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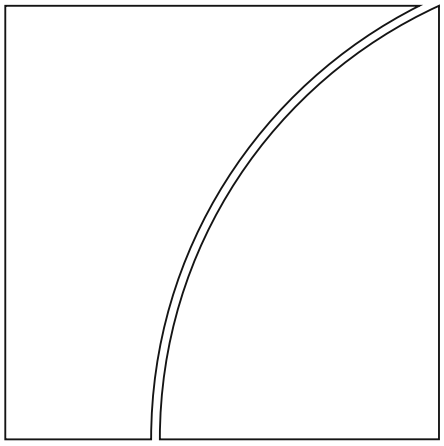

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Are international banks different? Evidence on bank performance and strategy

by Ata Can Bertay, Asli Demirgüç-Kunt and Harry Huizinga

Monetary and Economic Department

June 2019

JEL classification: F36, G21, G28

Keywords: Bank internationalization, financial crisis, deposit funding, procyclicality

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Foreword

The 17th BIS Annual Conference took place in Zurich, Switzerland, on 22 June 2018. The event brought together a distinguished group of central bank Governors, leading academics and former public officials to exchange views on the topic "Ten years after the Great Financial Crisis: what has changed?". The papers presented at the conference and the discussants' comments are released as *BIS Working Papers No 790, 791, 792 and 793*.

BIS Papers No 103 contains Panel remarks by Mervyn King (former Governor, Bank of England) and Anne Le Lorier (former First Deputy Governor, Bank of France) and a resulting Panel discussion between Agustín Carstens and them.

Contents

Are International Banks Different? Evidence on Bank Performance and Strategy

By Ata Can Bertay, Asli Demirgüç-Kunt and Harry Huizinga[1]

This draft: July 2018

Abstract

This paper provides evidence on how bank performance and strategies vary with the degree of bank internationalization, using data for 113 countries over 2000–15. Over this period, bank internationalization is associated with lower valuations and lower returns on equity. However, developing country banks that internationalized seem to have fared better than their high-income counterparts. Following the crisis, international banks were revalued particularly if they had stable funding in the form of deposits and if they had more generous deposit insurance coverage. Furthermore, for international banks headquartered in developing countries, our results indicate that bank internationalization reduces the cyclicality of their domestic credit growth with respect to home country gross domestic product growth, smoothing local downturns. In contrast, if the international bank is from a high-income country investing in a developing country, its lending is relatively procyclical, which can be destabilizing.

JEL Classification: F36, G21, G28

Keywords: Bank internationalization, financial crisis, deposit funding, procyclicality

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1. Introduction

Historically, banks have increased their geographical reach following their customers abroad in search of new profit opportunities. The decade before the 2007–09 global financial crisis was characterized by a significant increase in financial globalization, particularly for banking institutions, that coincided with increases in bank size to unprecedented levels. These changes were manifested in both a rise in cross-border lending and further internationalization of the banks themselves.

This globalization trend has been partially reversed by a recent retrenchment of international banks that are headquartered in high-income countries. Going against this trend, however, many developing country banks have expanded internationally, in part to fill the gaps left by high-income country international banks (World Bank, 2018).[2]

In this paper, we examine the implications of bank internationalization for bank performance using bank-level information from Bankscope for 113 countries over the 2000-2015 period. Specifically, we consider how bank internationalization is related to a set of bank-level variables that are indicative of bank valuation, risk, and return. Importantly, given the recent expansion of international banks from developing countries, we also examine whether these banks perform differently compared to those international banks headquartered in high-income countries.

In addition, we consider how internationalizing banks are different regarding their business models and funding strategies, and we examine how bank internationalization affects the cyclicality of an international bank's credit provision in its home country as well as in any foreign country where it has a subsidiary.

We measure the extent of bank internationalization in two alternative ways: by the share of a bank's overall assets owned by its foreign subsidiaries, or by the number of foreign host countries where the bank operates at least one subsidiary. Our sample of banks contains 2,793 banks in total, of which 325 banks are international with at least one foreign subsidiary. As seen in Figure 1, the average asset growth rate of international banks has generally been higher than for domestic banks during the 2000-2015 period, especially in the case of international banks headquartered in developing countries.

We find that bank internationalization generally has been associated with lower bank valuation as measured by Tobin's Q and the market-to-book value of equity for the 2000-2013 period, in part reflecting a lower return on equity. Internationalizing banks from developing countries have done better, were valued more highly, were less risky and enjoyed higher returns. International banks fund themselves to a lesser extent with customer deposits, they accumulate relatively few off-balance sheet exposures, and they receive relatively little non-interest income. The net effect of these differences between international and domestic banks on financial fragility is unclear, as lower deposit funding could increase bank riskiness, while lower off-balance sheet exposures and a lower share of non-interest income could reduce risk.

Following the financial crisis, the performance of international banks improved relative to domestic banks, as reflected in higher market valuations, a lower nonperforming loans ratio, and a higher return on assets. The relative performance

[2] Alade (2014) reports that by the end of 2008 more than half of domestically owned Nigerian banks owned at least one foreign subsidiary – mostly in Africa – compared to two in 2002.

of international banks improved especially for international banks with higher deposit funding and lower non-deposit short-term funding, reflecting the importance of relying on stable funding sources. There is also some evidence that those international banks that enjoyed more generous deposit insurance coverage and those with foreign subsidiaries that are geographically close saw their valuation improve following the crisis. The revaluation of international banks following the crisis is not significantly different for those headquartered in developing countries.

Going beyond the implications of bank internationalization for the banks themselves, we also examine how this affects the cyclicality of credit growth with respect to GDP growth. We see that bank internationalization reduces the cyclicality of domestic credit growth with respect to domestic GDP growth, potentially because international banks repatriate some funding to their home country during economic downturns to be able to continue lending domestically. This stabilizing effect is particularly strong for international banks headquartered in developing countries. A different pattern emerges when we investigate the cyclicality of the international bank lending in the foreign subsidiary countries. We find that developing country lending of international banks headquartered in high-income countries is relatively procyclical, although this effect is not significant if the international bank is also headquartered in a developing country. This enhanced procyclicality of credit growth in developing countries suggests that high-income international bank operations can be potentially destabilizing, while this is not true for South-South bank lending, i.e., developing country international banks doing business in other developing countries.

An important way this paper contributes to the existing literature is through investigating the performance and impact of bank internationalization using consolidated bank data. Using consolidated data in analyzing the performance of international banks is important because a bank's consolidated income statement is impervious to potential misrepresentation at the subsidiary level on account of international profit shifting motivated by international tax rate differences, which is common in the banking sector (see for example Huizinga et al., 2014, and Merz and Overesch, 2016). Furthermore, international banks tend to be evaluated by capital markets at the consolidated level, and they primarily fail at the consolidated level (Anginer et al., 2017).

Nevertheless, a voluminous literature investigates international banks by focusing on the performance of foreign-owned banks that typically are subsidiaries of multinational banks. Claessens and Van Horen (2012) provide an overview of 35 studies in this area in their Table 1, demonstrating how the results of various empirical studies differ – mostly depending on the sample of banks and the data that are used. In their own analysis, they find that the performance of foreign banks in the pre-crisis period compared to domestic banks depends on a range of factors including the particular home country and host-country regulations, and language similarity.

A separate approach is to investigate the impact of foreign bank presence, i.e., the share of foreign banking in total banking, on local banking markets.[3] An early contribution in this area is Claessens, Demirgüç-Kunt, and Huizinga (2001) who consider the impact of foreign bank presence on several key performance indicators of the local banking market such as the return on assets and overhead relative to assets. A recent contribution along these lines is Claessens and Van Horen (2014) who

[3] See Cull and Martinez Peria (2010) for a survey of the literature on the drivers and consequences of foreign bank participation in developing countries.

examine the impact of foreign bank presence on private credit growth and again document the relevance of host country and banks' characteristics.

However, there is a relatively small literature investigating the performance and impact of international banks using data at the consolidated level. Garcia-Herrero and Vazquez (2013) document higher risk-adjusted returns for international banks located in eight high-income countries mainly on account of their subsidiaries in developing countries. More recently, analyzing pre-crisis data for 56 countries, Gulamhussen et al. (2014, 2017) find that international banks tend to be riskier and international diversification creates excess shareholder value, especially for banks expanding towards developing countries. Using data for 84 countries, Bertay, Demirgüç-Kunt, and Huizinga (2016) find that bank internationalization is positively associated with a bank's average funding cost, possibly reflecting creditors' fears of not being repaid in case of a bank failure.[4]

Focusing on the strategies of parent international banks, De Haas and Van Horen (2013) find that following the collapse of Lehman Brothers, banks reduced credit less to foreign markets that were geographically close, where they were more experienced, and where they operated a subsidiary. De Haas and Van Lelyveld (2014) compare the credit growth responses of domestic banks and multinational unconsolidated parent banks (but not the multinational consolidated parent banks) to the global financial crisis, taking into account the share of a multinational bank's assets located at foreign subsidiaries.[5] They show that during the global financial crisis subsidiaries in foreign host countries could rely less on parent banks compared to earlier crises, and that parent banks reduced their lending less in the home country compared to their domestic counterparts – thanks to their liquid foreign subsidiaries. Finally, Claessens and Van Horen (2015) show that OECD banks reduced their foreign banking presence since the crisis, while non-OECD banks more than doubled their presence in foreign countries.

Our paper adds to the literature investigating the impact of bank internationalization in a number of ways. First, we analyze data at the consolidated level during the 2000-2015 period which includes the crisis period and beyond. Second, we examine the implications of bank internationalization distinguishing between banks headquartered in developing countries and high-income countries. Third, going beyond the implications of internationalization for the banks themselves, we also investigate the impact of internationalization on cyclicality of bank lending both with respect to home and host country GDP growth, again distinguishing between developing and high-income international banks. The potential differences

[4] Other papers focus on analyzing international banks from individual countries. Using U.S. data, Berger et al. (2016) find that international banks tend to be riskier – confirming findings by Gulamhussen et al. (2014) using international data. Frame, Mihov, and Sanz (2016) find that US Bank Holding Companies (BHCs) are more likely to operate subsidiaries in countries with weak regulation and supervision, which increases BHC risk. Buch et al. (2011, 2014) analyze the drivers of German banks' internationalization, showing the importance of bank characteristics such as productivity and risk aversion. Using the same German data, Buch et al. (2013) show that higher internationalization at the extensive margin (asset holdings in more countries) is associated with lower domestic market power, whereas higher internationalization at the intensive margin (a higher foreign assets share) is positively associated with market power. Galema et al. (2013) conclude that cost advantages are driving bank internationalization through foreign branches, but not in the case of foreign subsidiaries. Peek and Rosengren (2000) find that the Japanese banking crisis reduced lending by Japanese banks in the US with real effects on US construction activity.

[5] Their data set contains 48 large multinational banking groups almost entirely from high-income countries (there are only two developing country banks from Brazil).

between international banks from developing and high-income countries came to the fore in policy discussions with the rise of international banks from developing countries after the global financial crisis (World Bank, 2018). The pros and cons of this development are starting to be debated in academic and policy circles alike. Therefore, our emphasis on home country nationality is deliberate and hopes to start shedding light on these critical questions.

Section 2 presents the data and discusses the empirical methodology used in this study. Section 3 presents empirical evidence on how bank performance and strategies vary with bank internationalization. Section 4 shows evidence on the relative performance of international banks during the financial crisis. Section 5 provides results on the relation between the cyclicality of credit growth and bank internationalization. Section 6 concludes.

2. Data and methodology

2.1 Data

To construct a sample of domestic as well as international banks headquartered in 113 countries during the 2000-2015 period we use Bankscope database. This data source provides us with income and balance sheet information on these banks, and also with information on their ownership relationships. In the case of international banks, this information enables us to ascertain the number, sizes and country locations of the bank's foreign subsidiaries.[6]

Using the ownership data, we construct two alternative indices of bank internationalization. First, we consider the extent to which a bank's assets are owned by its foreign subsidiaries. We construct Foreign assets as the ratio of the sum of all foreign subsidiaries' assets (weighted by the parent bank's ownership share) to the consolidated assets of the parent bank. From Table 1, we see that the average Foreign assets ratio is 2.7% for the overall sample, while it is 14.7% for the sample of international banks that have at least one foreign subsidiary.

As an alternative internationalization measure, we consider the number of an international bank's foreign host countries (in the empirical work we use the variable Countries, which is the log of this number+1). The average bank operates in 0.9 foreign host countries, while the average international bank is present in 4.6 foreign countries. We relate the two measures of bank internationalization to a range of bank performance variables that represent a bank's valuation, risk and return. To start, Tobin's Q is a proxy for the market value of the bank's assets relative to their book value. It is constructed as the sum of the market value of common equity plus the book value of preferred equity and liabilities, divided by the book value of total assets. Tobin's Q has a mean value of 1.03. In Figure 2, we see that during 2003-2004 domestic banks had a higher Tobin's Q than international banks from both high-income and developing countries, while they have had a relatively low Tobin's Q since 2008. This suggests that the financial crisis has led to a revaluation of international

[6] Bankscope data does not incorporate information regarding foreign branches, thus we focus solely on foreign subsidiary investments of parent banks. The literature suggests, on average, subsidiaries have a higher weight especially in emerging market and developing country setting. Using the 2002 data, Cerutti et al. (2007) find that for Latin America and Eastern Europe foreign bank subsidiaries makes 65% and 82% of foreign affiliates.

banks compared to domestic banks, potentially because international banks received relatively generous bail-outs during the crisis.

As an alternative valuation variable, the market-to-book ratio is computed as the market value of common equity divided by its book value, with a mean value of 1.30. Figure 3 shows qualitatively similar patterns of the market-to-book ratios of domestic and international banks as for Tobin's Q in Figure 2.

We also consider two indices of bank risk. First, the Z-score is constructed as the log of the sum of the mean return on assets and the mean ratio of equity to assets divided by the standard deviation of the return on assets to measure bank solvency. The Z-score indicates the number of standard deviations that a bank's return on assets can decline before the bank reaches insolvency. A higher Z-score indicates a lower probability of bank failure. In Figure 4, we see that the average Z-score of international banks from high-income countries has been lower compared to domestic banks throughout the 2000-2015 period, indicating a higher probability of insolvency for international banks. The Z-score of international banks from developing countries has tended to increase throughout the 2000-2015 period and it has been mostly higher than for domestic banks since the crisis, which suggests that international banks from developing countries have recently been relatively less risky.

As a second proxy for bank risk, we construct the NPL variable as the log of the ratio of nonperforming loans to gross loans + 1. Figure 5 shows that the NPL ratio of international banks from high-income countries has been higher than for domestic banks since 2010, while the NPL ratio of international banks from developing countries has been higher than for domestic banks throughout the 2000-2015 period. This suggests that international banks generally have had lower quality loan portfolios in recent years.

To measure bank profitability, we use ROA, the return on assets computed as pre-tax profits divided by total assets, with a mean of 1.0%. In Figure 6, we see that international banks from high-income countries have achieved a lower average ROA than domestic banks since 2011, while international banks from developing countries have had a relatively high average ROA since 2002. Alternatively, ROE is the return on equity, which is constructed as the ratio of pre-tax profits to equity. Figure 7 shows that the return on equity of international banks from high income countries was higher than for domestic banks during 2009-2013, but lower in 2014-2015. The average ROE of international banks from developing countries has been relatively high since 2001.

