 2001. The ability of banks to lend to informationally opaque small businesses. Journal of Banking and Finance 25,2127-2167.

Berger, A.N., Hanweck, G.A., Humphrey, D.B., 1987. Competitive viability in banking: Scale, scope, and product mix economies. Journal of Monetary Economics 20, 501–520.

Berger, A.N., Hasan, I., Klapper, L.F., 2004. Further evidence on the link between finance and growth: An international analysis of community banking and economic performance. Journal of Financial Services Research 25, 169-202.

Berger, A.N., Hasan, I., Korhonen, I., and Zhou, M., 2010. Does diversification increase or decrease bank Risk and performance? Evidence on diversification and the risk-return tradeoff. Unpublished working paper. University of South Carolina.

Berger, A. N., Imbierowicz B., Rauch C., 2012. The roles of corporate governance in bank failures during the recent financial crisis. Unpublished working paper. University of South Carolina.

Berger, A., Klapper, L., Udell, G., 2001. The ability of banks to lend to informationally opaque small businesses. Journal of Banking & Finance 25, 2127-2167.

Berger, A.N., Miller, N., Petersen, M., Rajan, R., Stein, J. 2005. Does function follow organizational form? Evidence from the lending practices of large and small banks. Journal of Financial Economics 76, 237–269.

Bhagat S., Bolton, B.J., Lu J., 2012. Size and risk-taking of financial institutions. Unpublished working paper. University of Colorado at Boulder.

Bimmer, A., Dahl, F., 1975. Growth of American international banking: Implications for public policy. Journal of Finance 30, 341-363.

Black, L.K., Hazelwood, L.N. 2012. The effect of TARP on bank risk-taking, Journal of Financial Stability.

Boyd, J., De Nicolo, G., 2005. The theory of bank risk taking and competition revisited. Journal of Finance 60, 1329-1343.

Boyd J., De Nicolo G., Jalal A., 2006. Bank risk taking and competition revisited: New theory and evidence, International Monetary Fund, Unpublished working paper.

Boyd, J. H., Runkle, D., 1993. Size and performance of banking firms. Journal of Monetary Economics 31, 47–67.

Buch, C.M., DeLong, G.L., 2004. Cross-border bank mergers: What lures the rare animal? Journal of Banking and Finance 28, 2077-2102.

Buch, C., Lipponer, A., 2007. FDI vs. exports: Evidence from German banks. Journal of Banking and Finance 31, 805-26.

Calzolari, G., Loranth G., 2011. Regulation of multinational banks: A theoretical inquiry. Journal of Financial Intermediation 20, 178-198.

Campa, J., Kedia, S., 2002. Explaining the diversification discount. Journal of Finance 57, 1731–1762.

Cameron, C., Gelbach, J., Miller, D., 2011. Robust inference with multiway clustering. Journal of Business & Economic Statistics 29, 238-249 .

Carletti E., Hartmann P. 2003. Competition and financial stability: What's special about banking? In: Mizen P(ed) Monetary History, Exchange Rates and Financial Markets: Essays in Honour of Charles Goodhart, vol.2. Edward Elgar, Cheltenham, UK.

Cetorelli, N., Goldberg, L., 2012. Banking globalization and monetary transmission. Journal of Finance 67, 1811-1843.

Chari, A. , Gupta, N., 2008. Incumbents and protectionism: The political economy of foreign entry liberalization. Journal of Financial Economics 88, 633-656.

De Haan, J., Poghosyan, T., 2012. Bank size, market concentration, and bank earnings volatility in the US. Journal of International Financial Markets, Institutions and Money 22, 35-54.

De Haas, R., Lelyveld, I., 2010. Internal capital markets and lending by multinational bank subsidiaries. Journal of Financial Intermediation 19, 1-25.

Dehejia, R.H., Wahba, S., 2002. Propensity score-matching methods for non-experimental causal studies. Review of Economics and Statistics 84, 151-161.

DeLong, G.L., 2001. Stockholder gains from focusing versus diversifying bank mergers. Journal of Financial Economics 59, 221–252.

Demsetz R., Saidenberg, M.R., Strahan P.E., 1996. Banks with something to lose: The disciplinary role of franchise value. FRBNY Economic Policy Review, 2(2):1–14

Demsetz, R.S., Strahan, E.P., 1997. Diversification, size, and risk at bank holding companies. Journal of Money, Credit, and Banking 29, 300–313.

DeYoung, R., Nolle, D.E., 1996. Foreign-owned banks in the U.S.: Earning market share or buying it? Journal of Money, Credit and Banking 28, 622–636.

Demirgüç-Kunt, A., Huizinga, H., 2010. Bank activity and funding strategies: The impact on risk and returns. Journal of Financial Economics 98 626-650.

Denis, D. J., Denis, D. K., Yost, K., 2002. Global diversification, industrial diversification, and firm value. Journal of Finance 57, 1951-1979.

Diamond, D., 1984. Financial intermediation and delegated monitoring. Review of Economic Studies 51, 393–414.

Dimitrov, V., Tice, S., 2006. Corporate diversification and credit constraints: Real effects across the business cycle. Review of Financial Studies 19, 1465–1498.

Doukas, J.A., Kan, O.B., 2006. Does global diversification destroy firm value? Journal of International Business Studies 37, 352-371.

Duchin, R., Ozbas O., Sensoy, B.A., 2010. Costly external finance, corporate investment, and the subprime mortgage credit crisis. Journal of Financial Economics 97, 418–435.

Duchin, R., Sosyura, D., 2012. Safer ratios, riskier portfolios: Banks' response to government aid, Unpublished working paper. University of Michigan.

Errunza, V. R., Senbet, L.W., 1981. The effects of international operations on market value of the firm: Theory and evidence. Journal of Finance 36, 401–417.

Errunza, V. R., Senbet, L.W., 1984. International corporate diversification, market valuation, and size-adjusted evidence Journal of Finance 39, 727–743.

Esty, B., 1998. The impact of contingent liability on commercial bank risk taking. Journal of Financial Economics 47, 189-218.

Focarelli, D., Pozzolo, A.F., 2001. The patterns of cross-border bank mergers and shareholdings in OECD countries. Journal of Banking and Finance 25, 2305–2337.

Focarelli D., Pozzolo A.F., 2005. Where do banks expand abroad? An empirical analysis. Journal of Business 78, 2035-2065.

Furfine, C. Rosen, R., 2006. Mergers and risk. Federal Reserve Bank of Chicago, Unpublished working paper.

Gande, A., C. Schenzler, Senbet, L., 2009. Valuation effects of global diversification. Journal of International Business Studies 40, 1515–1532.

Gleason K. C., Mathur I., Wiggins III R. A., 2006. The use of acquisitions and joint ventures by U.S. banks expanding abroad. Journal of Financial Research 29, 503-522.

Goetz M., Laeven L., Levine R. 2012. The valuation effects of geographic diversification: Evidence from U.S. banks, International Monetary Fund, Unpublished working paper

Goldberg, L.G., Saunders, A., 1981. The determinants of foreign banking activity in the United States. Journal of Banking and Finance 5, 17–32.

Grosse, R., Goldberg, L.G., 1991. Foreign bank activity in the United States: An analysis by country of origin. Journal of Banking and Finance 15, 1093–1112.

Hirtle, B., 1991. Factors affecting the international competitiveness of internationally active financial institutions. Federal Reserve Bank of New York Quarterly Review 16, 38–51.

Houston, J.F., James, C.M., Marcus, D., 1997. Capital market frictions and the role of internal capital markets in banking. Journal of Financial Economics 46, 135-164.

Houston, J., Lin, C., Lin, P., Ma, Y., 2010. Creditor rights, information sharing, and bank risk taking. Journal of Financial Economics 96, 485–512.

Holmstrom, B., Tirole, J., 1997. Financial intermediation, loanable funds, and the real sector. Quarterly Journal of Economics 112, 663-691.

Hughes, L., Logue, D., Sweeney, R., 1975. Corporate international diversification and market assigned measures of risk and diversification. Journal of Financial and Quantitative Analysis 10, 627-37.

Keeley, M., 1990. Deposit insurance, risk, and market power in banking. American Economic Review 80, 1183-1200.

Kim, D., Santomero, A., 1994. Risk in banking and capital regulation. Journal of Finance 43, 1219-1233.

Koehn, M., Santomero, A., 1980. Regulation of bank capital and portfolio risk. Journal of Finance 35, 1235-1244.

Kwan, S.H., 2004. Risk and return of publicly held versus privately owned banks. New York. FRBNY Economic Policy Review, 97-107.

Kwok, C.C.Y., Reeb, D. M., 2000. Internationalization and firm risk: An upstream-downstream hypothesis. Journal of International Business Studies 31, 611-629.

