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MULTINATIONAL BANKING AND FINANCIAL CONTAGION: EVIDENCE FROM FOREIGN BANK SUBSIDIARIES

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Multinational Banking and Financial Contagion:
Evidence from Foreign Bank Subsidiaries*

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Abstract

Using bank-level data on 368 foreign subsidiaries of 68 multinational banks in 47 emerging economies during 1994-2008, we present consistent evidence that internal capital markets in multinational banking contribute to the transmission of financial shocks from parent banks to foreign subsidiaries. We find that internal capital markets transmit favorable and adverse shocks by affecting subsidiaries' reliance on their own internal funds for lending. We also find that the transmission of financial shocks varies across types of shocks; is strongest among subsidiaries in Central and Eastern Europe, followed by Asia and Latin America; is global rather than regional; and became more conspicuous in recent years than before. We also explore various conditions under which the international transmission of financial shocks via internal capital markets in multinational banking is stronger, including the subsidiaries' reliance on funds from their parent bank, the subsidiaries' entry mode, and the capital account openness and banking market structure in host countries.

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1.　　Introduction

The impact of foreign banks on host economies has been widely debated as the presence of foreign banks has increased rapidly in developing and emerging economies in recent years. On the one hand, foreign banks that operate in host economies under global networks of multinational banking (subsidiaries or branches) have contributed to enhancing the efficiency, competitiveness, and stability of the banking systems in host economies (McCauley et al., 2010; Jeon et al., 2011). On the other hand, foreign banks have also been observed to act as a destabilizing force, as short-term profit seeking speculators, as home-biased international lenders, or as a source of contagion by transmitting adverse shocks from the home country to various host countries, especially when the banks' home countries experience a banking crisis (Roubini, 2010; Popov and Udell, 2010; De Haas and Van Horen, 2012; Giannetti and Laeven, 2012a, 2012b).　The recent global financial crisis provides a convincing example that foreign banks are potential vehicles for spreading financial shocks from the home countries in the U.S. and Western Europe to emerging and developing economies. However, the speed and strength of this international transmission of financial shocks through the network of foreign banks have varied from continent to continent, and have also been affected by various banking market conditions and the business strategies adopted by these foreign banks (Canales-Kriljenko et al., 2010).

Conglomerate banks or multibank holding companies have established and utilized internal capital markets for both shifting risk between the headquarters and its subsidiaries, and reallocating revenues across the latter.[1] Internal capital markets have also provided unique opportunities for multinational banks to use limited resources efficiently by optimally allocating them across the network of global subsidiaries, to thereby overcome financial market frictions and save on the costs of external finance.[2] When multinational banks rely more heavily on internal capital markets, lending decisions by subsidiaries in host countries are expected to be significantly affected by the financial strength of parent banks in home countries.[3]

In this paper, we study the role that internal capital markets in multinational banking play as a channel of transmission of financial shocks across countries. Using bank-level data for the major multinational parent banks from industrial countries and their foreign subsidiaries operating in emerging and developing countries during the period 1994-2008, we explore the empirical evidence on whether

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[1]　Bank-specific information on internal capital market activities between the parent bank and its foreign subsidiaries for a large enough group of countries is difficult to find. For a detailed description on funding and liquidity movements between a Spanish multinational banking giant, Banco Santander SA, and its foreign subsidiaries in the U.S., U.K., and Brazil, and associated banking regulators' concerns, see "For Bank in Spain, Links Aren't Plain," in the October 21, 2011, issue of the *Wall Street Journal*.

[2]　For early work on the theory of internal capital markets, see Fazzari et al. (1987), Fazzari and Peterson (1993), and Hu and Schiantarelli (1998).

[3]　Related research has been done on internal capital markets in the network of large firms. If a firm is affiliated to a conglomerate, the holding company could create an internal capital market and move resources to (and across) its affiliates. Hence, the subsidiaries' investment would be less affected by their own internally generated funds, but more by the holding company's resources (see Stein (1997), Lamont (1997), and Desai et al. (2004)). This literature has been applied to the banking industry by Gilbert (1991), Houston et al. (1997), Campello (2002), and Ashcraft (2006, 2008).

intra-bank internal capital markets contribute, through the supply of loans, to the transmission of financial shocks from parent banks in the home country to their foreign subsidiaries in the host countries. We also investigate various aspects of internal capital markets as a channel of transmission of financial shocks, including: first, whether the role of intra-bank internal capital markets varies in transmitting favorable versus adverse shocks; second, if there are any differences in this transmission channel across regions, namely, Central and Eastern Europe, Asia and Latin America; third, whether this process is global or only regional; and last, whether the strength of transmission has changed over time. We also explore various conditions under which this transmission mechanism working via internal capital markets in multinational banking becomes stronger, including subsidiaries' ability to access alternative funding sources for lending, subsidiaries' entry modes, and capital account openness and the banking market structure in host countries.