These figures provide a cursory look at the patterns we observe for domestic and international banks from high-income and developing countries. In our empirical work we look deeper and investigate not only the difference between domestic and international banks but the impact of internationalization for an individual bank - headquartered in developed or a developing country, controlling for a number of other bank and country variables.

Differences in bank performance between domestic and international banks can reflect variation in business models and strategic behavior. In the empirical work, we consider 7 variables that are indices of a bank's funding and income strategies. First, on the funding side *Equity* is constructed as the ratio of equity to total assets with a mean of 10.0%. As a second funding variable, *Deposit funding* is the share of customer deposit over total assets with a mean of 63.9%. Third, *ST funding* is the share of non-deposit short-term funding over total assets with mean of 11.7%. Fourth, to

reflect the bank's asset allocation, *Off-balance sheet items* is the value of the assets that the bank does not control, but where it may have some exposure to losses, relative to total assets. *Off-balance sheet items* reflect a risky bank allocation strategy if they are not fully reflected in a bank's risk-weighted assets as used for capital regulatory purposes. The *Off-balance sheet items* variable has a mean of 15.0%. Fifth, to reflect the bank's income strategy, *Net interest margin* is constructed as net interest income divided by total assets with a mean value of 3.2%. A relatively low interest margin, among other things, can reflect that a bank focuses on providing credits to relatively large customers that tend to negotiate lower interest rates. Sixth, *Non-interest income* is the share of a bank's non-interest income, comprising fee income and trading income, in total operating income. Demirgüç-Kunt and Huizinga (2010) find that banks that focus more on generating non-interest income tend to be riskier. The average non-interest income share is 33.1%. As a final behavioral variable, *Overhead* is computed as non-interest expenses divided by total assets, with a mean value of 3.0%. The overhead variable reflects the composition of a bank's activities as well as its efficiency.

Credit provision is a key aspect of a bank's overall activities that is potentially affected by its degree of internationalization. To examine this, we construct the *Loan growth, consolidated* variable as the rate of credit growth of the consolidated parent bank, reflecting loan growth at the parent firm itself as well as at all its domestic and foreign subsidiaries. *Loan growth-consolidated* has a mean of 9%. In contrast, *Loan growth, unconsolidated* is the rate of credit growth at the unconsolidated parent bank. This variable should mostly reflect domestic credit growth (although it could reflect growth in cross-border loans). *Loan growth, unconsolidate*d has a mean of 8.6%. *Loan growth subsidiary, consolidated* in turn is the rate of loan growth at a subsidiary (domestic or foreign) based on the subsidiary's consolidated balance sheet with a mean value of 6.9%. Finally, *Loan growth subsidiary, unconsolidated*, is the rate of loan growth at a subsidiary as reflected in the subsidiary's unconsolidated balance sheet with a mean value of 6.7%.

The analysis includes several additional variables as controls variables. *Assets*, denoting the log of total assets, is a bank-level control variable. Furthermore, *Loans* is a bank's gross loans divided by total assets with a mean of 58.8%. Finally, there are three macroeconomic control variables: the rate of consumer price inflation, the rate of real GDP growth, and per capita GDP.

2.2 Methodology

Empirically, we relate bank performance, strategy and credit growth variables to the two alternative indices of bank internationalization. The basic estimating relationship between a bank performance or strategy variable and an index of bank internationalization is as follows:

$$Y_{ijt} = \alpha_i + \gamma_t + \beta_1 Inter_{ijt} + \beta_2 Bank_{ijt-1} + \beta_3 Macro_{jt} + \varepsilon_{ijt} \quad (1)$$

where the subscripts *i, j*, and *t* denote the bank, the country, and the year. Y_{ijt} is a bank performance or strategy variable. $Inter_{ijt}$ is a bank internationalization variable (either *Foreign assets* or *Countries*). $Bank_{ijt-1}$ denotes lagged bank-level control variables, and $Macro_{jt}$ represents macroeconomic control variables. Finally, α_i and γ_t are bank and year fixed effects. Given these fixed effects, the coefficient estimates of the internationalization variables capture the impact of a bank becoming more international within itself, not across banks based on their extent of internationalization.

Ex-ante, internationalized banks may display a different performance and adopt different strategies as they face different business opportunities and operate in different institutional environments. Internationalization, for instance, may provide banks with additional asset and income diversification opportunities that improve their risk-and-return tradeoff. If so, bank internationalization is expected to be positively associated with bank valuation (Tobin's Q and Market-to-book), negatively associated with bank risk (i.e., positively related to Z-score and negatively related to the NPL ratio), and positively associated with bank return (ROA and ROE). Also, internationalized banks may have the advantage that they are too complex to wind down, which could provide them with a funding advantage (Bertay, Demirgüç-Kunt, and Huizinga, 2016) and could enable them to operate with relatively little equity. Conversely, international banks may face information barriers in foreign banking markets, and they may be confronted by a lack of trust in these markets, which could restrict their ability to raise deposits locally or to engage in information-intensive activities such as accumulating off-balance sheet exposures or engaging in non-interest income generating activities.

To investigate whether the relation between bank performance and internationalization was changed by the financial crisis, we estimate the following specification:

$$Y_{ijt} = \alpha_i + \gamma_t + \beta_1 Inter_{ijt} + \beta_2 Inter_{ijt} \times Crisis_{j,t} + \beta_3 Bank_{ijt-1} + \beta_4 Macro_{jt} + \varepsilon_{ijt} \quad (2)$$

where $Crisis_{j,t}$ is a dummy variable signaling that country *j* is experiencing a financial crisis in year *t*. Alternatively, we take the crisis years to be the period 2007-2009 for all countries, the period after 2006 for all countries, and we consider crisis years that vary across countries as identified by Laeven and Valencia (2012), in which case $Crisis_{j,t}$ enters the regression as well.

To examine whether the impact of the crisis on the performance of international banks was different for international banks from developing countries, we estimate the following equation:

$$Y_{ijt} = \alpha_i + \gamma_t + \beta_1 Inter_{ijt} + \beta_2 Inter_{ijt} \times Developing_j + \beta_3 Inter_{ijt} \times Crisis_{j,t} + \beta_4 Inter_{ijt} \times Developing_j \times Crisis_{j,t} + \beta_5 Developing_j \times Crisis_{j,t} + \beta_6 Bank_{ijt-1} + \beta_7 Macro_{jt} + \varepsilon_{ijt} \quad (3)$$

where $Developing_j$ is a dummy variable signaling that a bank is located in a low-income or middle-income country.

To understand better why the performance of international banks relative to domestic banks may have been changed by the financial crisis, we also estimate regressions that are analogous to (3) where the *Developing* variable is replaced by a variable that is a potential driver of a differential international bank performance during the crisis. The potential drivers that we consider are national deposit insurance coverage limits, the deposit and alternatively non-deposit short-term funding shares of banks, and the asset weighted geographical distance of foreign subsidiaries. A priori, we expect international banks to be revalued during the crisis relative to domestic banks especially if national deposit insurance coverage limits are high, if they are funded more (less) through deposits (non-deposit short-term funding), and if the average distance of foreign subsidiaries is smaller.

Finally, we examine whether the cyclicality of a bank's loan growth with respect to GDP growth is affected by its degree of internationalization. To this end, we estimate the following relationship:

$$Loan\ growth_{ijt} = \alpha_i + \gamma_t + \beta_1 Inter_{ijt} + \beta_2 Inter_{ijt} \times GDP\ growth_{jt} + \beta_3 Bank_{ijt-1} + \beta_4 Macro_{jt} + \varepsilon_{ijt} \quad (4)$$

where $Loan\ growth_{ijt}$ is the rate of loan growth of bank *i* located in country *j* at time *t*, and $GDP\ growth_{jt}$ is the rate of GDP growth in country *j*. Less cyclicality of an international bank's loan growth with respective to GDP growth is consistent with finding $\beta_2 < 0$, and vice versa. Specifically, credit growth in the bank's parent country may be less cyclical with respect to parent-country GDP growth, if lower parent-country GDP growth (resulting in higher losses on the domestic loan portfolio) still allows the bank to continue lending domestically by relocating funding from its foreign subsidiaries to the parent bank. We examine these relationships for developing and high-income country international banks, investing in other developing or high-income countries, looking for potentially different patterns of association.

3. Evidence on bank performance and strategies and internationalization

Table 2 shows evidence on how the bank valuation, risk, and return variables vary with bank internationalization from estimating specification 1 in section 2.2. The regressions in columns 1-6 and 7-12 include the foreign assets variable and the countries variable, respectively. In the Tobin's Q regression 1, the foreign assets variable obtains a negative coefficient of -0.081 that is significant at 5%, while in the Market-to-book regression 2 this variable obtains a negative coefficient of -0.539 that is significant at 1%. These results suggest bank internationalization on average is associated with lower bank valuation. In the ROA and ROE regressions 5 and 6, *Foreign assets* enters with negative coefficients of -0.007 and -0.048 that are both significant at 5%. Similarly, in the ROE regression 12 the countries variable is estimated with a negative coefficient of -0.041 that is significant at 5%. Overall, the evidence of Table 2 indicates that internationalization has tended to reduce bank valuation in part on account of lower returns on assets and equity.

Next, we analyze how bank internationalization is associated with a range of variables that are indicative of bank funding and income strategies. In Table 3, regressions 1-7 relate these variables to the foreign assets ratio, while regressions 8-14 relate them to the countries variable. Regression 3 shows that the deposit variable varies negatively and significantly with the foreign assets variable, providing evidence that internationalized banks tend to be funded less through deposits as it may be more difficult for them to attract deposits in foreign markets. The relatively low deposit share in international banks' funding could make their funding less stable. In regressions 11 and 13, we see that the off-balance sheet items and the non-interest income share variables are negatively and significantly related to the countries variable. Internationalized banks may acquire fewer off-balance sheet exposures and engage less in non-interest income generating activities on account of their informational disadvantages in conducting non-standard banking activities, which may reduce their riskiness.

Overall, the lower deposit funding of internationalized banks suggests they have relatively risky business models, while the lower off-balance sheet items and non-interest income share point in the opposite direction.

4. The performance of international banks during the financial crisis

In this section we first consider the relative performance of international banks during the financial crisis for varying definitions of the crisis period. Subsequently, we consider a range of potential country-level and bank-level drivers of the relative performance of international banks during the crisis.

To start, Panel A of Table 4 reports the results of estimating specification 2. Specifically, the regressions include an interaction of the included internationalization variable with the Crisis2007-2009 variable, which equals one for the crisis years 2007-2009, in the regressions of Table 2. In the Tobin's Q and market-to-book regressions 1 and 2, the interactions of Foreign assets with Crisis2007-2009 are estimated to be positive and significant, pointing at a revaluation of international

banks during the crisis relative to domestic banks. In NPL ratio regression 4, the interaction of the Foreign assets with Crisis2007-2009 obtains a negative and significant coefficient, which suggest that the crisis caused the NPL ratio of international banks to decline relative to domestic banks. In the ROA regression 5, the estimated coefficient for the interaction of Foreign assets with Crisis2007-2009 is positive and significant, as apparently the ROA of international banks rose during the crisis relative to domestic banks. Regressions 8, 10 and 11 including the countries variable similarly show that the relative performance of international banks rose during the crisis in terms of a higher market-to-book ratio, a lower NPL ratio, and a higher ROA. Overall, the results of Panel A of Table 4 indicate a better performance of internationalizing banks during the crisis relative to domestic banks, as reflected in higher market valuations, a lower NPL ratio, and a higher return on assets.

In Panel B, we replace the Crisis2007-2009 variable by the CrisisLV variable which signals that a country is experiencing a financial crisis as identified by Laeven and Valencia (2012). In the Tobin's Q and Market-to-book regressions 1 and 2, the interactions of Foreign assets with CrisisLV obtain positive and significant coefficient, consistent with a revaluation of bank internationalization during a crisis period relative to domestic banks. Similarly, in the corresponding regression 7 and 8, the interactions of Countries with CrisisLV obtain positive and significant coefficients. In the ROE regression 12, however, the interaction of Countries with CrisisLV has a negative coefficient that is significant at 10%, which suggests that the crisis may have lowered the ROE of internationalizing banks relative to domestic banks, unlike the corresponding regression 12 in Panel A.

In Panel C, we consider how the performance of internationalizing banks relative to domestic banks was different in the period after 2006, including the crisis and its aftermath, indicated by the After2006 dummy variable. The Tobin's Q and Market-to-book regressions 1 and 2 show positive and significant coefficients for the interaction of Foreign assets * After2006, while the corresponding regressions 7 and 8 show positive and significant coefficient for the interaction Countries * After2006. This is evidence consistent with a relative revaluation of bank internationalization during the crisis period and its aftermath. The Z-score regression 9 displays a positive interaction of Countries with After2006, while in the NPL ratio regressions 4 and 10 the pertinent interaction variables obtain negative and significant coefficients, which suggest that the riskiness of bank internationalization relatively declined following the crisis. Finally, the interaction of countries with After2006 is estimated to be positive and significant in regression 11, indicating a relatively higher ROA of international banks following the crisis. Overall, the results of Panel C provide a picture of a relatively better performance of international banks following the crisis.

As an alternative to defining a crisis period, we can examine the performance impact of bank internationalization relative to staying domestic over time by including interactions of Foreign assets with time fixed effects for each year in regressions 1-6 of Table 2. The resulting regression output is presented in Table A2 in the Appendix. Examining the coefficients of interaction terms in each year during the crisis period (and before) provides further insight into the revaluation patterns.

Next, we consider a range of potential drives of the revaluation of international banks as evidenced by the results in Table 4. To start, we provide the results of estimating specification (3) to see whether there was a differential revaluation of internationalization for banks headquartered in developing countries during the crisis, as proxied by the Crisis2007-2009 variable. The regressions for the performance

variables reported in Panel A of Table 5 include the foreign assets variable, while the regressions in Panel B include the countries variable.

In the Tobin's Q regression 2 of Panel A, the interaction Foreign assets * Crisis2007-2009 is estimated to be positive and significant at 1%, consistent with a revaluation of inernational banks during the crisis. Similarly, the interaction Foreign assets* Crisis2007-2009 is positive and significant in the market-to-book regression 4. In regressions 2 and 4, however, the triple interaction Foreign assets * Developing * Crisis2007-2009 is estimated to be insignificant, which suggests that the revaluation of international banks on account of the crisis was not different for banks headquartered in developing countries. Similarly, this triple interaction is insignificant in regressions 6, 8, 10, and 12 in the table, which suggests that the impact of the crisis on the performance of international banks relative to domestic banks was not different for international banks headquartered in developing countries.