Laeven, L., Levine, R., 2007. Is there a diversification discount in financial conglomerates? Journal of Financial Economics 85, 331-367.

Laeven, L., Levine, R., 2009. Bank governance, regulation and risk taking. Journal of Financial Economics 93, 259–275.

Lawrence, A., Minutti-Meza, M., Zhang, P., 2011. Can big 4 versus non-big 4 differences in audit-quality proxies be attributed to client characteristics? The Accounting Review 86, 259–286.

LePetit, L., Nys, E., Rous, P., Tarazi, A., 2008. Bank income structure and risk: An empirical analysis of European banks. Journal of Banking and Finance 32, 1452–1467.

Levine, R., 2012. The governance of financial regulation: Reform lessons from the recent crisis. International Review of Finance 12, 39–56.

Li, S., Qiu, J., Wan, C., 2011. Corporate globalization and bank lending. Journal of International Business Studies 42, 1016–1042.

Martinez-Miera, D., Repullo, R., 2010. Does competition reduce the risk of bank failure? Review of Financial Studies 23, 3638-3664.

Mehran, H., Thakor A. V., 2011. Bank capital and value in the cross-section. Review of Financial Studies 24, 1019-1067.

Méon, P.G., Weill, L., 2005. Can mergers in Europe help banks hedge against macroeconomic risk? Applied Financial Economics 15, 315-26.

Minh To, H., Tripe, D., 2002. Factors influencing the performance of foreign-owned banks in New Zealand. Journal of International Financial Markets, Institutions and Money 12, 341-57.

Nichols, D.C., J. Wahlen, Wieland, M., 2009. Publicly-traded versus privately-held: Implications for conditional conservatism in bank accounting. Review of Accounting Studies 14, 88-122.

O'Hara, M., and Shaw, W., 1990. Deposit insurance and wealth effects: The value of being "too big to fail". Journal of Finance 45, 1587–1600.

Ongena, S., Popov, A., Udell, G. 2012. When the cat's away the mice will play': does regulation at home affect bank risk taking abroad?, Journal of Financial Economics, forthcoming

Peek, J., Rosengren, E.S., Kasirye, F., 1999. The poor performance of foreign bank subsidiaries: Were the problems acquired or created? Journal of Banking and Finance 23, 579-604.

Petersen, M.A., Rajan, R.G., 2002. Does distance still matter? The information revolution in small business lending. Journal of Finance 57, 2533–2570.

Rajan, R., Servaes, H., Zingales, L., 2000. The cost of diversity: The diversification discount and inefficient investment. Journal of Finance 55, 35-80.

Reeb, D., Kwok, C.C.Y., and Baek, Y., 1998. Systematic risk in the multinational corporation. Journal of International Business Studies 29, 263-279.

Rugman, A., 1976. Risk reduction by international diversification. Journal of International Business Studies 7, 75-80.

Saunders, A., Strock, E., Travlos, N.G., 1990. Ownership structure, deregulation, and bank risk taking. Journal of Finance 45, 643-654.

Stein, J.C., 2002. Information production and capital allocation: Decentralized vs. hierarchical firms. Journal of Finance 57, 1891–1921.

Stiroh, K., 2006. A portfolio view of banking with interest and noninterest activities. Journal of Money, Credit and Banking 38, 1351-1361.

Stiroh, K. J., and Rumble, A., 2006. The dark side of diversification: The case of US financial holding companies. Journal of Banking and Finance 30, 2131-2161.

Thompson, S. B., 2011. Simple formulas for standard errors that cluster by both firm and time. Journal of Financial Economics 99, 1-10.

Tschoegl, A., 2004. Who owns the major US subsidiaries of foreign banks? A note. Journal of International Financial Markets, Institutions and Money 14, 255–266.

Vander Vennet, R., 1996. The effect of mergers and acquisitions on the efficiency and profitability of EC credit institutions. Journal of Banking and Finance 20, 1531–1558.

Winton, A., 1999. Don't put all your eggs in one basket? Diversification and specialization in lending. Unpublished working paper. University of Minnesota, Twin Cities.

Wright, A., 2002. The impact of competition on the operations of foreign banks in Australia in the post-deregulation period. Journal of International Financial Markets, Institutions and Money 12, 359–75.

Figure 1: Number of International US Commercial banks

Figure 1 looks at the evolution of bank internationalization over our sample period. It plots the average number of international US commercial banks for each year in our sample period. Several dimensions of bank internationalization are considered: foreign assets, foreign loans, foreign deposits, and foreign inflows and outflows. The sample period is 1986 to 2010.

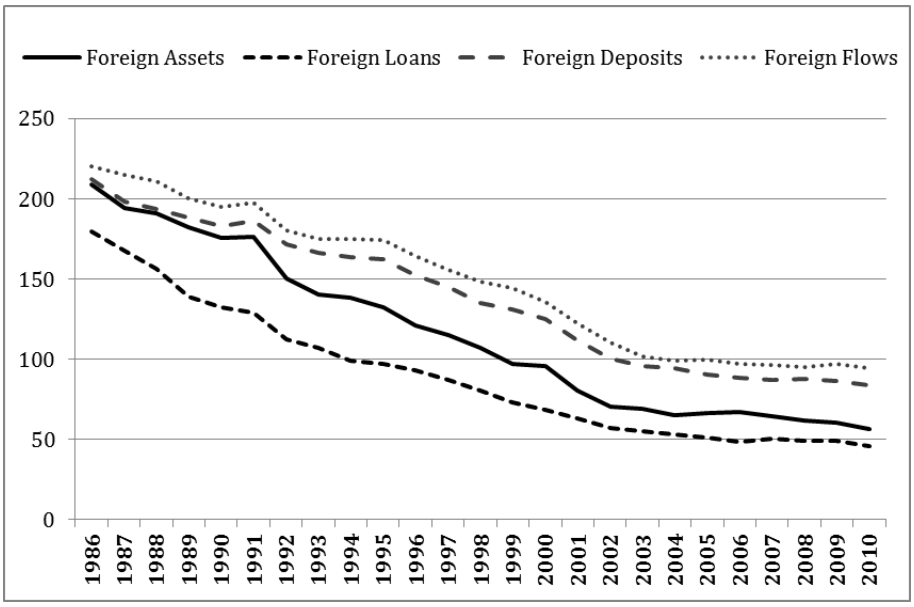

Figure 2: Different Internationalization Ratios

Figure 2 plots the average internationalization ratios of US commercial banks by year. Several dimensions of bank internationalization are considered: foreign assets, foreign loans, foreign deposits, and foreign inflows and outflows, and cross-border loans. The sample period is 1986 to 2010.

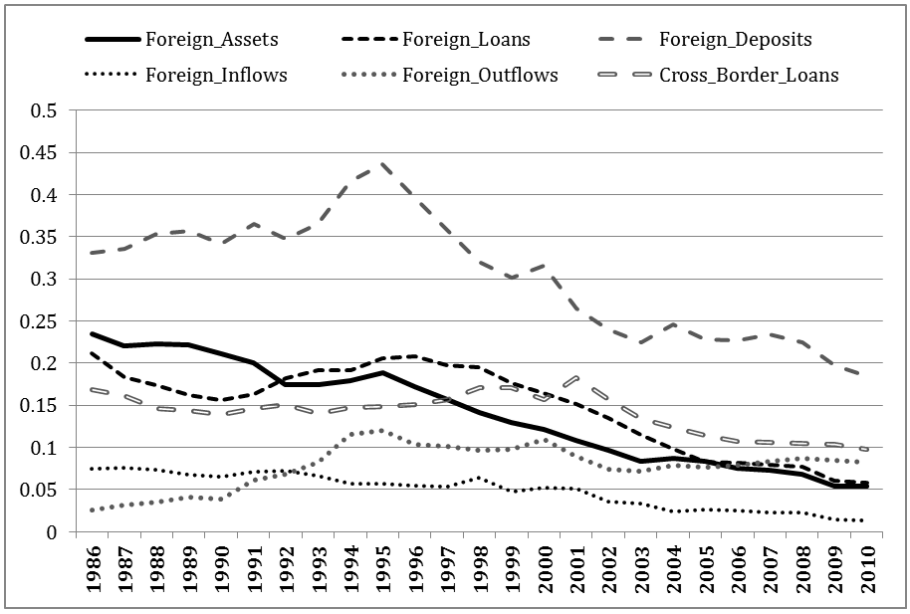

Figure 3: International Activities Volumes of International Banks

Figure 3 plots the actual dollar amount (thousands) of US commercial banks' foreign activities by year. Several dimensions of bank internationalization are considered: foreign assets, foreign loans, and foreign deposits. The sample period is 1986 to 2010.