There has been ample research on identifying specific channels of transmission of financial shocks across countries through global banking. The extant research has focused mostly on international trade, finance, and macroeconomic linkages as the fundamental determinants of this transmission. However, most of this line of research has used aggregate banking sector data (see Van Rijckeghem and Weder (2001), Gersl (2007) and Cetorelli and Goldberg (2008, 2010)).

Only more recently, new research has started to use bank-level data. However, in most cases it has been done only as part of a specific country case study. For example, Peek and Rosengren (1997 and 2000) examine how the financial crisis in Japan in the early 1990s affected lending by Japanese banks in the United States; and Cetorelli and Goldberg (2011, 2012) provide evidence that global banks in the U.S. activate internal capital markets, which contributes to the international propagation of shocks to lending by affiliated banks abroad. De Haas and Lelyveld (2010) examine the determinants of the credit growth of subsidiaries located mainly in developed countries during the period 1991-2004. They suggest the *association* of subsidiaries' lending with the parent bank's characteristics and the parents' support for weak subsidiaries as evidence of the existence of internal capital markets. Using syndicated loan market data, Giannetti and Laeven (2012a, 2012b) provide evidence that during banking crisis periods, syndicated loan lending banks rebalance their loan portfolio away from international markets toward domestic markets (a phenomenon which has been labeled the "flight home effect"), and thereby transmit negative shocks from the home country to the host country.

In this paper we take a broader and bank-specific approach since we use bank-level data for 68 multinational banks from industrial countries and their 368 foreign subsidiaries operating in a total of 47 emerging and developing economies. Moreover, we focus on a related but different aspect, namely, whether foreign subsidiaries' access to their parent bank's internal funds plays any role on the degree of these subsidiaries' dependence on their own internally generated funds for lending. The contribution we offer is that this measure of foreign subsidiaries' reliance on their own internally generated funds, taking into account the effect of available funds from their parent bank for subsidiaries' lending, provides convincing evidence that intra-bank internal capital markets work to

transmit financial shocks, and that it represents more than just a simple association between the balance sheet of the parent bank and those of its subsidiaries. We do this by setting up a dynamic panel model of loan growth where we examine the impact of the parent bank's internally generated funds on their foreign subsidiaries' loan growth. We also investigate various properties of this internal capital market mechanism in multinational banking, and identify conditions under which this international transmission mechanism of financial shocks becomes stronger.

The remainder of this paper is organized as follows. Section 2 presents the model and describes the data and estimation methodology used in the paper. Section 3 reports and discusses the empirical results. Various properties of the international transmission mechanism of financial shocks through internal capital markets in multinational banking are also discussed in this section. Section 4 explores conditions under which internal capital markets play a stronger role in transmitting financial shocks from parent banks to their foreign subsidiaries. Section 5 concludes.

2.   The Model, Data and Estimation Methodology

2.1   The Model

We investigate the role of internal capital markets in multinational banking as a channel of transmission of financial shocks from the home country to the host countries. To this end, we specifically examine whether and how lending by the subsidiaries in host countries is affected by the financial strength of their parent bank in the home country and by internal capital markets actively working between the parent bank and its foreign subsidiaries.

The benchmark model for our analysis can be specified as below:

$$gr(loans)_{i,j,m,t} = c + \alpha \cdot gr(loans)_{i,j,m,t-1} + \beta \cdot subfund_{i,j,m,t} + \delta \cdot subchar_{i,j,m,t} + \phi \cdot hostmacro_{m,t}$$
$$+ \gamma \cdot parfund_{j,t} + \eta \cdot parchar_{j,t} + \lambda \cdot homemacro_{n,t} + \rho \cdot subfund_{i,j,m,t} \times parfund_{j,t} + \varepsilon_{i,j,m,t}$$

(1)

where the dependent variable, $gr(loans)_{i,j,m,t}$, represents the growth rate of loans (in real terms) of subsidiary i of the parent bank j in the host country m in year t, and $gr(loans)_{i,j,m,t-1}$ is the one-year lag of the dependent variable. $subfund_{i,j,m,t}$ is a measure of internally generated funds held by the subsidiary. $subchar_{i,j,m,t}$ is a vector of subsidiary-specific characteristics, including their liquidity, capitalization, size and riskiness. $hostmacro_{m,t}$ is a vector of host country macroeconomic variables, which includes the growth rate of real GDP, the change in the unemployment rate, and a dummy for monetary policy. $parfund_{j,t}$ is a measure of internally generated funds held by the parent bank, and $parchar_{j,t}$ is a vector of financial characteristics of the parent bank, including liquidity and capitalization.[4] Last, the variable $homemacro_{n,t}$ includes a set of macroeconomic variables in the

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[4]   For the characteristics of parent banks, we choose liquidity and capitalization, over size and riskiness, because liquid assets and capital are the financial resources that can be used by parent banks to impact their subsidiaries' lending.

home country.