The regressions in Panel B include the countries variable. These regressions show that international banks headquartered in developing countries have generally performed well unlike their counterparts from high-income countries. This is indicated by positive and significant coefficients for the interaction Countries * Developing in the Market-to-book regression 4, the Z-score regression 6, and the ROE regression 12, while this interaction obtains a negative and significant coefficient in the NPL ratio regression 8. Hence, internationalizing banks from developing countries have done better overall as they extended their operations to additional countries, were valued more highly, were less risky and enjoyed higher returns. Turning to the impact of the crisis, we see that in the Market-to-book regression 4, the double interaction Countries * Crisis2007-2009 obtains a positive and significant coefficient, while the triple interaction Countries * Developing * Crisis2007-2009 is insignificant. These results suggest a revaluation of international banks during the crisis that was not different for international banks headquartered in developing countries. In regressions 2, 6, 8, 10 and 12 this triple interaction term also is estimated with insignificant coefficients, consistent with an impact of the crisis on the performance of international banks relative to domestic bank that was not different for international banks from developing countries.

To conclude this section, Table 6 examines the role of a range of country-level and bank-level variables in the revaluation of international banks during the crisis. To start, Panel A reports regression analogous to specification (3) where Developing has been replaced by the Coverage variable, which is the log of the deposit insurance coverage limit as a percentage of GDP per capita, starting from the regressions in Table 2. Foreign banks coming from countries with greater deposit insurance coverage appears to have performed relatively well, as for instance indicated by the positive and significant interaction term Foreign assets * Coverage in the Tobin's Q regression 1. As to the impact of the crisis, the triple interaction Countries * Coverage * Crisis2007-2009 obtains a positive and significant coefficient in the Market-to-book regression 8, which shows that international banks were revalued relative to domestic banks during the crisis especially if they came from countries with greater deposit insurance coverage. The included triple interaction terms obtain negative and significant coefficients in the NPL ratio regressions 4 and 10, and positive and significant coefficients in the ROA regressions 5 and 11 and the ROE regressions 6 and 12. Together these results provide suggestive evidence that the performance of international banks improved during the crisis relative to domestic banks especially if they benefited from greater deposit insurance coverage.

In Panel B we consider the role of a bank' deposit funding share in explaining the revaluation of international banks during the crisis. In this panel, the triple interaction terms are positive and significant in all regression apart from the NLP ratio regressions 4 and 10. In these latter regressions, the triple interaction terms are negative and significant. This is strong evidence that the performance of international banks relative to domestic banks improved during the crisis especially if they had large deposit funding shares, given that deposit funding was relatively stable and low-cost during the crisis.

In panel C, we focus on the non-deposit short-term funding share as a potential driver of the performance of international banks relative to domestic banks during the crisis. In this table, many triple interaction terms are again significant, with signs opposite to those in Panel B. This indicates that the performance of international banks relative to domestic banks improved during the crisis especially if they had low non-deposit short-term funding shares, as such funding proved to be unstable during the crisis. Together Panel B and C show that international banks performed well relative to domestic banks during the crisis if they had stable funding in the form of deposit funding rather than unstable short-term funding supplied by the market.

Finally, the regressions in Panel D include the Distance variable, which is the asset weighted geographical distance of foreign subsidiary countries, as a proxy for how far away a multinational bank is from its foreign subsidiary banks. Geographical closeness is expected to important to be able to operate foreign banking subsidiaries well especially during a financial crisis. Hence, we expect international bank revaluation relative to domestic banks during the crisis to be more pronounced for banks with a relatively low Distance variable. In Panel D, there is some evidence that international banks have generally achieved higher valuations if Distance was small, as indicated by negative and significant estimated coefficients for the interactions Foreign assets * Distance and Countries * Distance in the Market-to-book regressions 2 and 8. Included triple interactions terms are estimated to be negative and significant in the ROA regression 5 and the Tobin's Q regression 7, which provides some evidence that the ROA and valuation of international banks improved relatively little during the crisis relative to domestic banks if their geographical distance from foreign subsidiary countries was greater.

Overall, the results of Table 6 show that the revaluation of bank internationalization relative to domestic banks depended importantly on whether they had stable funding in the form of deposit funding rather than non-deposit short-term funding. There is also some suggestive evidence that the revaluation of international banks was more pronounced if they had more generous deposit insurance coverage.

5. The cyclicality of credit and internationalization

A potential benefit of bank internationalization is that it reduces the cyclicality of credit in individual countries to their respective business cycles. In this subsection, we consider the relationship between bank internationalization and the cyclicality of bank loans following specification 4 in section 2.2. In turn, we consider the cyclicality of loans at the level of the parent bank with respect to parent-country GDP growth, and the cyclicality of loans at subsidiary banks with respect to GDP growth in subsidiary countries.

Regressions 1 and 2 of Table 7, the dependent variable is the credit growth rate of the parent bank at the consolidated level. In regression 2, the triple interaction Foreign assets * GDP growth * Developing receives a negative and significant coefficient of -0.053, which suggests that greater internationalization of banks located in developing countries reduces the sensitivity of loans to their countries' GDP growth rate. In regressions 3-4, the dependent variable is parent-bank loan growth at the unconsolidated level, excluding domestic and foreign subsidiaries. This variable is a more direct measure of the growth rate of a bank's credit domestically. In regression 4, the negative and significant coefficient for the triple interaction Foreign assets * GDP growth * Developing suggests greater internationalization of banks in developing countries reduces the cyclicality of loan growth with respect to GDP at the unconsolidated parent level. The negative and significant coefficients for the triple interactions terms involving the countries variable in regressions 6 and 8 are consistent with this. Overall, Table 7 provides evidence that internationalization of developing country banks tends to make loan provision in their home countries less sensitive to home-country GDP growth. This could reflect that domestic GDP growth has a relatively small impact on firm-wide loan losses, and hence capitalization, for internationalized banks, which would mitigate the impact of domestic loan losses on international banks' abilities to provide new loans domestically.

To conclude this section, we address the cyclicality of loan growth to local GDP growth from the perspective of the banks' host countries. Analogously to Table 7, we consider loan growth of subsidiary banks both at the consolidated and unconsolidated levels in Table 8.[7] In addition, we consider a sample split between subsidiaries located in high-income host countries (in regressions 1 and 2), and subsidiaries located in developing host countries (in regressions 3 and 4). In regressions 3 and 4 (concerning loan growth at the consolidated and unconsolidated levels, respectively, for subsidiaries located in developing countries), we find positive and significant coefficients for interaction variables of host country GDP growth and a dummy variable signaling that the bank's home country is a high-income country.[8] Thus, host-country credit growth is relatively procyclical with respect to host-country GDP growth for banks located in developing countries, if their parent bank is headquartered in a high-income country. Such an enhanced procyclicality of credit provision by international banks in developing countries can come about if a higher GDP growth rate in a developing country causes the high-income parent bank to channel additional funds to the developing country to meet the greater loan demand. This can be potentially destabilizing for the economy of the developing country.

6. Conclusion

This paper adds to a relatively small literature that considers the performance of international banks at the consolidated level. We use consolidated bank-level data in 113 countries to investigate how international banks perform and behave relative to domestic banks, and how the financial crisis affected this relationship. Given the increased importance of international banks from developing countries, we

[7] Subsidiary bank loan growth at the unconsolidated level should be a relatively good measure of loan growth in the host country.

[8] Bertay, Demirgüç-Kunt, and Huizinga (2015) find that the credit growth of foreign subsidiaries is more procyclical with local GDP growth than the credit growth of domestic banks.

distinguish between international banks headquartered in high-income countries and developing countries.

We find that bank internationalization generally has been associated with lower bank valuation as measured by Tobin's Q and the market-to-book value of equity for the 2000-2013 period, in part reflecting a lower return on equity. Overall, bank internationalization thus does not seem to have created value for bank shareholders. Internationalizing banks from developing countries have done better, however. As they expanded into more countries, they were valued more highly, became less risky and enjoyed higher returns.

As they internationalize, banks generally fund themselves to a lesser extent with customer deposits, they accumulate relatively few off-balance sheet exposures, and they receive relatively little non-interest income. The net effect of these differences between international and domestic banks on financial fragility is unclear, as lower deposit funding could increase bank riskiness, while lower off-balance sheet exposures and a lower share of non-interest income could reduce risk.

Following the financial crisis, the performance of international banks improved relative to domestic banks, as reflected in higher market valuations, a lower nonperforming loans ratio, and a higher return on assets. The relative performance of international banks improved especially for international banks subject to greater deposit insurance coverage, with higher deposit funding and lower non-deposit short-term funding, and for international banks with foreign subsidiaries that are geographically close. The revaluation of bank internationalization following the crisis is not significantly different for those international banks headquartered in developing countries.

Finally, we see that international banks headquartered in developing countries reduce the cyclicality of domestic credit growth with respect to domestic GDP growth, potentially cushioning local economic downturns. In contrast, international banks from high-income countries can amplify the cyclicality of credit growth in developing countries when they invest there. In summary, for developing countries, internationalization of their banks can be a stabilizing force for their overall economy. However, international banks coming from high-income countries can be destabilizing for developing countries, since their lending tends to be procyclical.

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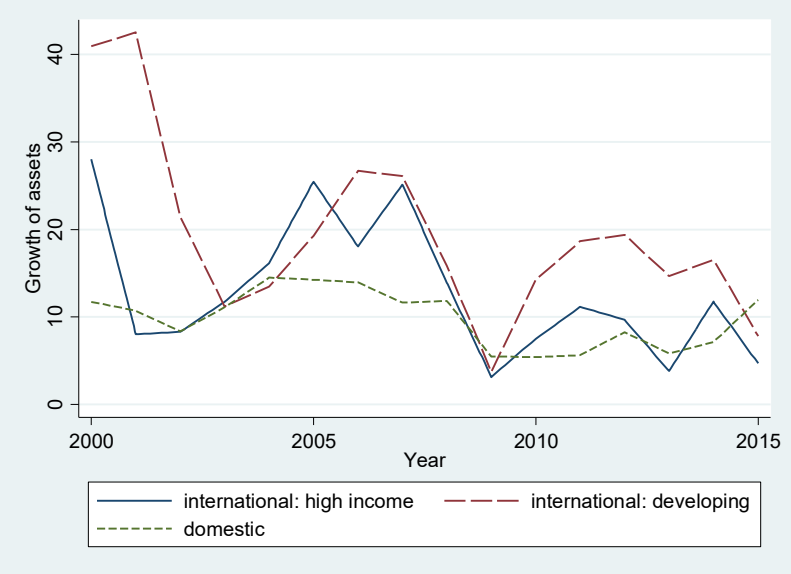
Data appendix

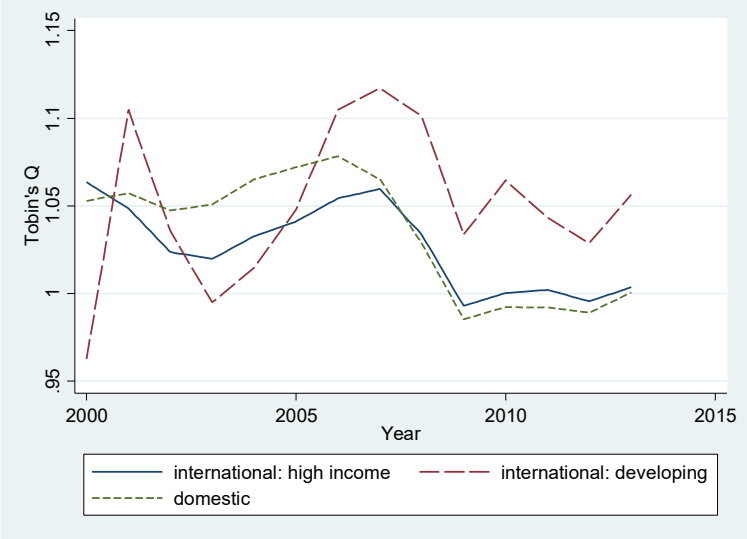
Figures

Growth rate of total assets for international and domestic banks — Figure 1



[1] This figure displays yearly means of the growth rate of assets during 2000-2015 for international banks from high-income and developing countries and domestic banks.

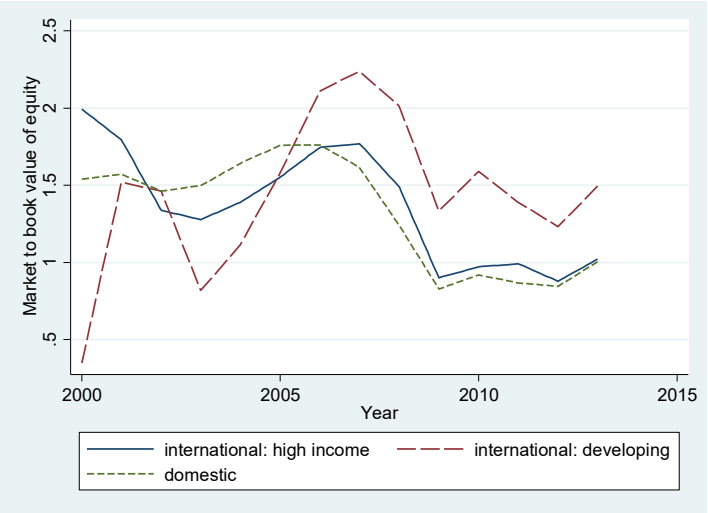
Tobin's Q for international and domestic banks — Figure 2



[1] This figure displays yearly means of Tobin's Q during 2000-2013 for international banks from high-income and developing countries and domestic banks. Tobin's Q is the sum of market value of common equity, preferred equity, and total liabilities divided by total assets.

Market-to-book for international and domestic banks

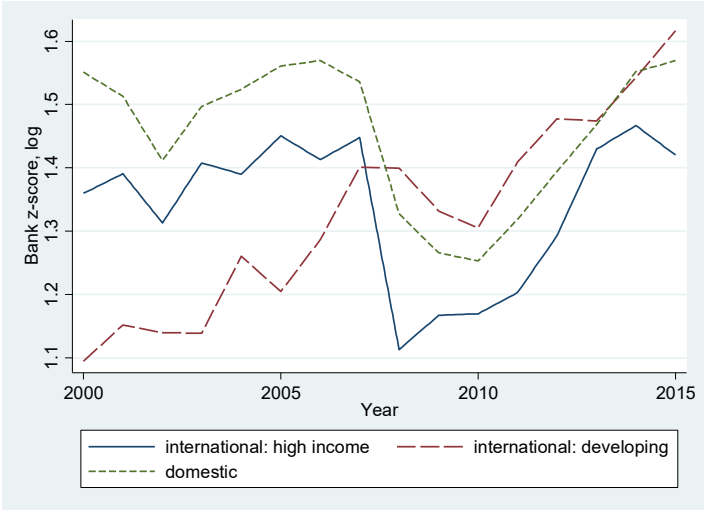
Figure 3



[1] This figure displays yearly means of the market-to-book variable during 2000-2013 for international banks from high-income and developing countries and domestic banks. Market-to-book is ratio of market value of equity to book value of equity.