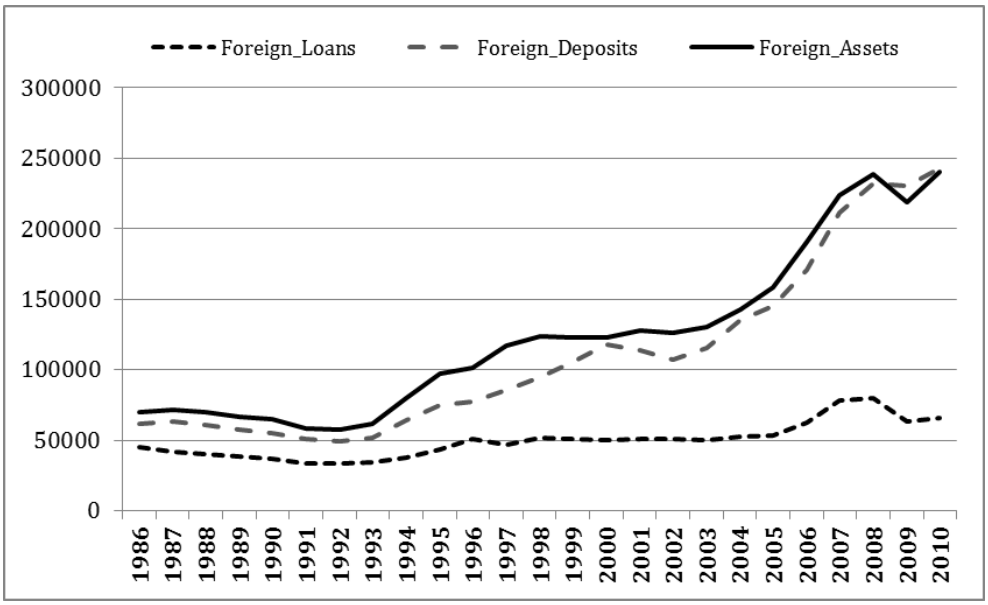

Figure 4: Foreign Loans vs. Cross-Border Loans vs. Flows

Figure 4 compares the actual dollar amount (thousands) of several US commercial bank foreign activities by year. Several dimensions of bank internationalization are considered: foreign loans, international inflows and outflows, cross-border loans by international banks, and cross-border loans by domestic banks. The sample period is 1986 to 2010.

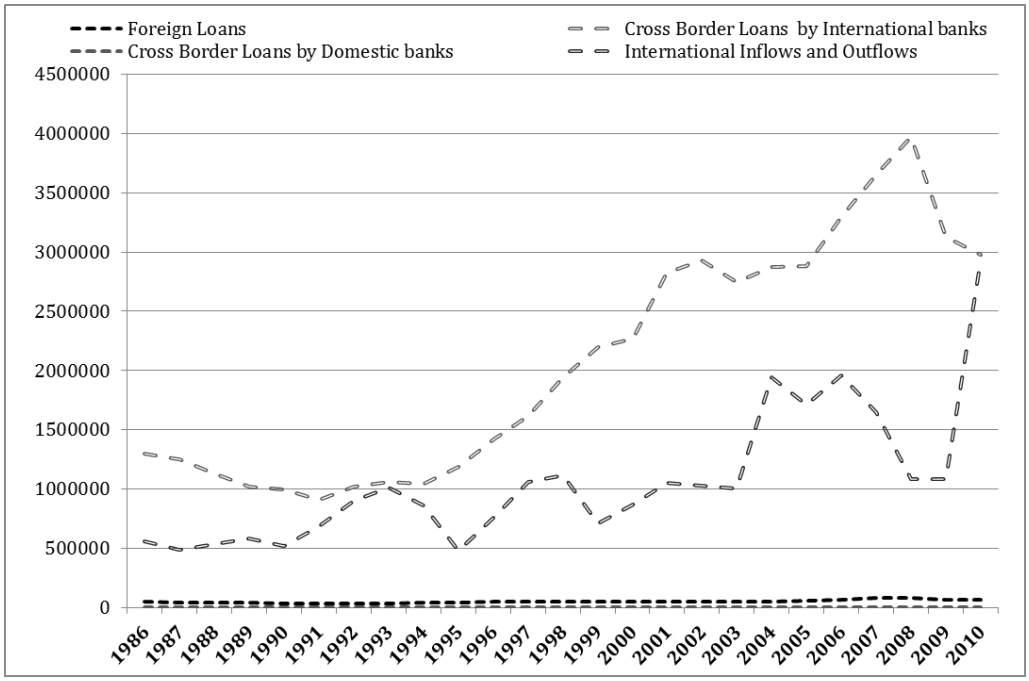

Figure 5: Average *Z-Score* for International Banks vs. Domestic Banks over Time

Figure 5 compares the risk-taking behavior (*Z-Score*) of international commercial banks versus purely domestic banks during our sample period. This figure depicts crisis periods in shaded grey areas: banking crises (Banking_Crises) are represented by areas in dark grey and market crises (Market_Crises) are shown in light grey. Given that *Z-Score* is calculated using data over the previous 12 quarters, the sample period depicted is 1987 to 2010.

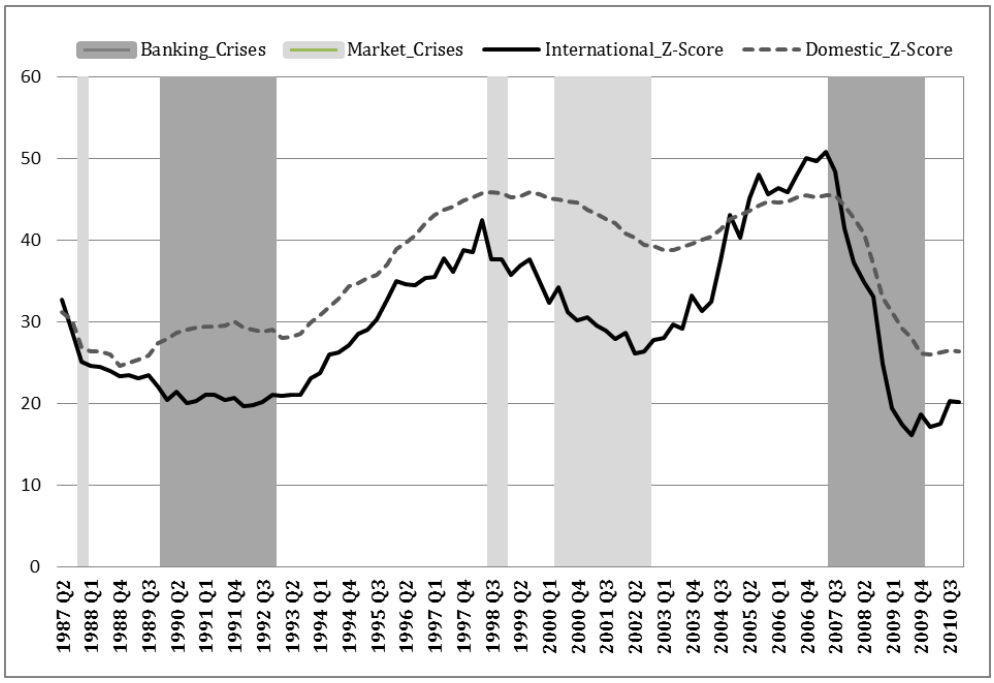

Table 1. Definitions and Summary Statistics (Bank-level Data)

This table presents variables definitions and reports summary statistics for the full samples of US commercial banks used in the analysis. All variables using dollar amounts are expressed in real 2010 dollars using the implicit GDP price deflator. The sample period runs from t = 1986 to t = 2010.