Z-score for international and domestic banks

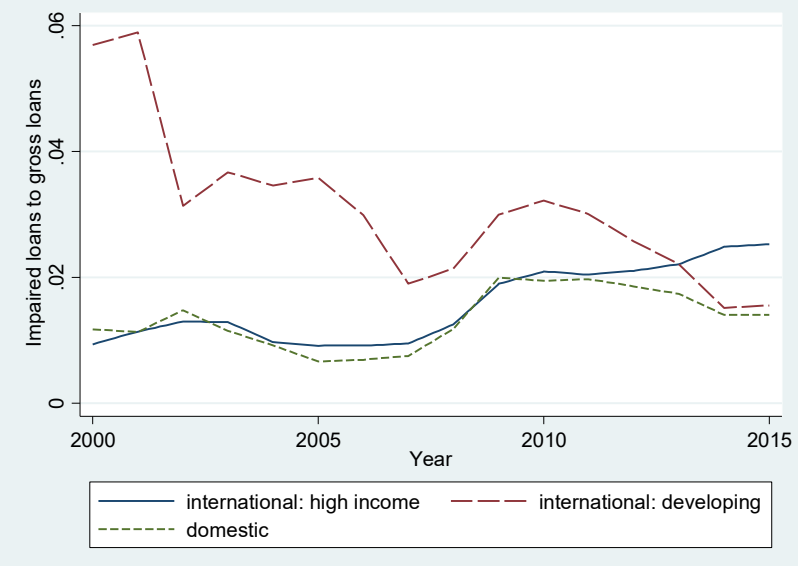
Figure 4



[1] This figure displays yearly means of the Z-score during 2000-2015 for international banks from high-income and developing countries and domestic banks. Z-score is log of (ROA+CAR)/stddev(ROA), where ROA is return on assets, CAR is the ratio of capital to assets, and stddev(ROA) is the standard deviation of return on assets. It is calculated for 4-years rolling windows, normalized by total assets, and lagged one period.

NPL ratio for international and domestic banks

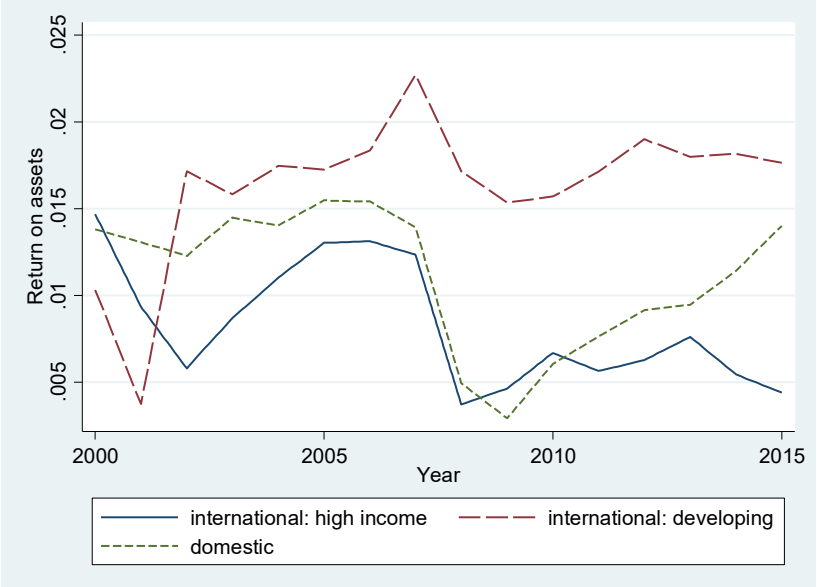
Figure 5



[1] This figure displays yearly means of the NPL ratio during 2000-2015 for international banks from high-income and developing countries and domestic banks. NPL ratio is log of ratio of non-performing loans to gross loans + 1

ROA for international and domestic banks

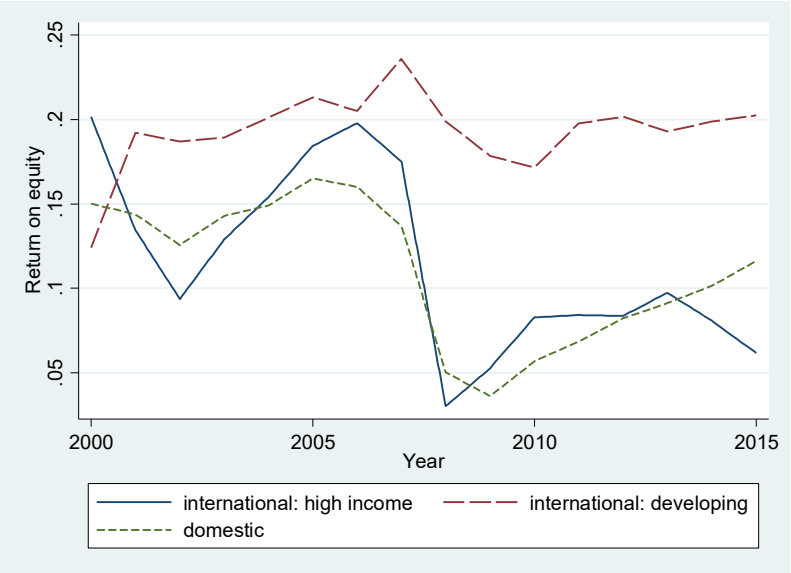
Figure 6



[1] This figure displays yearly means of ROA during 2000-2015 for international banks from high-income and developing countries banks and domestic banks. ROA is the return on average assets.

ROE for international and domestic banks

Figure 7



[1] This figure displays yearly means of ROE for international banks from high-income and developing countries and domestic banks during 2000-2015. ROE is ratio of equity to total assets

Table A1. Variable definitions and data sources

Table A1. Variable definitions and data sources

Variable	Description	Sources
Foreign assets	Sum of the assets of foreign subsidiary banks weighted by the parent bank's ownership share divided by the parent bank's consolidated assets	Bankscope
Countries	Log of (number of host countries +1)	Bankscope
Tobin's Q	Sum of market value of common equity, preferred equity, and total liabilities divided by total assets	Bankscope and Datastream
Market-to-book	Ratio of market value of equity to book value of equity	Bankscope and Datastream
Z-score	Log of Z-score which is calculated as (ROA+CAR)/stddev(ROA), where ROA is return on assets, CAR is the ratio of capital to assets, and stddev(ROA) is the standard deviation of return on assets. It is calculated for 4-years rolling windows, normalized by total assets, and lagged one period	Bankscope
NPL ratio	Log of ratio of non-performing loans to gross loans + 1	Bankscope
ROA	Ratio of pre-tax profits to total assets	Bankscope
ROE	Ratio of pre-tax profits to equity	Bankscope
Equity	Ratio of equity to total assets	Bankscope
Deposit funding	Ratio of customer deposit funding to total assets	Bankscope
ST funding	Ratio of non-deposit short-term funding to total assets	Bankscope
Off-balance sheet items	Ratio of assets that the bank does not control but where it may have some exposure to losses to total assets	Bankscope
Net interest margin	Interest income minus interest expense divided by total assets	Bankscope
Non-interest income	Ratio of non-interest income to total operating income	Bankscope
Overhead	Personnel expenses and other non-interest expenses divided by total assets	Bankscope
Loan growth, consolidated	Growth rate of loans from the parent bank's consolidated balance sheet	Bankscope
Loan growth, unconsolidated	Growth rate of loans from the parent bank's unconsolidated balance sheet	Bankscope
Loan growth subsidiary, consolidated	Growth rate of loans from a subsidiary bank's consolidated balance sheet	Bankscope
Loan growth subsidiary, unconsolidated	Growth rate of loans from a subsidiary bank's unconsolidated balance sheet	Bankscope
Assets	Log of total assets in constant 2010 dollars	Bankscope
Loans	Ratio of loans to total assets	Bankscope
Inflation	Rate of annual change in consumer prices	Bankscope
Developing	Dummy variable that is one for a bank located in a low-income or middle-income country according to World Bank classification, and zero otherwise.	Bankscope
Inflation	Consumer price inflation rate	WDI
GDP growth	Rate of real per capita GDP growth	WDI
GDP per capita	GDP per capita in thousands of constant 2000 dollars	WDI
Coverage	Log of deposit insurance coverage limit as a percentage of GDP per capita. This variable is set to zero in case there is no explicit deposit insurance.	Demirguc-Kunt, Kane and Laeven (2014)
Distance	Asset-weighted geographical simple distance (most populated cities, km) of foreign subsidiary countries	CEPII Dataset
$Crisis_{2007\text{-}2009}$	Dummy variable that is one for the years 2007-2009 and zero otherwise.	
$Crisis_{LV}$	Dummy variable that is one if there is a banking crisis in the country (covering 2000-2011 period) and zero otherwise.	Laeven and Valencia (2012)
After2006	Dummy variable that is one for the years 2007-2015 and zero otherwise.	

Table A2. Bank internationalization and performance: Annual coefficients

This table shows the results of regressions analogous to columns 1-6 of Table 2 where we include interactions of the Foreign assets variable with year effects. Foreign assets is the sum of the assets of foreign subsidiary banks weighted by the parent bank's ownership share divided by the parent bank's consolidated assets. The dependent variable is Tobin's Q in column 1, Market-to-book in column 2, Z-score in column 3, NPL ratio in columns 4, ROA in column 5, and ROE in column 6. Tobin's Q is the sum of market value of common equity, preferred equity, and total liabilities divided by total assets. Market-to-book is ratio of market value of equity to book value of equity. Z-score is log of (ROA+CAR)/stddev(ROA), where ROA is return on assets, CAR is the ratio of capital to assets, and stddev(ROA) is the standard deviation of return on assets. It is calculated for 4-years rolling windows, normalized by total assets, and lagged one period. NPL ratio is log of ratio of non-performing loans to gross loans + 1. ROA is pre-tax profits divided by total assets. ROE is pre-tax profits divided by total assets. Assets is the log of total assets in constant 2010 US dollars. Equity is ratio of equity to total assets. Loans is ratio of loans to total assets. Inflation is the rate of annual change in consumer prices. GDP growth is the rate of real GDP growth. GDP per capita is GDP per capita in thousands of constant 2000 dollars. Bank and year fixed effects are included. The sample period is 2000-2015. Robust standard errors are given in parentheses. *, ** and *** denote significance at 10%, 5% and 1%.

Table A2. Bank internationalization and performance: Annual coefficients

	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE
	(1)	(2)	(3)	(4)	(5)	(6)
Foreign assets * Year 2000	-0.104*	0.365	-0.268	0.035***	-0.005	-0.010
	(0.063)	(0.822)	(0.252)	(0.012)	(0.009)	(0.086)
Foreign assets * Year 2001	-0.123***	-0.499	-0.432**	0.049**	-0.018*	-0.048
	(0.044)	(0.397)	(0.169)	(0.020)	(0.010)	(0.047)
Foreign assets * Year 2002	-0.176***	-0.912***	-0.243	0.024**	-0.012***	-0.077*
	(0.049)	(0.293)	(0.149)	(0.009)	(0.004)	(0.044)
Foreign assets * Year 2003	-0.292***	-0.967***	-0.080	0.033***	-0.016***	-0.085**
	(0.110)	(0.252)	(0.168)	(0.011)	(0.005)	(0.037)
Foreign assets * Year 2004	-0.188***	-1.190***	-0.032	0.022***	-0.002	-0.030
	(0.057)	(0.246)	(0.180)	(0.007)	(0.006)	(0.031)
Foreign assets * Year 2005	-0.122***	-0.889***	-0.226	0.012*	-0.006*	0.001
	(0.034)	(0.185)	(0.151)	(0.006)	(0.003)	(0.028)
Foreign assets * Year 2006	-0.098***	-0.638***	-0.154	0.004	-0.007*	0.014
	(0.035)	(0.133)	(0.120)	(0.006)	(0.004)	(0.024)
Foreign assets * Year 2007	-0.097***	-0.485***	-0.008	-0.007	-0.001	0.009
	(0.030)	(0.186)	(0.124)	(0.009)	(0.003)	(0.035)
Foreign assets * Year 2008	-0.037	-0.183	-0.217	-0.001	-0.005	-0.109*
	(0.027)	(0.165)	(0.170)	(0.008)	(0.004)	(0.065)
Foreign assets * Year 2009	-0.012	-0.294	0.157	0.003	0.005	0.020
	(0.029)	(0.198)	(0.164)	(0.007)	(0.004)	(0.040)
Foreign assets * Year 2010	-0.059	-0.442**	-0.075	0.009	-0.005	-0.013
	(0.049)	(0.206)	(0.128)	(0.008)	(0.005)	(0.026)
Foreign assets * Year 2011	-0.056**	-0.450***	-0.102	0.005	-0.009**	-0.067*
	(0.026)	(0.144)	(0.119)	(0.007)	(0.004)	(0.039)
Foreign assets * Year 2012	-0.103*	-0.737***	0.028	0.008	-0.009	-0.081*
	(0.060)	(0.186)	(0.140)	(0.011)	(0.006)	(0.042)
Foreign assets * Year 2013	-0.094	-0.654***	0.088	0.008	-0.006	-0.070*
	(0.059)	(0.194)	(0.126)	(0.007)	(0.004)	(0.037)
Foreign assets * Year 2014			0.060	0.013*	-0.009**	-0.068**
			(0.138)	(0.007)	(0.004)	(0.029)
Foreign assets * Year 2015			-0.124	0.021**	-0.006*	-0.112***
			(0.182)	(0.010)	(0.004)	(0.038)
Assets	0.023	0.323***	0.169***	-0.008**	-0.004**	-0.025*
	(0.014)	(0.121)	(0.059)	(0.003)	(0.002)	(0.014)
Equity	0.150	0.031	1.345***	-0.053***	0.019**	-0.083
	(0.100)	(0.515)	(0.200)	(0.018)	(0.009)	(0.055)
Loans	0.013	0.197	0.522***	-0.011**	0.006*	0.036
	(0.026)	(0.251)	(0.090)	(0.004)	(0.003)	(0.027)
Inflation	0.000*	-0.000***	0.000	-0.000*	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP growth	0.005***	0.042***	0.004	-0.000	0.000**	0.003**
	(0.001)	(0.009)	(0.003)	(0.000)	(0.000)	(0.001)
GDP per capita	-0.004*	0.008	0.030***	-0.003***	0.001***	0.008***
	(0.002)	(0.014)	(0.006)	(0.000)	(0.000)	(0.001)
N	5826	5828	11877	10842	13306	13169
R-sq	0.315	0.394	0.180	0.201	0.144	0.189

Construction of the bank sample

We construct the data set by combining three modules from Bankscope. The Financials module discloses balance sheet information and has been applied frequently in past empirical literature. The Ownership and Subsidiary modules provide information on the equity structure of banks, their subsidiaries, and participatory affiliates. In constructing the data set, we had to meet three major challenges.

First, to ensure entities at every level are coded properly, we used identifiers including Bureau van Dijk ID (bvdid), the Bankscope index, and the bank name jointly to organize financial and ownership statements. The primary purposes of bvdid and the index are to track banks and related financial statements at different consolidation levels. However, over the period of 2000-2015 the published identifiers have exhibited changes that confound direct identification. Exploiting the fact that multiple bvdids can refer to one banking entity through the same financial statement index number (and vice versa), we conducted a pre-identification network analysis to connect groups of bvdids sharing any indices in any year and adjusted for bank name overlaps to create standardized identifiers for analysis. This exercise groups the 50,987 bank bvdids into 33,723 entities, which represent ultimate owners (UOs), intermediate entities, and lower-level subsidiaries.

Second, we adopt a systematic approach to harmonize entity links from the two connection modules as an ownership transfer may not be recorded in unison. Treating total and direct ownership link-years separately (respectively 4.4 million and 2.5 million), we first retain the set of link-years that appear in the most up-to-date record. Next, we give precedence to Subsidiary module information in case of conflicts so as to maximize comparability from the shareholder perspective. For very limited remaining cases, the largest recorded shareholding value is applied to break ties. At this stage, 1.8 million total and 847,000 direct ownership link-years remain. As Bureau van Dijk retains ownership records until a change is reported, we carry forward values from the latest year previously available, applying this principle to bridge any gaps in the panel dimension for every entity pair. This restores the number of link-years to 2.2 million and 905,000 for total and direct ownership links, respectively.

Third, using the total shareholding positions as the basis to identify a bank's UOs, we augment it with results of a recursive algorithm that traces consecutive direct shareholding positions to UOs such as parent banks or holding companies. For each year in 2000-15, the algorithm arranges fractional direct shareholding positions into a matrix, with rows representing immediate subsidiaries and columns shareholders that have been standardized in the network analysis. To identify foreign ownership, we assume any unreported ownership is retained domestically by the entity, replacing diagonal entries with residuals so each matrix row sums up to 1. Ruling out circular ownership, each step of right-multiplication consolidates one layer of the shareholding structure. The computation attained the multiplicative limit after 8 steps, suggesting the longest ownership chain involves 9 entities.

From the pool of UO-subsidiary pairs we retained those with controlling (as opposed to participatory) ownership by banking entities, re-applied the gap connection routine to smoothen series, and attached information from the Financials module to aggregate the balance sheets of majority-owned subsidiaries in foreign jurisdictions. We use consolidated statements at the UO level and unconsolidated at subsidiary level wherever possible. The end result is 466,000 link-years of 4,674 UOs, among which 25,777 links originate from 678 international UOs.

Table 1. Summary statistics on internationalization and other variables for the period 2000-2015

Foreign assets is the sum of the assets of foreign subsidiary banks weighted by the parent bank's ownership share divided by the parent bank's consolidated assets. Countries is log of number of host countries + 1. Tobin's Q is the sum of market value of common equity, preferred equity, and total liabilities divided by total assets. Market-to-book is ratio of market value of equity to book value of equity. Z-score is log of (ROA+CAR)/stddev(ROA), where ROA is return on assets, CAR is the ratio of capital to assets, and stddev(ROA) is the standard deviation of return on assets. It is calculated for 4-years rolling windows, normalized by total assets, and lagged one period. NPL ratio is log of ratio of non-performing loans to gross loans + 1. ROA is pre-tax profits divided by total assets. ROE is pre-tax profits divided by total assets. Equity is the ratio of equity to total assets. Deposit funding is share of customer deposit funding in total liabilities. ST funding is share of non-deposit short-term funding in total liabilities. Off-balance sheet items is ratio of assets that the bank does not control but where it may have some exposure to losses to total assets. Net interest margin is interest income minus interest expense divided by total assets. Non-interest income is ratio of non-interest income to total operating income. Overhead is personnel expenses and other non-interest expenses divided by total assets. Loan growth, consolidated is the growth rate of loans from the parent bank's consolidated balance sheet. Loan growth, unconsolidated is the growth rate of loans from the parent bank's unconsolidated balance sheet. Loan growth subsidiary, consolidated is the growth rate of loans from a subsidiary bank's consolidated balance sheet. Loan growth subsidiary, unconsolidated is the growth rate of loans from a subsidiary bank's unconsolidated balance sheet. Assets is the log of total assets in constant 2010 US dollars. Loans is ratio of loans to total assets. Developing is a dummy variable that is one for a bank located in a low-income or middle-income country according to World Bank classification, and zero otherwise. Inflation is the rate of annual change in consumer prices. GDP growth is the rate of real GDP growth. GDP per capita is GDP per capita in thousands of constant 2000 dollars. Coverage is the log of the deposit insurance coverage limit as a percentage of GDP per capita. Distance is the average distance of foreign subsidiary countries weighted by foreign subsidiary assets.

Table 1. Summary statistics on internationalization and other variables for the period 2000-2015

Variable	Obs	Mean	Std. dev.	Min	Max
Foreign assets	13306	0.027	0.100	0	0.879
International banks	2432	0.147	0.194	0.000	0.879
Countries	13306	0.122	0.276	0	1.653
International banks	2432	0.591	0.328	0.301	1.653
Tobin's Q	5808	1.030	0.096	0.880	1.758
Market-to-book	5811	1.295	0.797	0.026	5.154
Z-score	11874	1.416	0.452	0.010	2.424
NPL ratio	10836	0.015	0.019	0	0.113
ROA	13303	0.010	0.016	-0.048	0.098
ROE	13166	0.109	0.128	-0.429	0.476
Equity	13268	0.100	0.089	0.019	0.786
Deposit funding	13051	0.639	0.212	0.004	0.916
ST funding	13051	0.117	0.130	0	0.736
Off-balance sheet items	11186	0.150	0.154	0	0.737
Net interest margin	13265	0.032	0.019	0	0.129
Non-interest income	12926	0.331	0.192	0	0.957
Overhead	13254	0.030	0.029	0.002	0.236
Loan growth, consolidated	13031	0.090	0.198	-1	0.988
Loan growth, unconsolidated	12508	0.086	0.211	-1	0.995
Loan growth subsidiary, consolidated	13920	0.069	0.246	-1	0.993
Loan growth subsidiary, unconsolidated	13804	0.067	0.246	-1	0.993
Assets	13303	1.769	0.993	-0.498	3.915
Loans	13282	0.588	0.191	0.011	0.912
Developing	13303	0.121	0.326	0	1
Inflation	13303	6.928	299.696	-9.798	24411.030
GDP growth	13303	1.994	2.995	-62.076	104.487
GDP per capita	13303	40.409	17.870	0.303	110.00
Coverage	11034	5.642	0.701	2.996	10.198
Distance	12705	1.109	2.737	0	9.706

Table 2. Bank internationalization and performance

The dependent variables are Tobin's Q in columns 1 and 7, Market-to-book in columns 2 and 8, Z-score in columns 3 and 9, NPL ratio in columns 4 and 10, ROA in columns 5 and 11, and ROE in columns 6 and 12. Tobin's Q is the sum of market value of common equity, preferred equity, and total liabilities divided by total assets. Market-to-book is ratio of market value of equity to book value of equity. Z-score is log of (ROA+CAR)/stddev(ROA), where ROA is return on assets, CAR is the ratio of capital to assets, and stddev(ROA) is the standard deviation of return on assets. It is calculated for 4-years rolling windows, normalized by total assets, and lagged one period. NPL ratio is log of ratio of non-performing loans to gross loans + 1. ROA is pre-tax profits divided by total assets. ROE is pre-tax profits divided by total assets. Foreign assets is the sum of the assets of foreign subsidiary banks weighted by the parent bank's ownership share divided by the parent bank's consolidated assets. Countries is log of number of host countries + 1. Assets is the log of total assets in constant 2010 US dollars. Equity is ratio of equity to total assets. Loans is ratio of loans to total assets. Inflation is the rate of annual change in consumer prices. GDP growth is the rate of real GDP growth. GDP per capita is GDP per capita in thousands of constant 2000 dollars. Bank and year fixed effects are included. The sample period is 2000-2015. Robust standard errors are given in parentheses. *, ** and *** denote significance at 10%, 5% and 1%.

	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign assets	-0.081**	-0.539***	-0.061	0.009	-0.007**	-0.048**						
	(0.036)	(0.135)	(0.080)	(0.006)	(0.003)	(0.022)						
Countries							0.010	-0.040	-0.032	0.003	-0.002	-0.041**
							(0.015)	(0.150)	(0.073)	(0.003)	(0.002)	(0.017)
Assets	0.022	0.323***	0.168***	-0.008***	-0.004**	-0.025*	0.024*	0.352***	0.158***	-0.009***	-0.003	-0.018
	(0.014)	(0.120)	(0.059)	(0.003)	(0.002)	(0.015)	(0.014)	(0.116)	(0.058)	(0.003)	(0.002)	(0.014)
Equity	0.151	0.036	1.333***	-0.052***	0.019**	-0.087	0.092	-0.016	1.358***	-0.053***	0.020**	-0.090*
	(0.099)	(0.511)	(0.199)	(0.018)	(0.009)	(0.055)	(0.116)	(0.481)	(0.203)	(0.018)	(0.008)	(0.052)
Loans	0.008	0.184	0.525***	-0.010**	0.006*	0.034	0.020	0.236	0.495***	-0.009**	0.005	0.025
	(0.026)	(0.248)	(0.090)	(0.004)	(0.003)	(0.027)	(0.025)	(0.237)	(0.088)	(0.004)	(0.003)	(0.026)
Inflation	0.000*	-0.000***	0.000	-0.000	0.000***	0.000***	0.000**	-0.000***	0.000	-0.000	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP growth	0.005***	0.044***	0.004	-0.000	0.000**	0.003**	0.006***	0.047***	0.004	-0.000*	0.000**	0.004**
	(0.001)	(0.009)	(0.003)	(0.000)	(0.000)	(0.001)	(0.001)	(0.009)	(0.003)	(0.000)	(0.000)	(0.001)
GDP per capita	-0.003	0.010	0.030***	-0.003***	0.001***	0.008***	-0.000	0.000	0.000***	-0.000***	0.000***	0.000***
	(0.002)	(0.014)	(0.006)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	5826	5828	11877	10842	13306	13169	6016	6018	12482	11355	13980	13837
R-sq	0.304	0.391	0.178	0.193	0.142	0.187	0.289	0.377	0.166	0.179	0.129	0.181

Table 3. Bank internationalization and strategy

The dependent variables are Equity in columns 1 and 7, Deposit funding in columns 2 and 9, ST funding in columns 3 and 10, Off-balance sheet items in columns 4 and 11, Net interest margin in columns 5 and 12, Non-interest income in columns 6 and 13, and Overhead in columns 7 and 14. Equity is the ratio of equity to total assets. Deposit funding is share of customer deposit funding in total liabilities. ST funding is share of non-deposit short-term funding in total liabilities. Off-balance sheet items is ratio of assets that the bank does not control but where it may have some exposure to losses to total assets. Net interest margin is interest income minus interest expense divided by total assets. Non-interest income is ratio of non-interest income to total operating income. Overhead is personnel expenses and other non-interest expenses divided by total assets. Foreign assets is the sum of the assets of foreign subsidiary banks weighted by the parent bank's ownership share divided by the parent bank's consolidated assets. Countries is log of number of host countries + 1. Assets is the log of total assets in constant 2010 US dollars. Loans is ratio of loans to total assets. Inflation is the rate of annual change in consumer prices. GDP growth is the rate of real GDP growth. GDP per capita is GDP per capita in thousands of constant 2000 dollars. Bank and year fixed effects are included. The sample period is 2000-2015. Robust standard errors are given in parentheses. *, ** and *** denote significance at 10%, 5% and 1%.

	Equity	Deposit funding	ST funding	Off-balance sheet items	Net interest margin	Non-interest income	Overhead	Equity	Deposit funding	ST funding	Off-balance sheet items	Net interest Margin	Non-interest income	Overhead
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Foreign Assets	-0.006	-0.048**	0.004	-0.046	-0.003	-0.023	-0.000							
	(0.012)	(0.024)	(0.019)	(0.032)	(0.002)	(0.024)	(0.003)							
Countries								-0.007	-0.026	-0.004	-0.113***	0.002	-0.054***	-0.002
								(0.007)	(0.018)	(0.016)	(0.022)	(0.001)	(0.017)	(0.002)
Assets	-0.060***	-0.073***	0.029**	-0.051***	-0.006***	-0.063***	-0.013***	-0.064***	-0.071***	0.025*	-0.038**	-0.006***	-0.059***	-0.014***
	(0.011)	(0.014)	(0.013)	(0.019)	(0.002)	(0.016)	(0.003)	(0.011)	(0.015)	(0.013)	(0.018)	(0.001)	(0.015)	(0.003)
Equity		-0.334***	-0.152***	-0.008	0.021***	-0.057	0.030*		-0.346***	-0.156***	0.016	0.023***	-0.058	0.035**
		(0.071)	(0.059)	(0.062)	(0.006)	(0.077)	(0.015)		(0.067)	(0.055)	(0.060)	(0.006)	(0.074)	(0.015)
Loans	-0.022	0.072***	-0.057***	0.006	0.015***	-0.147***	-0.005	-0.018	0.053**	-0.046**	-0.003	0.014***	-0.144***	-0.003
	(0.018)	(0.025)	(0.019)	(0.031)	(0.002)	(0.024)	(0.004)	(0.017)	(0.026)	(0.019)	(0.030)	(0.002)	(0.023)	(0.004)
Inflation	0.000**	-0.001***	0.001**	0.000	0.000	0.000	-0.000	0.000**	-0.001***	0.001**	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP growth	-0.001	0.001	-0.001	0.003*	0.000	0.001	-0.000**	-0.001	0.001	-0.001	0.003**	0.000	0.001	-0.000**
	(0.000)	(0.001)	(0.001)	(0.002)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)
GDP per capita	-0.001*	0.003*	-0.004***	0.009***	0.000	0.001	0.000	-0.001**	0.003**	-0.004***	0.008***	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.002)	(0.000)	(0.001)	(0.000)
N	13339	13089	13089	11217	13270	12926	13259	14018	13741	13741	11790	13942	13568	13929
R-sq	0.054	0.091	0.064	0.112	0.106	0.053	0.046	0.060	0.084	0.061	0.102	0.095	0.051	0.052

Table 4. Bank internationalization and performance during the crisis.

The dependent variables are Tobin's Q in columns 1 and 7, Market-to-book in columns 2 and 8, Z-score in columns 3 and 9, NPL ratio in columns 4 and 10, ROA in columns 5 and 11, and ROE in columns 6 and 12. Tobin's Q is the sum of market value of common equity, preferred equity, and total liabilities divided by total assets. Market-to-book is ratio of market value of equity to book value of equity. Z-score is log of (ROA+CAR)/stddev(ROA), where ROA is return on assets, CAR is the ratio of capital to assets, and stddev(ROA) is the standard deviation of return on assets. It is calculated for 4-years rolling windows, normalized by total assets, and lagged one period. NPL ratio is log of ratio of non-performing loans to gross loans + 1. ROA is pre-tax profits divided by total assets. ROE is pre-tax profits divided by total assets. Foreign assets is the sum of the assets of foreign subsidiary banks weighted by the parent bank's ownership share divided by the parent bank's consolidated assets. Countries is log of number of host countries + 1. $Crisis_{2007\text{-}2009}$ is a dummy variable that is one for the years 2007-2009, and zero otherwise. $Crisis_{LV}$ is a dummy variable that equals one if a country is experiencing a financial crisis as identified by Laeven and Valencia (2012), and zero otherwise. After2006 is a dummy variable that equals one for the years after 2006, and zero otherwise. Assets is the log of total assets in constant 2010 US dollars. Equity is ratio of equity to total assets. Loans is ratio of loans to total assets. Inflation is the rate of annual change in consumer prices. GDP growth is the rate of real GDP growth. GDP per capita is GDP per capita in thousands of constant 2000 dollars. Assets, Equity, Loans, Inflation, GDP growth, and GDP per capita are included, but not reported. Panel A reports regressions that include the $Crisis_{2007\text{-}2009}$ variable, Panel B reports regressions that include the $Crisis_{LV}$ variable, and Panel C reports regressions that include the After2006 variable. Bank and year fixed effects are included. The sample period is 2000-2015. Robust standard errors are given in parentheses. *, ** and *** denote significance at 10%, 5% and 1%.