Variable	*Definition*	*Mean*	*Median*	*Std*
Internationalization Variables				
Foreign Assets Ratio	A measure of bank internationalization determined as the ratio of foreign total assets over total assets of the bank; a larger value indicates a higher degree of internationalization and a ratio of 0 refers to purely domestic banks.	0.001	0.000	0.022
Foreign Loans Ratio	A measure of bank internationalization determined as the ratio of foreign total loans over total loans of the bank; a larger value indicates a higher degree of internationalization.	0.002	0.000	0.025
Foreign Deposits Ratio	A measure of bank internationalization determined as the ratio of foreign total deposits over total deposits of the bank; a larger value indicates a higher degree of internationalization.	0.003	0.000	0.038
Foreign Inflows Ratio	A measure of bank internationalization determined as the ratio of foreign total inflows over total assets of the bank; a larger value indicates a higher degree of internationalization.	0.001	0.000	0.012
Foreign Outflows Ratio	A measure of bank internationalization determined as the ratio of foreign total outflows over total assets of the bank; a larger value indicates a higher degree of internationalization and banks that do not have any foreign assets will take a value of 0.	0.001	0.000	0.013
Degree of Internationalization Factor	A measure of financial risk obtained via factor analysis and it uses all prior 5 Foreign Assets Ratios: foreign assets ratio, foreign loans ratio, foreign deposits ratio, foreign inflows ratio and respectively foreign outflows ratio; a larger value indicates a higher degree of internationalization.	0.000	-0.081	0.970
Risk-taking Variables				
Z_Score (12 Quarters)	A bank-level measure of financial risk calculated as A(ROA)+ A(EQ/TA) / Stdv.ROA; a larger value indicates lower overall bank risk. Averages of ROA and EQ/TA as well as the standard deviation of ROA are computed over the previous 12 quarters, this being our main specification.	36.053	28.287	30.754
Z_Score (8 Quarters)	A bank-level measure of financial risk calculated as A(ROA)+ A(EQ/TA) / Stdv.ROA; a larger value indicates lower overall bank risk. Averages of ROA and EQ/TA as well as the standard deviation of ROA are computed over the previous 8 quarters.	42.561	32.564	38.504
Z_Score (20 Quarters)	A bank-level measure of financial risk calculated as A(ROA)+ A(EQ/TA) / Stdv.ROA; a larger value indicates lower overall bank risk. Averages of ROA and EQ/TA as well as the standard deviation of ROA are computed over the previous 20 quarters.	29.805	23.830	24.374
Sharpe Ratio	The risk-adjusted return on equity defined as ROE/Stdv.ROE. ROE is determined as the ratio of net operating income over total equity (EQ).	6.477	3.238	157.687

Variable	*Definition*	*Mean*	*Median*	*Std*
Risk-taking Variables				
Stdv.ROA	For each quarter, the standard deviation of ROA is calculated as the quarterly standard deviation over the previous 12 quarters. ROA is determined as the ratio of net operating income over gross total assets (GTA).	0.008	0.004	0.016
Stdv.ROE	For each quarter, the standard deviation of ROE is calculated as the quarterly standard deviation over the previous 12 quarters. ROE is determined as the ratio of net operating income over total equity (EQ).	0.035	0.031	0.021
NPL Ratio	A measure of financial stability: the bank-level ratio of nonperforming and impaired loans to total loans; a higher value indicates a riskier loan portfolio.	0.016	0.009	0.025
LLA Ratio	A measure of risk defined as the ratio of loan loss allowance over total assets; a higher value indicates higher risk.	0.022	0.018	0.021
Idiosyncratic Risk	A measure of bank idiosyncratic risk using bank stock daily returns and determined as the difference between market risk (stock return volatility, Var ($R_{i,t}$)) and systematic risk (β^2*Var($R_{m,\ t}$). Beta is computed from the market model, where the CRSP value-weighted index is the market proxy as in Sosyura and Duchin (2012).	0.025	0.021	0.020
Total Bank Risk	Sum of idiosyncratic and systematic risk proxied by stock return volatility, computed as the volatility of daily returns for each calendar year.	0.027	0.022	0.021
S&P Credit Rating	S&P Domestic Long-Term Issuer Credit Rating averaged over the quarter; a lower rating indicates higher risk as in Sosyura and Duchin (2012).	1.529	1.000	1.325
S&P Investment vs. Speculative	S&P Domestic Long-Term Issuer Credit Rating split between investment and speculative grades and averaged over the quarter.	0.146	0.000	0.353
Main Bank Characteristics				
Income Diversification	A measure of diversification across different sources of income, calculated as 1- | (Net Interest Income - Other Operating Income)/Total Operating Income|. Source: Laeven and Levine (2007).	0.200	0.216	0.158
Size	The log of Total Assets.	11.904	11.649	1.168
Listed	A dummy variable that takes a value of 1 if the bank is listed on a stock exchange or is part of a bank holding company that is listed on a stock exchange.	0.146	0.000	0.353
BHC	A dummy variable that takes a value of 1 if the bank is owned by a bank holding company.	0.695	1.000	0.460
Overhead Costs	A proxy for the bank's cost structure calculated as the ratio of overhead expenses to GTA.	1.621	1.592	0.362
FED	A dummy variable indicating whether the bank is a state-chartered Federal Reserve member, that is, the Federal Reserve is the bank's primary federal regulator.	0.106	0.000	0.308
OCC	A dummy variable indicating whether the bank has a national bank charter, that is, the bank's primary federal regulator is the OCC.	0.309	0.000	0.462
FDIC	A dummy that takes a value of 1 for non-member banks that have the Federal Deposit Insurance Corporation (FDIC) as a primary regulator.	0.585	1.000	0.493

Variable	*Definition*	*Mean*	*Median*	*Std*
Other Variables				
Capitalization Ratio	The bank-level capitalization ratio, measured as Equity Capital over GTA; a lower ratio indicates higher bank distress.	0.098	0.089	0.042
ROA	Ratio of net income over bank GTA.	0.009	0.011	0.027
Merger	A dummy variable that takes a value of 1 from the moment that the entity acquired another institution and 0 otherwise.	0.162	0.000	0.369
HHI Deposits	A measure of bank concentration, measured by the Herfindahl-Hirschman Deposits Index, with higher values indicting greater market concentration.	0.097	0.080	0.088
TBTF	A dummy variable that takes a value of 1 in all quarters when the bank has GTA greater than or equal to $100 Billion.	0.009	0.000	0.092
Asset Growth	The growth rate of real bank GTA.	0.072	0.008	6.727
Loan Growth	The growth rate of bank total loans.	0.264	0.011	58.476
Fee Income	The ratio of non-interest income to total operating income.	0.101	0.084	1.619
Nondeposit Funding	The ratio of non-deposit funding to total deposits.	0.057	0.023	0.093
Catfat (Liquidity Creation)	A measure of bank liquidity risk standardized by bank GTA. Source: Berger and Bouwman (2009).	0.261	0.227	1.868
Financial Crises	A dummy variable that takes a value of 1 for a financial crisis period and 0 otherwise following Berger and Bouwman (2012).	0.346	0.000	0.476
Banking Crises	A dummy variable that takes a value of 1 for a banking crisis period and 0 otherwise. A banking crisis is a crisis that originated in the banking sector following Berger and Bouwman (2012).	0.223	0.000	0.416
Market Crises	A dummy variable which that a value of 1 for a market crisis period. A market crisis is a crisis that originated in the capital markets following Berger and Bouwman (2012).	0.123	0.000	0.328
Instrumental Variables				
Minority Interest	Minority interest dummy that takes a value of 1 if a firm reports a nonzero amount for minority interest on its balance sheet.	0.014	0.000	0.118
State Exports Ratio	Measure of export activity of each state in the US, calculated as the ratio of state foreign exports to total US exports in a given year.	0.032	0.016	0.039
Percent International Banks	Fraction of global banks within the industry in a given year.	0.015	0.015	0.005

Table 2. Correlation Coefficients for Selected Variables

This table reports correlation coefficients for the key bank variables used in the regression analysis. Table 1 shows definitions for all variables. * indicates significance at the 1% level.

	Foreign Assets Ratio	*Z-Score*	*Income Diversification*	*Size*	*Listed*	*BHC*	*Overhead Costs*	*FED*	*OCC*	*Minority Interest*	*State Exports Ratio*	*Percent International*
Foreign Assets Ratio	1											
Z-Score	-0.0228*	1										
Income Diversif.	0.0766*	0.0401*	1									
Size	0.2296*	0.1275*	0.1739*	1								
Listed	0.0487*	0.0625*	0.1303*	0.4234*	1							
BHC	-0.0060*	0.0770*	0.0293*	0.0559*	0.0696*	1						
Overhead Costs	0.0192*	-0.2585*	0.4312*	-0.0722*	0.0379*	-0.0811*	1					
FED	0.0366*	0.0358*	-0.0284*	0.0760*	0.0643*	0.0228*	-0.0464*	1				
OCC	0.0069*	0.0179*	0.0561*	0.1301*	0.0922*	-0.0228*	0.0859*	-0.2308*	1			
Minority	0.1399*	0.0132*	0.0333*	0.2631*	0.1137*	0.0165*	-0.0292*	0.0394*	0.0156*	1		
State Exports Ratio	0.0257*	-0.0410*	-0.1445*	0.0510*	-0.0021	-0.3387*	0.0165*	-0.0475*	0.1363*	0.0067*	1	
Percent Intern.	0.0267*	-0.1423*	0.5573*	-0.0778*	0.0686*	-0.0855*	0.7305*	-0.0568*	0.1145*	-0.0704*	-0.0240*	1

Table 3. Internationalization and Risk-Taking: Univariate Analysis

This table reports univariate comparison tests for international banks versus purely domestic banks. We report both difference in means and difference in medians between the characteristics of global and domestic banks. The sample period runs from *t* = 1986 to *t* = 2010. Table 1 shows definitions for all variables.