Panel A. Crisis defined as the years 2007-2009

	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign assets	-0.100**	-0.646***	-0.073	0.012*	-0.008**	-0.051**						
	(0.040)	(0.134)	(0.083)	(0.006)	(0.003)	(0.022)						
Foreign assets * $Crisis_{2007\text{-}2009}$	0.060**	0.341***	0.051	-0.016***	0.007***	0.016						
	(0.024)	(0.094)	(0.111)	(0.005)	(0.003)	(0.033)						
Countries							0.008	-0.079	-0.026	0.004	-0.003*	-0.042**
							(0.015)	(0.147)	(0.073)	(0.004)	(0.002)	(0.017)
Countries * $Crisis_{2007\text{-}2009}$							0.005	0.095**	-0.022	-0.004***	0.003***	0.004
							(0.004)	(0.038)	(0.030)	(0.001)	(0.001)	(0.011)
N	5826	5828	11877	10842	13306	13169	6016	6018	12482	11355	13980	13837
R-sq	0.307	0.392	0.178	0.195	0.143	0.187	0.289	0.378	0.166	0.180	0.130	0.181

Panel B. Crisis periods from Laeven and Valencia (2012)

	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign assets	-0.119***	-0.702***	0.024	0.003	-0.006**	-0.017						
	(0.028)	(0.182)	(0.123)	(0.006)	(0.003)	(0.024)						
Foreign assets * $Crisis_{LV}$	0.107***	0.457**	-0.059	-0.004	0.002	-0.044						
	(0.021)	(0.190)	(0.178)	(0.004)	(0.003)	(0.033)						
Countries							-0.035*	-0.234	-0.017	-0.001	-0.003	-0.007
							(0.021)	(0.184)	(0.082)	(0.003)	(0.002)	(0.017)
Countries * $Crisis_{LV}$							0.039***	0.137*	0.019	-0.001	0.002	-0.023*
							(0.008)	(0.082)	(0.050)	(0.002)	(0.001)	(0.014)
$Crisis_{LV}$	-0.044***	-0.421***	-0.199***	0.012***	-0.005***	-0.051***	-0.046***	-0.435***	-0.220***	0.012***	-0.006***	-0.052***
	(0.007)	(0.065)	(0.024)	(0.001)	(0.001)	(0.006)	(0.007)	(0.064)	(0.024)	(0.001)	(0.001)	(0.006)
N	4976	4978	9115	8174	10318	10202	5115	5117	9457	8473	10717	10595
R-sq	0.341	0.409	0.223	0.258	0.166	0.223	0.326	0.395	0.213	0.250	0.153	0.216

Panel C. The period after 2006

	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign assets	-0.144***	-0.780***	-0.165	0.020***	-0.009**	-0.030						
	(0.036)	(0.157)	(0.130)	(0.007)	(0.004)	(0.027)						
Foreign assets * After2006	0.081***	0.307**	0.141	-0.015***	0.004	-0.024						
	(0.018)	(0.132)	(0.139)	(0.005)	(0.003)	(0.026)						
Countries							-0.031	-0.212	-0.190**	0.008*	-0.006***	-0.037*
							(0.019)	(0.180)	(0.090)	(0.004)	(0.002)	(0.019)
Countries * After2006							0.033***	0.135*	0.139***	-0.004**	0.003***	-0.004
							(0.007)	(0.072)	(0.048)	(0.002)	(0.001)	(0.011)
N	5826	5828	11877	10842	13306	13169	6016	6018	12482	11355	13980	13837
R-sq	0.308	0.392	0.179	0.195	0.142	0.187	0.295	0.378	0.169	0.180	0.130	0.181

Table 5. Bank internationalization and performance during the crisis: developing country banks

The dependent variables risk Tobin's Q in columns 1 and 2, Market-to-book in columns 3 and 4, Z-score in columns 5 and 6, NPL ratio in columns 7 and 8, ROA in columns 9 and 10, and ROE in columns 11 and 12. Tobin's Q is the sum of market value of common equity, preferred equity, and total liabilities divided by total assets. Market-to-book is ratio of market value of equity to book value of equity. Z-score is log of (ROA+CAR)/stddev(ROA), where ROA is return on assets, CAR is the ratio of capital to assets, and stddev(ROA) is the standard deviation of return on assets. It is calculated for 4-years rolling windows, normalized by total assets, and lagged one period. NPL ratio is log of ratio of non-performing loans to gross loans + 1. ROA is pre-tax profits divided by total assets. ROE is pre-tax profits divided by total assets. Foreign assets is the sum of the assets of foreign subsidiary banks weighted by the parent bank's ownership share divided by the parent bank's consolidated assets. Developing is a dummy variable that is one for a bank located in a low-income or middle-income country according to World Bank classification, and zero otherwise. $Crisis_{2007\text{-}2009}$ is a dummy variable that is one for the years 2007-2009, and zero otherwise. Countries is log of number of host countries + 1. Assets is the log of total assets in constant 2010 US dollars. Equity is the ratio of equity to total assets. Loans is ratio of loans to total assets. Inflation is the rate of annual change in consumer prices. GDP growth is the rate of real GDP growth. GDP per capita is GDP per capita in thousands of constant 2000 dollars. Assets, Equity, Loans, Inflation, GDP growth, and GDP per capita are included, but not reported. Panel A reports regressions that include Foreign assets, and Panel B reports regressions that include Countries. Bank and year fixed effects are included. The sample period is 2000-2015. Robust standard errors are given in parentheses. *, ** and *** denote significance at 10%, 5% and 1%.

Panel A: Foreign assets	Tobin's Q		Market-to-book		Z-score		NPL ratio		ROA		ROE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign assets	-0.079**	-0.092**	-0.575***	-0.662***	-0.045	-0.044	0.009	0.011	-0.006*	-0.008**	-0.058**	-0.060**
	(0.038)	(0.042)	(0.138)	(0.138)	(0.088)	(0.093)	(0.007)	(0.007)	(0.004)	(0.004)	(0.024)	(0.025)
Foreign assets * Developing	-0.029	-0.068	0.595	0.502	-0.089	-0.050	0.002	0.001	-0.001	0.003	0.059	0.080
	(0.091)	(0.112)	(0.706)	(0.522)	(0.218)	(0.213)	(0.020)	(0.017)	(0.009)	(0.009)	(0.056)	(0.056)
Foreign assets * $Crisis_{2007\text{-}2009}$		0.048***		0.316***		0.017		-0.012***		0.007***		0.012
		(0.018)		(0.082)		(0.122)		(0.004)		(0.003)		(0.036)
Foreign assets * Developing * $Crisis_{2007\text{-}2009}$		0.305		0.917		0.010		-0.026		-0.007		-0.033
		(0.323)		(1.097)		(0.194)		(0.025)		(0.010)		(0.072)
Developing * $Crisis_{2007\text{-}2009}$		0.039***		0.329***		0.156***		-0.003**		0.006***		0.061***
		(0.011)		(0.080)		(0.028)		(0.002)		(0.001)		(0.007)
N	5826	5826	5828	5828	11877	11877	10842	10842	13306	13306	13169	13169
R-sq	0.304	0.320	0.391	0.400	0.178	0.183	0.193	0.198	0.142	0.148	0.187	0.193

Panel B: Countries	Tobin's Q		Market-to-book		Z-score		NPL ratio		ROA		ROE	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Countries	-0.000	-0.001	-0.247*	-0.275**	-0.110	-0.094	0.009***	0.010***	-0.003**	-0.004**	-0.063***	-0.062***
	(0.012)	(0.012)	(0.137)	(0.134)	(0.075)	(0.076)	(0.003)	(0.004)	(0.002)	(0.002)	(0.018)	(0.018)
Countries * Developing	0.078	0.069	1.529***	1.455***	0.491***	0.430**	-0.040***	-0.040***	0.008	0.007	0.141***	0.130**
	(0.069)	(0.065)	(0.455)	(0.429)	(0.182)	(0.183)	(0.013)	(0.013)	(0.006)	(0.006)	(0.051)	(0.052)
Countries * $Crisis_{2007\text{-}2009}$		0.005		0.098***		-0.052*		-0.004***		0.002**		-0.003
		(0.004)		(0.035)		(0.031)		(0.001)		(0.001)		(0.012)
Countries * Developing* $Crisis_{2007\text{-}2009}$		-0.020		-0.092		0.102		0.002		-0.004		-0.003
		(0.029)		(0.248)		(0.081)		(0.006)		(0.003)		(0.025)
Developing * $Crisis_{2007\text{-}2009}$		0.046***		0.337***		0.137***		-0.004*		0.007***		0.062***
		(0.014)		(0.084)		(0.031)		(0.002)		(0.001)		(0.008)
N	6016	6016	6018	6018	12482	12482	11355	11355	13980	13980	13837	13837
R-sq	0.291	0.301	0.384	0.391	0.169	0.174	0.188	0.191	0.130	0.136	0.183	0.189

Table 6. Bank internationalization and performance during the crisis: country and bank level channels

The dependent variables risk Tobin's Q in columns 1 and 7, Market-to-book in columns 2 and 8, Z-score in columns 3 and 9, NPL ratio in columns 4 and 10, ROA in columns 5 and 11, and ROE in columns 6 and 12. Tobin's Q is the sum of market value of common equity, preferred equity, and total liabilities divided by total assets. Market-to-book is ratio of market value of equity to book value of equity. Z-score is log of (ROA+CAR)/stddev(ROA), where ROA is return on assets, CAR is the ratio of capital to assets, and stddev(ROA) is the standard deviation of return on assets. It is calculated for 4-years rolling windows, normalized by total assets, and lagged one period. NPL ratio is log of ratio of non-performing loans to gross loans + 1. ROA is pre-tax profits divided by total assets. ROE is pre-tax profits divided by total assets. Foreign assets is the sum of the assets of foreign subsidiary banks weighted by the parent bank's ownership share divided by the parent bank's consolidated assets. Countries is log of number of host countries + 1. Coverage is the log of the deposit insurance coverage limit as a percentage of GDP per capita. Deposit funding is share of customer deposit funding in total liabilities. ST funding is share of non-deposit short-term funding in total liabilities. Distance is the average distance of foreign subsidiary countries weighted by foreign subsidiary assets. $Crisis_{2007\text{-}2009}$ is a dummy variable that is one for the years 2007-2009, and zero otherwise. Assets is the log of total assets in constant 2010 US dollars. Equity is the ratio of equity to total assets. Loans is ratio of loans to total assets. Inflation is the rate of annual change in consumer prices. GDP growth is the rate of real GDP growth. GDP per capita is GDP per capita in thousands of constant 2000 dollars. Assets, Equity, Loans, Inflation, GDP growth, and GDP per capita are included, but not reported. Panel A reports regressions that include Coverage, Panel B reports regressions that include Deposit funding, Panel C reports regressions that include ST funding, and Panel D reports regressions that include Distance. Bank and year fixed effects are included. The sample period is 2000-2015. Robust standard errors are given in parentheses. *, ** and *** denote significance at 10%, 5% and 1%.

Panel A. Deposit insurance coverage

	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign assets	-0.224***	-1.055***	-0.122	0.020	-0.012*	0.000						
	(0.066)	(0.350)	(0.159)	(0.014)	(0.007)	(0.045)						
Foreign assets * Coverage	0.027***	0.123**	-0.001	-0.001	0.001	-0.009						
	(0.010)	(0.061)	(0.033)	(0.003)	(0.001)	(0.008)						
Foreign Assets * $Crisis_{2007-2009}$	0.054	-0.083	-0.289	0.030**	-0.030***	-0.288***						
	(0.076)	(0.452)	(0.249)	(0.012)	(0.011)	(0.098)						
Foreign assets * Coverage * $Crisis_{2007-2009}$	0.003	0.100	0.065	-0.010***	0.008***	0.061***						
	(0.016)	(0.094)	(0.045)	(0.003)	(0.002)	(0.019)						
Countries							-0.050	0.103	-0.057	-0.010	-0.003	0.015
							(0.051)	(0.303)	(0.144)	(0.009)	(0.004)	(0.029)
Countries * Coverage							0.014**	0.021	-0.001	0.003**	-0.000	-0.013***
							(0.007)	(0.043)	(0.022)	(0.001)	(0.001)	(0.005)
Countries * $Crisis_{2007-2009}$							-0.013	-0.272	-0.113	0.009*	-0.008***	-0.094***
							(0.034)	(0.208)	(0.091)	(0.005)	(0.003)	(0.029)
Countries * Coverage * $Crisis_{2007-2009}$							0.005	0.078**	0.014	-0.002**	0.002***	0.017***
							(0.006)	(0.039)	(0.018)	(0.001)	(0.001)	(0.006)
Coverage	0.006**	0.047*	0.006	0.001*	-0.000	-0.002	0.000	0.033	0.005	0.000	-0.000	0.002
	(0.003)	(0.027)	(0.012)	(0.001)	(0.000)	(0.002)	(0.004)	(0.031)	(0.014)	(0.001)	(0.000)	(0.003)
Coverage * $Crisis_{2007-2009}$	-0.002	-0.045**	-0.006	-0.000	-0.001***	-0.007***	-0.003	-0.056**	-0.005	0.000	-0.001***	-0.009***
	(0.003)	(0.021)	(0.007)	(0.000)	(0.000)	(0.002)	(0.004)	(0.026)	(0.007)	(0.001)	(0.000)	(0.002)
N	5157	5159	10613	9763	11764	11636	5336	5338	11200	10249	12405	12272
R-sq	0.351	0.449	0.197	0.235	0.162	0.201	0.332	0.431	0.185	0.219	0.146	0.194

Panel B. Deposit funding

	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign assets	-0.024	-0.151	-0.189	-0.003	-0.008	-0.064						
	(0.084)	(0.323)	(0.202)	(0.015)	(0.007)	(0.058)						
Foreign Assets * Deposit funding	-0.140	-0.847	0.226	0.025	0.002	0.031						
	(0.172)	(0.685)	(0.412)	(0.030)	(0.011)	(0.095)						
Foreign Assets * $Crisis_{2007-2009}$	-0.194*	-1.786***	-0.354	0.021*	-0.014**	-0.190**						
	(0.113)	(0.512)	(0.256)	(0.012)	(0.007)	(0.084)						
Foreign Assets * Deposit funding * $Crisis_{2007-2009}$	0.547*	4.645***	0.898**	-0.077**	0.041***	0.452***						
	(0.299)	(1.256)	(0.437)	(0.031)	(0.014)	(0.138)						
Countries							-0.011	-0.489**	-0.326*	0.021***	-0.006	-0.098***
							(0.025)	(0.244)	(0.172)	(0.008)	(0.004)	(0.035)
Countries * Deposit funding							0.051	0.949*	0.632**	-0.034**	0.007	0.124**
							(0.047)	(0.509)	(0.307)	(0.015)	(0.006)	(0.061)
Countries * $Crisis_{2007-2009}$							-0.051***	-0.468***	-0.127*	0.002	-0.011***	-0.114***
							(0.016)	(0.148)	(0.073)	(0.003)	(0.003)	(0.030)
Countries * Deposit funding * $Crisis_{2007-2009}$							0.105***	1.171***	0.279*	-0.016**	0.027***	0.254***
							(0.036)	(0.305)	(0.146)	(0.007)	(0.006)	(0.055)
Deposit funding	-0.048*	-0.212	-0.033	-0.003	0.008***	0.085***	-0.060*	-0.434	-0.065	0.006	0.004	0.040
	(0.027)	(0.241)	(0.110)	(0.006)	(0.003)	(0.023)	(0.033)	(0.268)	(0.114)	(0.006)	(0.004)	(0.027)
Deposits funding * $Crisis_{2007-2009}$	-0.034***	-0.336***	0.027	0.003	-0.008***	-0.034**	-0.044***	-0.382***	-0.006	0.002	-0.009***	-0.050***
	(0.012)	(0.114)	(0.045)	(0.002)	(0.002)	(0.014)	(0.014)	(0.129)	(0.048)	(0.002)	(0.002)	(0.015)
N	5712	5715	11651	10766	13028	12896	5892	5895	12231	11277	13674	13536
R-sq	0.349	0.401	0.186	0.203	0.161	0.196	0.332	0.392	0.178	0.189	0.147	0.191

Panel C. Non-deposit short-term funding

	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign assets	-0.191**	-0.993***	0.052	0.009	-0.010*	-0.028						
	(0.083)	(0.213)	(0.151)	(0.010)	(0.006)	(0.034)						
Foreign assets * ST funding	0.658*	2.903***	-0.837	0.011	0.017	-0.164						
	(0.339)	(1.073)	(0.632)	(0.041)	(0.023)	(0.209)						
Foreign Assets * $Crisis_{2007-2009}$	0.210*	1.244***	0.115	-0.031**	0.009	0.071						
	(0.110)	(0.391)	(0.212)	(0.013)	(0.006)	(0.055)						
Foreign assets * ST funding * $Crisis_{2007-2009}$	-0.959*	-5.912***	-0.200	0.088*	-0.009	-0.255						
	(0.512)	(1.977)	(1.404)	(0.053)	(0.026)	(0.349)						
Countries							0.010	-0.101	0.103	0.001	-0.003	-0.038**
							(0.019)	(0.172)	(0.086)	(0.004)	(0.002)	(0.019)
Countries * ST funding							0.031	0.454	-0.792**	0.020	-0.001	-0.015
							(0.052)	(0.501)	(0.320)	(0.014)	(0.007)	(0.060)
Countries * $Crisis_{2007-2009}$							0.020	0.287***	0.065	-0.007***	0.006***	0.060***
							(0.013)	(0.110)	(0.059)	(0.003)	(0.002)	(0.020)
Countries * ST funding * $Crisis_{2007-2009}$							-0.130*	-1.519**	-0.469	0.017	-0.018	-0.336***
							(0.067)	(0.608)	(0.315)	(0.013)	(0.011)	(0.118)
ST funding	-0.034	0.119	0.062	-0.003	-0.011***	-0.068***	-0.017	0.125	0.173	-0.009	-0.007**	-0.039
	(0.024)	(0.205)	(0.104)	(0.005)	(0.003)	(0.024)	(0.024)	(0.232)	(0.114)	(0.006)	(0.003)	(0.027)
ST funding * $Crisis_{2007-2009}$	0.061***	0.724***	-0.155**	-0.007**	0.004*	0.023	0.060***	0.742***	-0.088	-0.006	0.005*	0.048**
	(0.017)	(0.224)	(0.073)	(0.003)	(0.002)	(0.022)	(0.019)	(0.244)	(0.077)	(0.004)	(0.002)	(0.023)
N	5712	5715	11651	10766	13028	12896	5892	5895	12231	11277	13674	13536
R-sq	0.349	0.401	0.186	0.202	0.157	0.193	0.328	0.389	0.178	0.187	0.142	0.188

Panel D. Asset weighted distance of foreign subsidiaries

	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE	Tobin's Q	Market-to-book	Z-score	NPL ratio	ROA	ROE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Foreign assets	0.097	1.645**	0.173	0.035	0.005	0.016						
	(0.139)	(0.832)	(0.400)	(0.044)	(0.007)	(0.094)						
Foreign assets * Distance	-0.019	-0.294***	-0.031	-0.003	-0.001	-0.010						
	(0.017)	(0.107)	(0.054)	(0.006)	(0.001)	(0.012)						
Foreign assets * $Crisis_{2007\text{-}2009}$	0.156	0.588	-0.108	-0.042	0.027***	0.248						
	(0.131)	(0.608)	(0.575)	(0.028)	(0.010)	(0.172)						
Foreign assets * Distance * $Crisis_{2007\text{-}2009}$	-0.017	-0.063	-0.006	0.005	-0.004***	-0.040						
	(0.016)	(0.082)	(0.074)	(0.004)	(0.001)	(0.025)						
Countries							0.026	0.314	0.043	0.002	-0.002	-0.041
							(0.032)	(0.289)	(0.096)	(0.005)	(0.002)	(0.025)
Countries * Distance							-0.001	-0.062*	0.004	0.000	0.000	0.000
							(0.004)	(0.037)	(0.012)	(0.001)	(0.000)	(0.003)
Countries * $Crisis_{2007\text{-}2009}$							0.015	0.114	-0.155*	-0.005	0.000	-0.030
							(0.019)	(0.160)	(0.085)	(0.004)	(0.003)	(0.035)
Countries * Distance * $Crisis_{2007\text{-}2009}$							-0.006*	-0.037	-0.004	0.001	-0.001	-0.005
							(0.003)	(0.023)	(0.013)	(0.001)	(0.000)	(0.005)
Distance	0.001	0.003	0.004	-0.000	0.000	0.002	-0.000	0.014	-0.002	-0.000	0.000	0.001
	(0.001)	(0.010)	(0.005)	(0.000)	(0.000)	(0.001)	(0.002)	(0.017)	(0.007)	(0.000)	(0.000)	(0.002)
Distance * $Crisis_{2007\text{-}2009}$	0.001	0.012*	0.005	-0.000*	0.000***	0.003**	0.004*	0.032**	0.018**	-0.000	0.001***	0.008***
	(0.001)	(0.007)	(0.004)	(0.000)	(0.000)	(0.001)	(0.002)	(0.013)	(0.007)	(0.000)	(0.000)	(0.002)
N	5638	5640	11325	10390	12705	12579	5638	5640	11325	10390	12705	12579
R-sq	0.318	0.415	0.189	0.219	0.151	0.194	0.317	0.414	0.190	0.217	0.151	0.196

Table 7. Bank internationalization and the cyclicality of lending

The dependent variable is Loan growth, consolidated in columns 1-2 and 5-6, and Loan growth, unconsolidated in columns 3-4 and 7-8. Loan growth, consolidated is the growth rate of loans from the bank's consolidated balance sheet. Loan growth, unconsolidated is the growth rate of loans from the bank's unconsolidated balance sheet. Foreign assets is the sum of the assets of foreign subsidiary banks weighted by the parent bank's ownership share divided by the parent bank's consolidated assets. GDP growth is the rate of real GDP growth. Developing is a dummy variable that is one for a bank located in a low-income or middle-income country according to World Bank classification, and zero otherwise. Countries is the log of number of host countries + 1. Assets is the log of total assets in constant 2010 US dollars. Equity is the ratio of equity to total assets. Loans is ratio of loans to total assets. Inflation is the rate of annual change in consumer prices. GDP per capita is GDP per capita in thousands of constant 2000 dollars. Bank and year fixed effects are included. The sample period is 2000-2015. Robust standard errors are given in parentheses. *, ** and *** denote significance at 10%, 5% and 1%.

Table 7. Bank internationalization and the cyclicality of lending

	Loan growth, consolidated		Loan growth, unconsolidated		Loan growth, consolidated		Loan growth, unconsolidated	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Foreign assets	-0.069	-0.109*	-0.009	-0.055				
	(0.052)	(0.056)	(0.086)	(0.105)				
Foreign assets * GDP growth	-0.005	0.009	-0.019	-0.003				
	(0.011)	(0.009)	(0.012)	(0.014)				
Foreign assets * Developing		0.263		0.287				
		(0.170)		(0.181)				
Foreign assets * GDP growth * Developing		-0.053**		-0.060**				
		(0.026)		(0.025)				
Countries					-0.045	-0.093***	-0.000	-0.024
					(0.029)	(0.029)	(0.039)	(0.042)
Countries * GDP growth					-0.005	0.005*	-0.007	0.004
					(0.005)	(0.003)	(0.005)	(0.004)
Countries * Developing						0.328***		0.170*
						(0.088)		(0.096)
Countries * GDP growth * Developing						-0.025***		-0.023***
						(0.005)		(0.006)
GDP growth * Developing		0.002		0.004		0.009***		0.009**
		(0.003)		(0.004)		(0.003)		(0.004)
GDP growth	0.005**	0.007***	0.006**	0.007***	0.008***	0.006***	0.008***	0.007***
	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Assets	-0.249***	-0.244***	-0.218***	-0.215***	-0.234***	-0.233***	-0.213***	-0.209***
	(0.023)	(0.023)	(0.024)	(0.024)	(0.024)	(0.024)	(0.025)	(0.025)
Equity	0.096	0.094	0.156	0.154	0.077	0.082	0.127	0.133
	(0.136)	(0.135)	(0.143)	(0.142)	(0.129)	(0.126)	(0.131)	(0.130)
Loans	-0.304***	-0.300***	-0.313***	-0.309***	-0.309***	-0.313***	-0.304***	-0.301***
	(0.038)	(0.038)	(0.039)	(0.039)	(0.038)	(0.038)	(0.039)	(0.039)
Inflation	0.000***	0.000***	-0.000***	-0.000***	0.000***	0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP per capita	0.011***	0.010***	0.010***	0.009***	0.011***	0.012***	0.010***	0.010***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)
N	13072	13072	12549	12549	13709	13709	13162	13162
R-sq	0.205	0.206	0.164	0.165	0.205	0.210	0.163	0.166

Table 8. The cyclicality of lending in host countries

The dependent variable is Loan growth, consolidated in columns 1 and 3, and Loan growth, unconsolidated in columns 2 and 4. Loan growth, consolidated is the growth rate of loans from the bank's consolidated balance sheet. Loan growth, unconsolidated is the growth rate of loans from the bank's unconsolidated balance sheet. Home country developing is a dummy variable that is one if the foreign subsidiary's parent bank is located in a low-income or middle-income country according to World Bank classification. GDP growth is the rate of real GDP growth of the subsidiary's country of location. Home country high-income is a dummy variable that is one if the subsidiary's parent bank is located in a low-income or middle-income country according to World Bank classification, and zero otherwise. Assets is the log of total assets in constant 2010 US dollars. Equity is the ratio of equity to total assets. Loans is ratio of loans to total assets. Inflation is the rate of annual change in consumer prices. GDP per capita is GDP per capita in thousands of constant 2000 dollars. Regressions in columns 1 and 2 include subsidiaries located in high-income countries according to World Bank classification. Regressions in columns 3 and 4 include subsidiaries located in low-income and middle-income countries according to World Bank classification. Bank and year fixed effects are included. The sample period is 2000-2015. Robust standard errors are given in parentheses. *, ** and *** denote significance at 10%, 5% and 1%.

	High-income host		Developing host	
	Loan growth, consolidated	Loan growth, unconsolidated	Loan growth consolidated	Loan growth, unconsolidated
	(1)	(2)	(3)	(4)
Home country developing	-0.098**	-0.111**	0.159*	0.162*
	(0.042)	(0.053)	(0.086)	(0.086)
GDP growth * Home country developing	0.002	0.005	0.007	0.006
	(0.004)	(0.004)	(0.005)	(0.005)
Home country high-income	-0.011	-0.006	0.093	0.092
	(0.030)	(0.030)	(0.069)	(0.067)
GDP growth * Home country high-income	0.004	0.004	0.011***	0.011***
	(0.003)	(0.003)	(0.003)	(0.003)
GDP growth	0.017***	0.017***	-0.000	-0.000
	(0.003)	(0.003)	(0.001)	(0.002)
Assets	-0.229***	-0.221***	-0.390***	-0.397***
	(0.042)	(0.041)	(0.048)	(0.047)
Equity	-0.082	-0.095	-0.242	-0.187
	(0.119)	(0.119)	(0.169)	(0.183)
Loans	-0.473***	-0.434***	-0.747***	-0.732***
	(0.051)	(0.050)	(0.085)	(0.086)
Inflation	0.002	0.002	0.000	0.000
	(0.004)	(0.004)	(0.001)	(0.001)
GDP per capita	0.000	0.000	0.000*	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
N	11507	11431	2413	2399
R-sq	0.166	0.157	0.225	0.219

Comments on "Are international banks different? Evidence on Bank Performance and Strategy"

By Tobias Adrian[1]

1. Introduction

This is a stimulating paper about multinational banking. It constructs two measures of the degree of bank multinationalisation: the share of assets in foreign subsidiaries in total consolidated assets (a kind of intensive margin), and the number of foreign subsidiaries (a kind of extensive margin). It then asks whether the degree of bank multinationalisation affects bank performance at the consolidated level, bank strategy, the cyclicality of lending in the home country, and the cyclicality of lending in host countries. It also analyzes whether the location of bank headquarters (in advanced economies (AEs) versus non-AEs) matters for the effects of the degree of bank multinationalisation, and differences in the effects of multinationalisation over time (eg during crisis years versus non-crisis years). This analysis can help shed light on shifts in market shares between AE and non-AE banking groups in the aftermath of the global financial crisis (GFC).

The key findings are that: (i) a greater degree of bank multinationalisation is associated with worse performance (measured by return on equity or price-to-book ratio); (ii) this association is generally stronger before the GFC; (iii) this association tends to be driven by multinational banks headquartered in AEs; (iv) a greater degree of bank multinationalisation is associated with lower deposit funding, lower off-balance-sheet items, and lower noninterest income. These are interesting findings, that sometimes challenge some of the received wisdom on the benefits and modes of banks' foreign expansion.

My comments will focus on three areas: the scope of the paper, some of its findings, and its identification strategy.