	Domestic Banks			International Banks			Difference in Means International - Domestic		Difference in Medians International - Domestic	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Variable	**N**	**Mean**	**Median**	**N**	**Mean**	**Median**	**Difference**	**T-Stat**	**Difference**	**Wilcoxon M-W Stat**
Z- Score (12 Quarters)	690,300	36.1567	28.4108	10,376	29.2161	20.4395	-6.9406	-22.9	-7.9713	-32.6
Z- Score (8 Quarters)	690,300	42.6623	32.6934	10,376	35.8577	23.9503	-6.8046	-17.9	-8.7431	-29.5
Z- Score (20 Quarters)	690,300	29.9010	23.9328	10,376	23.4755	17.0507	-6.4255	-26.8	-6.8821	-34.5
Stdv.ROA	751,406	0.0075	0.0038	11,270	0.0091	0.0043	0.0016	10.5	0.0006	10.0
Stdv.ROE	751,406	0.0350	0.0313	11,270	0.0385	0.0349	0.0035	17.5	0.0036	14.9
Sharpe Ratio	678,290	6.9604	3.2498	10,212	6.4694	2.5289	-0.4910	0.3	-0.7208	-21.7
NPL Ratio	767,162	0.0163	0.0089	11,499	0.0268	0.0148	0.0105	44.3	0.0059	43.5
LLA Ratio	767,165	0.0216	0.0176	11,499	0.0344	0.0244	0.0128	65.4	0.0068	59.7
Income Diversification	767,163	0.1983	0.2136	11,582	0.3367	0.4240	0.1384	94.2	0.2104	101.0
Size	767,165	11.8486	11.6329	11,582	15.5607	15.7906	3.7121	370.0	4.1577	164.5
Listed	767,165	0.1403	0.0000	11,582	0.4936	0.0000	0.3533	110.0	0.0000	107.0
BHC	767,165	0.6965	1.0000	11,582	0.5856	1.0000	-0.1110	-25.7	0.0000	-25.7
Overhead Costs	767,165	1.6193	1.5897	11,582	1.7390	1.7676	0.1197	35.3	0.1779	34.3
FED	767,165	0.1052	0.0000	11,499	0.1886	0.0000	0.0834	28.8	0.0000	28.8
OCC	767,165	0.3056	0.0000	11,499	0.5247	1.0000	0.2190	50.5	1.0000	50.5

Table 4. Internationalization and Risk-Taking: Regression Analysis

This table reports regression estimates of the relation between the internationalization of US commercial banks and their risk-taking behavior using *Z-Score* (12 quarters) as the dependent variable. We define the main internationalization measure as *Foreign Assets Ratio*, the ratio of foreign total assets over total assets. Bank-level *Z-Score* is a measure of financial risk, calculated as A (ROA) + A(EQ/TA) / Stdv.ROA. We report in the table our main model, OLS with time fixed effects and clustering by bank (main model) for the full sample, and several subsamples/robustness models such as: a model that excludes foreign-owned banks (Model 2), a model that excludes too-big-to-fail (TBTF) banks (Model 3), a model that excludes the top 20 banks with the most intensive foreign activity (Model 4), and models by bank size with small (Model 5) being a bank with GTA < 1 Bil., medium (Model 6) being a bank with GTA between 1 and 5 Bil., and large (Model 7) being a bank with GTA over 5 Bil. The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: Z-Score (1986-2010)						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Independent Variables:	**Full Sample**	**Exclude Foreign-owned**	**Exclude TBTF**	**Exclude Top 20**	**Small Size**	**Medium Size**	**Large Size**
Foreign Assets Ratio	-67.458***	-82.560***	-61.119***	-90.440***	-46.839***	-49.514***	-31.651***
	(-8.792)	(-8.483)	(-6.194)	(-7.132)	(-4.125)	(-4.741)	(-2.720)
Income Diversification	0.956	0.601	1.327	0.909	1.782	-12.203*	-16.806*
	(0.719)	(0.447)	(0.997)	(0.682)	(1.345)	(-1.701)	(-1.654)
Size	2.498***	2.894***	3.250***	2.606***	5.448***	2.758***	1.330
	(11.521)	(12.767)	(14.258)	(11.964)	(20.256)	(2.711)	(1.484)
Listed	2.892***	2.379***	2.826***	2.819***	4.264***	2.252	6.214***
	(4.671)	(3.800)	(4.526)	(4.547)	(6.512)	(1.269)	(2.989)
BHC	1.299***	1.228***	1.125***	1.294***	0.614	4.482**	0.677
	(3.457)	(3.228)	(2.992)	(3.444)	(1.634)	(2.059)	(0.273)
Overhead Costs	-38.816***	-39.070***	-38.646***	-38.898***	-38.379***	-31.106***	-25.334***
	(-54.020)	(-53.707)	(-53.434)	(-53.984)	(-51.450)	(-12.740)	(-7.872)
FED	2.476***	2.525***	2.456***	2.530***	2.473***	-0.536	0.503
	(3.745)	(3.799)	(3.710)	(3.818)	(3.619)	(-0.224)	(0.124)
OCC	1.300***	1.261***	1.429***	1.299***	1.543***	-0.664	-8.617***
	(2.996)	(2.894)	(3.304)	(2.994)	(3.551)	(-0.329)	(-2.647)
Constant	53.236***	55.085***	44.327***	58.098***	24.789***	61.095***	40.551***
	(19.103)	(19.603)	(15.159)	(21.343)	(7.449)	(4.662)	(2.710)
Quarter-Year FE	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Observations	600,055	591,799	593,939	598,340	557,607	29,295	13,153
R-squared	0.148	0.149	0.151	0.148	0.161	0.147	0.166
N-Clusters(Bank)	13448	13351	13402	13439	12901	1324	428

Table 5. Different Measures of Risk-Taking

This table reports OLS regression estimates of the relation between the internationalization of US commercial banks and their risk-taking behavior using *Foreign Assets Ratio* as a measure of bank internationalization. We show models with alternative risk-taking measures: *Log of Z-Score* (over prior 12 quarters), *Z-Score* (over prior 8 quarters), *Z-Score* (over prior 20 quarters), *Sharpe Ratio* (over prior 12 quarters), *Stdv.ROA*, *Stdv.ROE*, *NPL Ratio*, and *LLA Ratio*. We use an OLS model with time fixed effects and clustering by bank. The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: Different Measures of Risk							
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Independent Variables:	***Log of Z-Score*** **(over 12 quarters)**	***Z-Score*** **(over 8 quarters)**	***Z-Score*** **(over 20 Quarters)**	***Sharpe Ratio*** **(12 quarters)**	***Stdv.ROA*** **(over 12 quarters)**	***Stdv.ROE*** **(over 12 quarters)**	***NPL Ratio*** **(Nonperforming & Impaired Loans)**	***LLA Ratio*** **(Loan Loss Allowance)**
Foreign Assets Ratio	-1.985***	-77.565***	-58.657***	-29.637***	0.009**	0.035***	0.055**	0.061***
	(-6.585)	(-8.290)	(-8.826)	(-3.705)	(2.478)	(6.482)	(2.164)	(2.903)
Income Diversification	0.197***	-0.618	3.356***	2.542	0.000	0.001	-0.003**	-0.000
	(5.029)	(-0.424)	(2.624)	(0.812)	(0.576)	(0.779)	(-2.501)	(-0.357)
Size	0.024***	3.283***	1.896***	1.507**	0.000**	-0.001***	0.001***	0.000***
	(4.290)	(13.788)	(9.143)	(2.417)	(2.304)	(-9.403)	(6.063)	(2.624)
Listed	0.076***	5.054***	0.495	2.636*	-0.000	-0.002***	-0.004***	0.001***
	(4.624)	(7.531)	(0.818)	(1.727)	(-1.377)	(-7.545)	(-13.458)	(2.705)
BHC	0.060***	1.783***	0.663*	-0.631	-0.001***	-0.001***	-0.001***	-0.002***
	(5.751)	(4.338)	(1.869)	(-0.575)	(-8.396)	(-3.369)	(-5.023)	(-6.689)
Overhead Costs	-1.334***	-44.647***	-32.295***	-5.240***	0.010***	0.020***	0.016***	0.006***
	(-63.315)	(-56.270)	(-47.132)	(-4.573)	(18.780)	(44.890)	(25.313)	(7.659)
FED	0.063***	2.574***	2.462***	-1.654***	-0.000***	-0.001***	-0.001***	-0.001**
	(3.694)	(3.596)	(3.883)	(-2.857)	(-2.905)	(-4.072)	(-3.389)	(-2.010)
OCC	0.021*	1.208**	1.396***	-0.293	0.000	-0.001**	0.000*	0.001***
	(1.796)	(2.531)	(3.419)	(-0.334)	(0.510)	(-2.218)	(1.956)	(4.330)
Constant	4.390***	49.967***	40.594***	-3.077	-0.005***	0.017***	0.004**	0.009***
	(58.180)	(16.303)	(15.680)	(-0.394)	(-2.959)	(10.874)	(1.975)	(4.645)
Quarter-Year FE	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Observations	599,746	656,175	498,015	591,760	600,055	600,055	762,671	762,674
R-squared	0.185	0.138	0.144	0.000	0.036	0.125	0.115	0.063
N-Clusters	13423	14389	11868	13365	13448	13448	15750	15750