2. Scope

Let me first clarify why I think it is more appropriate to call banks with foreign operations "multinational" banks rather than "international" banks, and use the word "multinationalisation" rather than "internationalization" in the context of the paper. In the standard BIS classification, banks' foreign claims are the sum of banks' cross-border claims and of the local claims of their affiliates abroad. The paper focuses on a subset of the latter, ie the (mostly) local claims of their subsidiaries abroad, and ignores the former and the local claims of their branches abroad (more precisely, it lumps them with domestic claims). This exclusive focus on subsidiaries

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abroad as a form of doing foreign business would be made more transparent by referring to multinational banking, in line with the terminology proposed by McCauley et al. (2010) in their work here at the BIS.

BIS consolidated statistics show that BIS-reporting banks' share of local claims (on an immediate counterparty basis) in total foreign claims grew from about 30 percent in the early 2000's to slightly over 40 percent at end-2011, and has remained relatively stable since then (Avdjiev et al. 2017). In other words, multinational banking still represents less than 50 percent of foreign banking. These relative magnitudes are worth keeping in mind when thinking about the scope of the paper and its potential implications for the debate on the costs and benefits on globalization of banking.

3. Findings

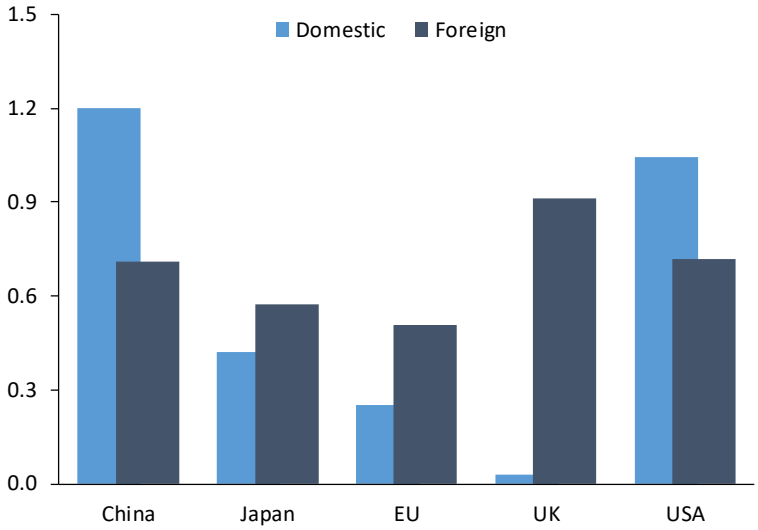
The sample of banks used in the paper is large (2793 banks of all sizes, of which 325 are multinational banks), and the econometric framework always includes bank fixed effects – in other words, the estimation exploits within-bank variation rather than cross-sectional variation. I would like to provide here elements from a complementary analysis based on the cross-section of 30 globally systemically important banks (G-SIBs) recently performed by IMF and ECB colleagues (Caparusso et al., forthcoming). Some of their findings resonate with Ata, Asli and Harry's, while others suggest areas for further investigation.

Caparusso et al. suggest that when thinking about a bank's degree of multinationalisation, the *relative* performance at home and abroad matters. They show that this relative performance is quite heterogeneous. G-SIBs headquartered in Europe and Japan perform better abroad than at home, ie the return on assets (ROA) of their domestic subsidiaries is smaller than their foreign subsidiaries' ROA, while the opposite is true for US and Chinese G-SIBs (Figure 1). This would suggest a positive association between multinationalisation and consolidated returns for European and Japanese banks, and a negative one for US banks, Chinese banks, and perhaps non-AE banks more generally. Figure 2 further suggests that a key motive for a larger presence abroad is the ROA differential between foreign and domestic operations: a higher ROA differential is associated with a greater relative size of the foreign business relative to that of the total business. The heterogeneity in home market profitability would seem to be a key element to add to the analysis.

G-SIBs return on assets: foreign subsidiaries vs home subsidiaries

2014-16 average, percent

Figure 1

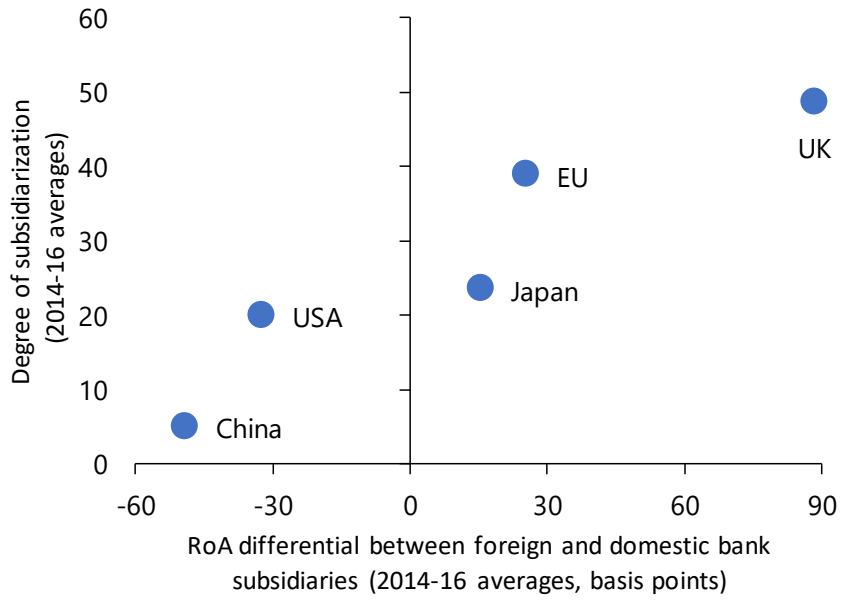


Source: Caparusso et al. (forthcoming)

G-SIBs: return on assets differential and subsidiarisation

2014-16 average, percent

Figure 2



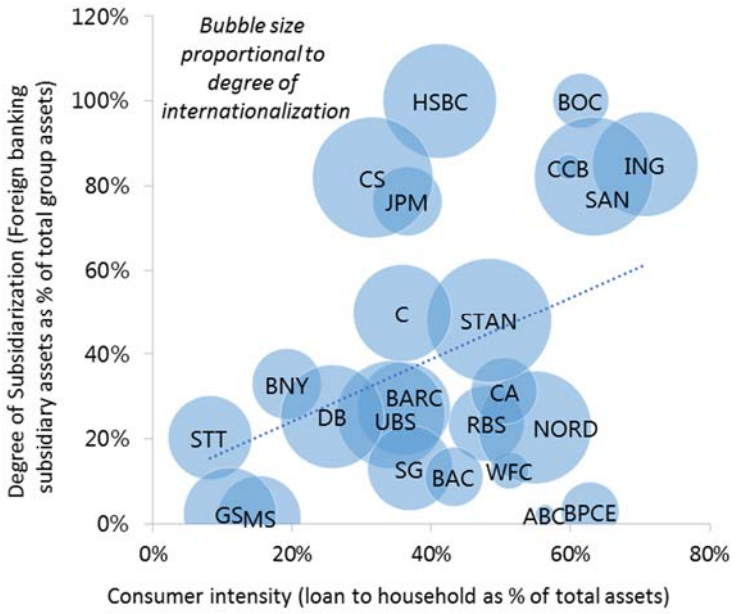
[1] Degree of subsidiarisation is defined as foreign banking subsidiary assets as a share of total group assets

Source: Caparusso et al. (forthcoming)

Caparusso et al. also document that a larger degree of multinationalisation is associated with a larger share of the consumer business (Figure 3), a finding that seems consistent with the finding of the paper that greater multinationalisation is associated with a higher share of interest income. However, they also show that greater multinationalisation is associated with a greater share of local funding (Figure 4). Since local funding is typically made of deposits, this seems inconsistent with the finding in Ata, Asli and Harry's paper that a greater degree of bank multinationalisation is associated with lower deposit funding. To try reconciling these findings, it could be useful to look at the relationship between multinationalisation and deposit funding not only for the 2000-2015 period as a whole but also by year (as the paper does for bank performance). Such an analysis may reveal time variation in this relationship, and show a post-GFC shift in banks' funding model of foreign affiliates from cross-border sources to local sources (Caparusso et al. examine the 2014-16 period).

Subsidiarization and global consumer intensity

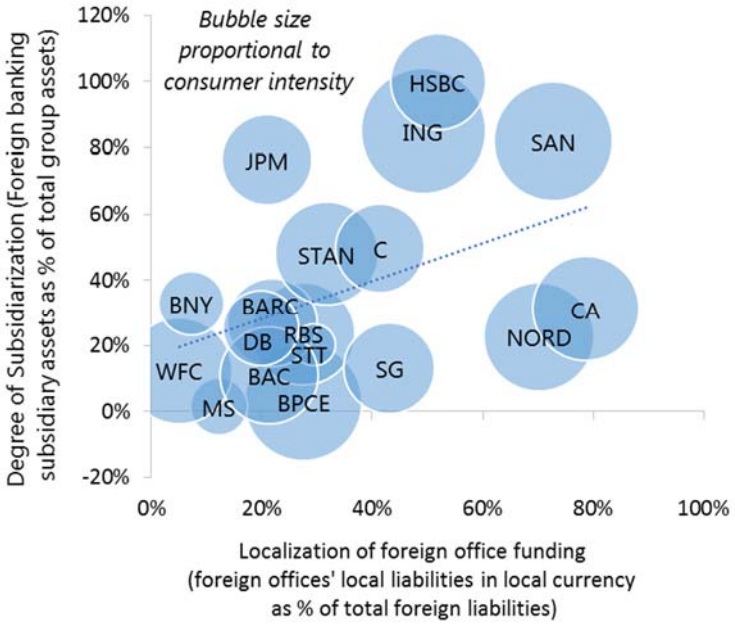
Figure 3



[1] Degree of internationalization is defined as cross-jurisdiction claims as a share of total assets.

Source: Caparusso et al. (forthcoming)

Subsidiarization and overseas office funding localization Figure 4



[1] Consumer intensity is defined as loans to household as a share of total assets.

Source: Caparusso et al. (forthcoming)

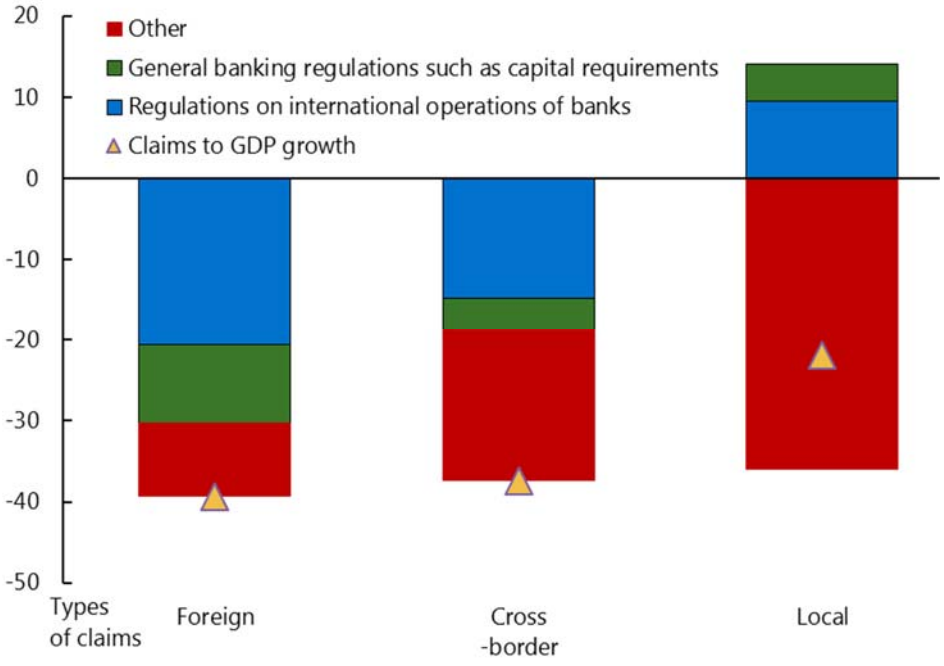
4. Identification

The paper does not discuss identification explicitly. Variation in the multinationalisation variables could arise from exchange rate movements, organic growth or acquisitions or asset sales abroad, organic growth or acquisitions or asset sales at home, asset transfers between parent and subsidiaries. As I hinted above, multinationalisation along the intensive margin could also be driven by variation in banks' cross-border exposures (which are treated as domestic exposures in the paper). Are these changes expected to affect performance in the same way? Can we plausibly consider these variations as exogenous to the bank's performance?

Endogeneity and reverse causality are concerns that the paper should better acknowledge. An area that could be investigated in the paper and which could perhaps help tackle some of the endogeneity issues is banking regulation and supervisory practices regarding operations of foreign-owned entities. Changes in regulation and supervisory practices in foreign countries are arguably exogenous to any individual bank's consolidated performance. Some level of granularity of information (eg, regulation of branches versus regulation of subsidiaries of foreign-owned banks) would likely be required to expand the paper in this direction. As an illustration, I would like to refer to an analysis performed in the IMF's April 2015 Global Financial Stability Report (IMF, 2015), based on a 2014 survey of national regulatory authorities. The analysis suggested that regulation of "international" banking operations had changed significantly in a large number of countries since 2006. This appeared to be especially true for host country regulations.

Figure 5 is based on a regression of the growth rate of bilateral claims on three home country indices of regulatory changes (one based on survey results, and two based on World Bank data on capital requirements and supervisory power), three host country indices of regulatory changes (one based on survey results, and two based on World Bank data on capital requirements and supervisory power) and some control variables. The chart decomposes factors contributing to the growth of the ratios of foreign claims, cross-border claims, and local claims to GDP from 2005–07 to 2011–13. "Regulations on international operations of banks" is the sum of the contributions of international operations regulatory changes in home and host countries. "General banking regulations such as capital requirements" is the sum of the contributions of the other regulation variables. The overall effect of regulatory changes on foreign banking claims is comparable to that of nonregulatory factors. Among regulatory changes, those directly targeted at the international operations of banks have a larger effect than more general banking regulatory or supervisory changes.

Contributions of Regulatory Changes to Growth in Claims-to-GDP Ratio — Figure 5



[1] The figure decomposes factors contributing to the growth of the claims-to-GDP ratio from 2005–07 to 2011–13 averaged across the observations of the regression. The factor contribution is calculated by multiplying the estimated coefficient by the average of the independent variable. Country samples vary depending on the type of claims. "Regulations on international operations of banks" is the sum of the contributions of international operations regulatory changes in home and host countries. "General banking regulations such as capital requirements" is the sum of the contributions of the other regulation variables. See Annex 2.1 of IMF (2015) for details.

Source: April 2015 Global Financial Stability Report

The set of control variables in the performance and strategy regressions could also be enhanced. It would also be useful to give more thought to the choice of countries where a bank's foreign expansion takes place as function of the location of the home country, and take diversification motives and profitability differentials explicitly into account. A recent paper by Isabel Argimón (2017) based on Spanish bank-level supervisory data might provide some inspiration for integrating some of these dimensions into the analysis.

5. Conclusion

The paper provides an interesting set of facts on multinational banking that sometimes challenge our intuition and/or the received wisdom on the benefits and modes of banks' foreign expansion. Further work is needed to give them causal interpretations, and to demonstrate their materiality by reconciling them with available cross-sectional evidence for G-SIBs.

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