Table 6. Different Measures of Bank Internationalization

This table reports OLS regression estimates of the relation between the internationalization of US commercial banks and their risk-taking behavior using *Z-Score* as the dependent variable. We show models with six alternative internationalization measures: *Foreign Assets Ratio, Foreign Loans Ratio, Foreign Deposits Ratio, Foreign Inflows Ratio, Foreign Outflows Ratio,* and *Degree of Internationalization Factor,* which incorporates the five previous ratios. We use an OLS model with time fixed effects and clustering by bank. The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: *Z-Score*					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Independent Variables:	***Foreign Assets Ratio***	***Foreign Loans Ratio***	***Foreign Deposits Ratio***	***Foreign Inflows Ratio***	***Foreign Outflows Ratio***	***Degree of Internationalization Factor***
Foreign Assets Ratio	-67.458***	-50.636***	-43.267***	-55.553***	-68.536***	-1.754***
	(-8.792)	(-9.045)	(-8.281)	(-6.089)	(-4.456)	(-9.467)
Income Diversification	0.956	0.883	1.220	0.803	0.989	1.176
	(0.719)	(0.665)	(0.918)	(0.604)	(0.743)	(0.885)
Size	2.498***	2.375***	2.571***	2.174***	2.252***	2.600***
	(11.521)	(10.996)	(11.762)	(9.906)	(10.196)	(11.898)
Listed	2.892***	3.019***	2.855***	3.166***	3.130***	2.828***
	(4.671)	(4.867)	(4.613)	(5.086)	(5.045)	(4.571)
BHC	1.299***	1.296***	1.241***	1.320***	1.283***	1.241***
	(3.457)	(3.448)	(3.304)	(3.505)	(3.411)	(3.306)
Overhead Costs	-38.816***	-38.732***	-38.746***	-38.815***	-38.788***	-38.717***
	(-54.020)	(-53.890)	(-54.025)	(-53.939)	(-53.922)	(-53.994)
FED	2.476***	2.482***	2.469***	2.389***	2.392***	2.494***
	(3.745)	(3.748)	(3.733)	(3.583)	(3.589)	(3.776)
OCC	1.300***	1.370***	1.263***	1.392***	1.348***	1.279***
	(2.996)	(3.155)	(2.912)	(3.197)	(3.098)	(2.951)
Constant	53.236***	54.567***	52.318***	57.067***	56.156***	51.777***
	(19.103)	(19.646)	(18.621)	(20.275)	(19.794)	(18.394)
Quarter-Year FE	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Observations	600,055	600,055	600,055	600,055	600,055	600,055
R-squared	0.148	0.147	0.148	0.146	0.146	0.148
N. Clusters	13448	13448	13448	13448	13448	13448

Table 7. Alternative Econometric Specifications

This table reports regression estimates of the relation between the internationalization of US commercial banks and their risk-taking behavior using models with alternative econometric specifications. We report results for an OLS model with time fixed effects and clustering by bank (Model 1), a fixed effects model with both time and bank fixed effects (Model 2), a random effects model with bank random effects and time fixed effects (Model 3), We also report a model with Newey-West standard errors correction and 2 lags (Model 4), a model with Prais-Winsten standard errors (Model 5), a model with Fama-MacBeth standard errors (Model 6), and a model with two-way clustering by bank and time (Model 7). The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: *Z-Score*						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Independent Variables:	**OLS w/ Time FE & Bank Clusters**	**FE Model Time & Bank FE**	**RE Model Time & Bank RE**	**Newey-West w/ Lags and FE**	**Prais-Winsten**	**Fama-MacBeth**	**Two-way Clustering By Bank & Time**
Foreign Assets Ratio	-67.458***	-11.115***	-17.700**	-60.767***	-31.080***	-66.172***	-60.767***
	(-8.792)	(-3.114)	(-2.456)	(-25.625)	(-5.831)	(-16.424)	(-7.057)
Income Diversification	0.956	-13.191***	-12.193***	15.962***	-5.906***	2.084	15.962***
	(0.719)	(-36.478)	(-13.172)	(42.185)	(-26.759)	(1.590)	(9.819)
Size	2.498***	0.390***	1.032***	1.531***	2.609***	2.749***	1.531***
	(11.521)	(3.628)	(4.019)	(22.955)	(28.973)	(11.024)	(4.015)
Listed	2.892***	1.615***	2.130***	4.212***	2.985***	2.070***	4.212***
	(4.671)	(6.822)	(2.796)	(18.768)	(10.156)	(5.564)	(5.760)
BHC	1.299***	-0.172	0.115	0.629***	0.756***	1.238***	0.629
	(3.457)	(-1.522)	(0.322)	(5.200)	(5.371)	(7.262)	(1.434)
Overhead Costs	-38.816***	-17.118***	-18.929***	-28.722***	-4.763***	-38.498***	-28.722***
	(-54.020)	(-89.213)	(-41.026)	(-168.161)	(-36.636)	(-59.254)	(-26.437)
FED	2.476***	1.297***	1.389*	2.691***	1.886***	2.479***	2.691***
	(3.745)	(4.584)	(1.765)	(13.066)	(7.197)	(18.688)	(3.950)
OCC	1.300***	0.796***	0.804	2.083***	0.554***	1.457***	2.083***
	(2.996)	(2.754)	(1.355)	(16.169)	(3.290)	(9.582)	(4.062)
Constant	53.236***	64.351***	54.296***	62.448***	15.058***	66.070***	62.448***
	(19.103)	(46.552)	(17.471)	(75.362)	(13.703)	(27.930)	(17.229)
Quarter-Year Effects	**YES**	**YES**	**YES**	**NO**	**NO**	**NO**	**NO**
Bank Effects	**NO**	**YES**	**YES**	**NO**	**NO**	**NO**	**NO**
Observations	600,055	600,055	600,055	600,055	600,055	600,055	600,055
R-squared	0.148	0.498	0.1214		0.162	0.105	0.102
N-Clusters(Bank)	13448		13448				13447

Table 8. Endogeneity

Panel A: Potential Omitted Correlated Variables

This table reports OLS regression estimates of the relation between the internationalization of US commercial banks and their risk-taking behavior using *Foreign Assets Ratio* as a measure of bank internationalization. We show several models with additional possible omitted variables that could influence the risk-taking behavior of banks: *Merger, HHI Deposits, HHI Deposits_Sq, TBTF, Assets Growth, Loan Growth, Fee Income, Nondeposit Funding,* and *Liquidity (Catfat)*. We use an OLS model with time fixed effects and clustering by bank. The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: *Z-Score*									
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Independent Variables:	***Main***	***Merger***	***HHI Deposits***	***HHI Deposits_Sq***	***TBTF***	***Assets Growth***	***Loan Growth***	***Fee Income***	***Nondeposit Funding***	***Liquidity (Catfat)***
Foreign Assets Ratio	-67.458***	-67.832***	-68.784***	-68.743***	-50.989***	-50.891***	-50.894***	-50.893***	-47.049***	-46.569***
	(-8.792)	(-8.812)	(-8.773)	(-8.769)	(-7.097)	(-7.084)	(-7.084)	(-7.084)	(-6.980)	(-6.831)
Income Diversification	0.956	0.944	0.370	0.405	0.519	0.515	0.513	0.515	3.742***	3.750***
	(0.719)	(0.710)	(0.277)	(0.301)	(0.387)	(0.384)	(0.383)	(0.384)	(2.788)	(2.794)
Size	2.498***	2.538***	2.669***	2.661***	3.308***	3.309***	3.309***	3.309***	3.983***	3.991***
	(11.521)	(11.234)	(11.765)	(11.616)	(14.072)	(14.074)	(14.074)	(14.075)	(16.385)	(16.310)
Listed	2.892***	2.912***	2.970***	2.967***	2.875***	2.875***	2.875***	2.875***	3.390***	3.387***
	(4.671)	(4.705)	(4.789)	(4.781)	(4.653)	(4.653)	(4.653)	(4.653)	(5.545)	(5.538)
BHC	1.299***	1.319***	1.157***	1.161***	1.025***	1.026***	1.026***	1.026***	1.049***	1.045***
	(3.457)	(3.513)	(3.067)	(3.079)	(2.728)	(2.729)	(2.730)	(2.729)	(2.805)	(2.796)
Overhead Costs	-38.816***	-38.806***	-38.703***	-38.723***	-38.358***	-38.359***	-38.358***	-38.357***	-37.144***	-37.128***
	(-54.020)	(-54.065)	(-53.637)	(-53.314)	(-52.935)	(-52.936)	(-52.935)	(-52.933)	(-51.857)	(-51.785)
FED	2.476***	2.473***	2.439***	2.438***	2.533***	2.533***	2.533***	2.533***	2.696***	2.691***
	(3.745)	(3.742)	(3.688)	(3.688)	(3.846)	(3.846)	(3.846)	(3.846)	(4.116)	(4.109)
OCC	1.300***	1.301***	1.319***	1.323***	1.355***	1.355***	1.355***	1.355***	1.408***	1.410***
	(2.996)	(2.999)	(3.039)	(3.048)	(3.132)	(3.133)	(3.134)	(3.134)	(3.274)	(3.279)
Merger		-0.485	-0.584	-0.581	-0.906*	-0.905*	-0.906*	-0.906*	-1.147**	-1.152**
		(-0.930)	(-1.120)	(-1.114)	(-1.745)	(-1.745)	(-1.745)	(-1.745)	(-2.221)	(-2.228)
HHI Deposits			-6.921***	-6.156*	-8.054**	-8.054**	-8.054**	-8.052**	-8.137**	-8.181**
			(-3.533)	(-1.718)	(-2.258)	(-2.258)	(-2.258)	(-2.258)	(-2.287)	(-2.299)
HHI Deposits_Sq				-1.776	1.506	1.506	1.506	1.503	2.499	2.598
				(-0.317)	(0.270)	(0.270)	(0.270)	(0.269)	(0.445)	(0.463)
TBTF					-20.636***	-20.620***	-20.620***	-20.620***	-19.629***	-19.201***

					(-9.451)	(-9.443)	(-9.443)	(-9.443)	(-8.898)	(-8.209)
Assets Growth						-0.007**	-0.006*	-0.006*	-0.006**	-0.006**
						(-2.085)	(-1.865)	(-1.865)	(-1.984)	(-1.991)
Loan Growth							-0.001***	-0.001***	-0.001***	-0.001***
							(-2.624)	(-2.624)	(-2.972)	(-2.966)
Fee Income								-0.010	-0.009	-0.009
								(-0.305)	(-0.321)	(-0.320)
Nondeposit Funding									-26.105***	-26.089***
									(-13.706)	(-13.693)
Liquidity (Catfat)										-0.000
										(-0.676)
Constant	53.236***	52.831***	52.089***	52.159***	44.362***	44.351***	44.350***	44.347***	35.906***	44.515***
	(19.103)	(18.525)	(18.260)	(18.222)	(15.147)	(15.142)	(15.141)	(15.140)	(12.003)	(15.178)
Quarter-Year FE	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Observations	600,055	600,055	598,955	598,955	598,955	598,954	598,954	598,954	598,954	598,947
R-squared	0.148	0.148	0.148	0.148	0.151	0.151	0.151	0.151	0.155	0.155
Number of Clusters	13448	13448	13401	13401	13401	13401	13401	13401	13401	13401

Panel B: IV Model

Panel B represents the results of instrumental variables (IV) estimation that controls for the endogeneity of bank internationalization. We employ three IVs: (1) a bank-level IV, *Minority Interest* (the binary indicator of minority interest payment); (2) a geographic IV, *State Exports Ratio* (the ratio of foreign exports of the state in which a bank is headquartered to US total exports in a given year), where data on state exports are available only from 1995 to 2010; and (3) an industry-level IV, *Percent International Banks* (the fraction of global banks within the banking industry in a given quarter). The row labeled "*F*-statistic" reports the *F*-statistic of the test on whether the three IVs are jointly significant in the first-stage regression. We report IV 2SLS, IV GMM and IV LIML results. All models include time fixed effects. We also report the OLS main results to facilitate comparison. The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: *Z-Score*				
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Independent Variables:	**IV 2SLS First Stage**	**IV 2SLS Second Stage**	**IV GMM Second Stage**	**IV LIML Second Stage**	**OLS**
Foreign Assets Ratio		-562.881***	-685.740***	-587.035***	-67.458***
		(-12.027)	(-13.346)	(-11.674)	(-8.792)
Minority Interest	0.013***				
	(13.928)				
State Exports Ratio	0.006***				
	(9.641)				
Percent International Banks	0.349***				
	(13.685)				
Income Diversification	0.003***	-4.571***	-4.153***	-4.482***	0.956
	(10.492)	(-8.814)	(-7.616)	(-8.500)	(0.719)
Size	0.003***	5.366***	5.794***	5.463***	2.498***
	(26.584)	(30.111)	(30.867)	(28.892)	(11.521)
Listed	-0.003***	-0.346	-0.796***	-0.427	2.892***
	(-13.318)	(-1.164)	(-2.589)	(-1.406)	(4.671)
BHC	-0.001***	0.263*	0.252*	0.238*	1.299***
	(-7.083)	(1.899)	(1.754)	(1.696)	(3.457)
Overhead Costs	0.002***	-39.335***	-39.245***	-39.277***	-38.816***
	(10.129)	(-151.893)	(-144.970)	(-149.318)	(-54.020)
FED	0.001***	3.568***	3.749***	3.603***	2.476***
	(10.296)	(17.037)	(17.270)	(16.996)	(3.745)
OCC	-0.001***	1.856***	1.636***	1.842***	1.300***
	(-7.685)	(13.541)	(11.817)	(13.356)	(2.996)
Constant	-0.054***	21.534***	16.284***	20.299***	53.236***
	(-24.245)	(9.475)	(6.810)	(8.429)	(19.103)
Quarter-Year FE	**YES**	**YES**	**YES**	**YES**	**YES**
Observations	326,929	326,929	326,929	326,929	600,055
R-squared	0.062	0.058	0.015	0.050	0.148
F-Statistic	1036.28***				

Panel C: Propensity Score Matching

Panel C reports the difference in *Z-Score*, our main measure of risk, between the global and domestic US banks, estimated by propensity score matching (PSM) with four different matching methods. The propensity scores are computed from a probit model using the same variables as in our main effects model and the instrumental variables *Minority Interest, State Exports Ratio,* and *Percent International Banks*. The *t*-statistics are reported in parentheses. Panel B also shows regression estimates of the relation between the internationalization of US commercial banks and their risk-taking behavior using the matched samples obtained via the four propensity score methods: 1-1 matching without replacement (Model 1), 1-1 matching with replacement (Model 2), nearest neighbor (n=2) (Model 3), and nearest neighbor (n=3) (Model 4). The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Dependent Variable: *Z-Score*				
Propensity Score Matching Estimation	**Treated (International)**	**Controls**	**Difference**	**T-stat**
1-1 Matching without replacement	34.44	41.57	-7.13***	-8.28
1-1 Matching with replacement	34.44	41.16	-6.72***	-2.47
Nearest neighbor (n=2)	34.44	39.90	-5.46***	-2.55
Nearest neighbor (n=3)	34.44	40.05	-5.61***	-3.00

Dependent Variable: Z-Score (1986-2010)				
	(1)	**(2)**	**(3)**	**(4)**
Independent Variables:	**PSM: 1:1 Matching without replacement**	**PSM: 1:1 Matching with replacement**	**PSM: Nearest neighbor (n=2)**	**PSM: Nearest neighbor (n=3)**
Foreign Assets Ratio	-27.533***	-27.795***	-30.019***	-31.701***
	(-2.759)	(-2.782)	(-2.937)	(-3.040)
Income Diversification	-22.528**	-19.849**	-19.236**	-18.801***
	(-2.563)	(-2.263)	(-2.479)	(-2.678)
Size	-0.003	0.068	-0.214	-0.324
	(-0.004)	(0.093)	(-0.330)	(-0.534)
Listed	3.998	2.942	2.420	1.798
	(1.629)	(1.172)	(1.101)	(0.883)
BHC	-0.813	-0.152	0.192	1.271
	(-0.319)	(-0.060)	(0.087)	(0.638)
Overhead Costs	-31.046***	-31.105***	-32.390***	-32.895***
	(-10.377)	(-9.612)	(-11.926)	(-13.493)
FED	1.043	-0.285	1.160	2.065
	(0.277)	(-0.075)	(0.364)	(0.717)
OCC	-6.182**	-6.369**	-4.914**	-4.042*
	(-2.189)	(-2.093)	(-1.984)	(-1.860)
Constant	78.097***	73.416***	82.411***	81.482***
	(7.563)	(7.141)	(9.072)	(9.778)
Quarter-Year FE	**YES**	**YES**	**YES**	**YES**
Observations	7,496	6,398	8,501	10,292
R-squared	0.160	0.157	0.157	0.159
N-Clusters(Bank)	1155	1144	1607	1919

Panel D: Heckman Selection Model

Panel D reports the results of Heckman's two-step treatment effect model used to correct the self-selection in internationalization. The selection (internationalization) equation uses *International Bank Dummy* as the dependent variable; the variable takes the value of 1 if the bank has foreign assets in any given quarter. We employ three IVs: (1) a bank-level IV, *Minority Interest* (the binary indicator of minority interest payment); (2) a geographic IV, *State Exports Ratio* (the ratio of foreign exports of the state in which a bank is headquartered to US total exports in a given year), where data on state exports are available only from 1995 to 2010; and (3) an industry-level IV, *Percent International Banks* (the fraction of global banks within the banking industry in a given quarter). The outcome equation uses *Z-Score* as the dependent variable. The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	(1)	**(2)**
	Selection Equation	**Outcome Equation**
Independent Variables:	***International Bank Dummy***	***Z-Score***
Foreign Assets Ratio		-24.174***
		(-30.621)
Minority Interest	0.130***	
	(4.242)	
State Exports Ratio	4.233***	
	(22.271)	
Percent International Banks	51.102	
	(1.489)	
Income Diversification	1.256***	-6.216***
	(13.932)	(-14.068)
Size	0.540***	3.909***
	(79.594)	(57.832)
Listed	-0.304***	1.201***
	(-12.430)	(4.935)
BHC	-0.185***	0.536***
	(-8.511)	(4.327)
Overhead Costs	0.418***	-40.123***
	(12.183)	(-181.382)
FED	0.166***	2.906***
	(6.589)	(15.465)
OCC	0.009	2.176***
	(0.415)	(16.739)
Constant	-12.795***	40.024***
	(-9.057)	(43.503)
Inverse Mills Ratio		3.650***
		(8.971)
Quarter-Year FE	**YES**	**YES**
Observations	326,929	326,929
R-squared		0.135

Table 9. Z-Score Decomposition

This table reports OLS regression estimates of the relation between the internationalization of US commercial banks and the components of *Z-Score*, our main risk taking behavior measure, as dependent variables: *ROA*, *Capitalization Ratio*, and *Stdv.ROA*. We use *Foreign Assets Ratio* as a measure of bank internationalization. We use an OLS model with time fixed effects and clustering by bank. The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: Risk			
	(1)	**(2)**	**(3)**	**(4)**
Independent Variables:	***Z-Score***	***ROA***	***Capitalization Ratio***	***Stdv.ROA***
Foreign Assets Ratio	-67.458***	-0.018***	0.049**	0.009**
	(-8.792)	(-6.176)	(2.014)	(2.478)
Income Diversification	0.956	0.011***	0.002	0.000
	(0.719)	(14.417)	(0.703)	(0.576)
Size	2.498***	0.000*	-0.004***	0.000**
	(11.521)	(1.747)	(-11.476)	(2.304)
Listed	2.892***	0.000	-0.003***	-0.000
	(4.671)	(0.550)	(-3.662)	(-1.377)
BHC	1.299***	0.000	-0.011***	-0.001***
	(3.457)	(0.323)	(-17.886)	(-8.396)
Overhead Costs	-38.816***	-0.006***	-0.030***	0.010***
	(-54.020)	(-11.589)	(-13.605)	(18.780)
FED	2.476***	-0.001***	-0.002***	-0.000***
	(3.745)	(-4.206)	(-2.606)	(-2.905)
OCC	1.300***	0.000	-0.001**	0.000
	(2.996)	(0.330)	(-2.081)	(0.510)
Constant	53.236***	0.010***	0.208***	-0.005***
	(19.103)	(7.147)	(37.890)	(-2.959)
Quarter-Year FE	**YES**	**YES**	**YES**	**NO**
Observations	600,055	600,055	600,055	600,055
R-squared	0.148	0.101	0.136	0.036
N-Clusters(Bank)	13448	13448	13448	13448

Table 10. Listed Banks

This table reports results of models using several measures of market risk: *Idiosyncratic Risk*, *Total Bank Risk*, *S&P Credit Rating*, and *S&P Investment-grade vs. Speculative*, where it reports OLS regression estimates of the relation between the internationalization of US listed commercial banks and their risk-taking behavior for the first three measures of risk, and ordered logit and logit estimates for the last two risk measures. We use *Foreign Assets Ratio* as a measure of bank internationalization. All models include time fixed effects. The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

		Dependent Variable: Risk			
	(1)	(2)	(3)	(4)	(5)
Independent Variables:	***Z-Score***	***Idiosyncratic Risk***	***Total Bank Risk (Idiosyncratic +Systematic)***	***S&P Credit Rating***	***S&P Investment vs. Speculative***
Foreign Assets Ratio	-59.420***	0.016***	0.015***	-1.398***	-6.156***
	(-4.547)	(4.105)	(3.589)	(-2.897)	(-12.184)
Income Diversification	14.593**	-0.004	-0.004	2.585***	1.548***
	(1.981)	(-1.094)	(-1.095)	(10.428)	(5.411)
Size	-0.659	-0.003***	-0.003***	1.514***	1.901***
	(-0.906)	(-8.774)	(-6.594)	(66.642)	(56.555)
BHC	-0.600	-0.004	-0.004*	-0.016	0.432***
	(-0.176)	(-1.614)	(-1.745)	(-0.157)	(2.958)
Overhead Costs	-46.178***	0.012***	0.012***	0.523***	1.524***
	(-12.033)	(6.318)	(6.480)	(4.543)	(9.706)
FED	5.632**	-0.001	-0.001*	0.546***	0.466***
	(2.072)	(-1.235)	(-1.686)	(10.828)	(7.315)
OCC	8.195***	-0.002***	-0.003***	0.456***	0.533***
	(3.149)	(-3.187)	(-3.513)	(9.215)	(8.881)
Constant1				26.269***	
				(63.359)	
Constant2				26.293***	
				(63.396)	
Constant3				26.470***	
				(63.614)	
Constant4				27.755***	
				(65.036)	
Constant5				31.021***	
				(68.558)	
Constant6				34.751***	
				(66.774)	
Constant	137.450***	0.051***	0.040***		-34.781***
	(10.587)	(11.496)	(8.933)		(-57.754)
Quarter-Year FE	**YES**	**YES**	**YES**	**YES**	**YES**
Observations	29,953	29,847	29,847	29,953	28,917
R-squared /Pseudo R	0.155	0.308	0.319	0.449	0.612
N-Clusters(Bank)	941	941	941		

Table 11. Internationalization and Bank Risk Taking during Financial Crises

This table reports OLS regression estimates of the relation between the internationalization of US commercial banks and their risk-taking behavior during crises versus normal times. The construction of normal times and financial crisis periods follows Berger and Bouwman (2012). We use an OLS model with time fixed effects and clustering by bank. We use *Foreign Assets Ratio* as a measure of bank internationalization. All independent variables are observed 12 quarters prior. The sample period runs from 1986 to 2010. Table 1 shows definitions for all variables. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Dependent Variable: *Z-Score*			
	(1)	**(2)**	**(3)**	**(4)**
Independent Variables:	***Normal Times***	***Financial Crises***	***Banking Crises* Only**	***Market Crises* Only**
Foreign Assets Ratio	-65.428***	-70.170***	-53.243***	-102.877***
	(-7.738)	(-9.712)	(-7.940)	(-7.734)
Income Diversification	1.272	0.472	5.106***	-8.075***
	(0.916)	(0.318)	(3.353)	(-3.191)
Size	2.843***	1.960***	0.608***	4.809***
	(12.426)	(8.521)	(2.722)	(11.597)
Listed	2.984***	2.683***	4.218***	-1.413
	(4.511)	(3.924)	(5.857)	(-1.108)
BHC	1.563***	0.876**	0.654	1.639**
	(3.986)	(2.134)	(1.576)	(2.310)
Overhead Costs	-38.280***	-39.646***	-35.982***	-45.232***
	(-52.519)	(-48.198)	(-43.257)	(-34.601)
FED	2.493***	2.445***	1.719**	3.685***
	(3.611)	(3.461)	(2.401)	(3.208)
OCC	1.056**	1.688***	1.703***	1.719**
	(2.347)	(3.646)	(3.702)	(2.249)
Constant	48.081***	88.336***	80.792***	56.789***
	(16.371)	(29.988)	(28.492)	(11.329)
Quarter-Year FE	**YES**	**YES**	**YES**	**YES**
Observations	369,778	230,277	153,764	76,513
R-squared	0.151	0.141	0.113	0.118
N-Clusters(Bank)	13275	12510	11723	7771