In the benchmark model we include one interaction term, $subfund_{i,j,m,t} \times parfund_{j,t}$. This term allows us to study the indirect, and buffering, effect played by the parent bank's internally generated funds on the subsidiaries' dependence on their own internally generated funds for lending. The sensitivity of subsidiaries' loan growth to own internally generated funds is expected to be affected by the availability of parent banks funds via internal capital markets in the banking conglomerates, which is reflected in the interaction term between $subfund_{i,j,m,t}$ and $parfund_{j,t}$.[5] We also experimented by including alternative interaction terms, say, *subsidiary internal funds × parent liquidity*, and *subsidiary internal funds × parent capitalization*, since parent banks may also resort to their liquid assets and capital to support their subsidiaries' lending. However, these two financial resources of parent banks are not found to play a significant role in dampening the subsidiaries' reliance on their own internal funds. This suggests that parent bank's internally generated funds, such as cash flow, seems to be the first selected resource over liquid assets and capital. This makes economic sense since parent banks would incur lower costs by shifting their own earnings within the conglomerate than by using their liquid assets and capital. Therefore, in our econometric model, we include the interaction term, *subsidiary internal funds × parent internal funds*, to detect the operation of internal capital markets in banking conglomerates.

Among the estimated coefficients, the coefficient on $subfund_{i,j,m,t}$, β, indicates the sensitivity of subsidiaries' loan growth to their own internal funds, which is expected to be positive. Subsidiaries with more abundant internal funds should more easily be able to attain faster growth in their loan supply. The coefficient on $parfund_{j,t}$, γ, reflects the association between subsidiaries' lending and parent banks' internally generated funds. A positive (negative) coefficient implies that the more liquid parent banks, the faster (slower) the growth of subsidiaries lending. Accordingly, the expected sign of the coefficient, γ, is undetermined.[6]

The coefficient ρ on the interaction term, $subfund_{i,j,m,t} \times parfund_{j,t}$, is expected to have a negative sign if the subsidiaries are less sensitive to their own internal funds when the parent bank has more abundant internal funds, as they use the parent bank's funds, rather than external funds with high costs, to substitute for their own internal funds via internal capital markets. We interpret a statistically

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[5]   The differences in the sensitivity of loan growth to internally generated funds between affiliated banks and unaffiliated banks with multi-bank holding companies in the U.S. have been used in the literature as evidence of the operation of internal capital markets (see, for example, Houston et al. (1997), Houston and James (1998), and Ashcraft (2008)). This is because affiliated banks are part of an internal capital market operating at the holding company level, while unaffiliated banks are not.

[6]   De Haas and Lelyveld (2010) discuss that the sign of the coefficient depends on whether parent banks primarily allocate resources across subsidiaries in different countries to achieve profit maximization or to support weaker subsidiaries in a difficult financial situation. The former implies a "substitution effect" which leads parent banks to pick well-performing subsidiaries within the conglomerate with the goal of enhancing allocation efficiency (see for example Stein (1997)). This "substitution effect" would be captured through a positive coefficient on $parfund_{j,t}$. The latter case implies a "support effect", and can render some inefficiency of internal capital markets in multinational banking particularly during crisis periods (see, for example, Scharfstein (1998) and Scharfstein and Stein (2000)). This "support effect" would be captured by a negative coefficient. Using multibank holding companies (BHCs) data in the U.S. banking market, Campello (2002) presents evidence of inefficiency in internal capital markets, especially when BHCs are liquidity-constrained due to contractionary monetary policy shocks.

significant ρ as providing evidence for internal capital markets actively working between the parent bank and its subsidiaries overseas. We also obtain "overall effects" by computing $\beta + (\rho \times mean\ parfund)$, which estimate the sensitivity of subsidiaries' real loan growth to their own internally generated funds, with the indirect effect of available parent banks' funds for subsidiaries' lending being taken into account.

The measures for internally generated funds held by subsidiaries and the parent bank, $subfund_{i,j,m,t}$ and $parfund_{j,t}$, respectively, are constructed following the conventional method used in prior work. As done in Campello (2002), internal funds are computed as the ratio of net income at the end of year t to the beginning-of-period total loans. We also try an alternative measure adopted in Houston et al. (1997), namely the ratio of net income plus the change in loan loss reserves to total loans. The results from using either methodology are very similar. However, we prefer the Campello (2002) measure since with this alternative measure we lose many observations due to the lower availability of data on loan loss reserves.

Bank liquidity is measured by the ratio of liquid assets to total assets. The literature on the bank lending channel suggests that banks can resort to liquid assets to finance their lending, hence more liquid banks tend to increase their credit at faster rates.[7] Bank capitalization is measured by the ratio of equity to total assets, as has been the convention in prior studies.[8] As argued by the literature on the capital channel, a better capitalized bank would facilitate faster loan growth.[9] The size of an individual bank measures its dominance in the host banking sector. It is computed as the ratio of the bank's total loans to total domestic credit in the host economy. The riskiness faced by an individual bank is measured by the ratio of loan loss provisions to total loans. In order to alleviate potential endogeneity problems in our model, we use one-year lagged values of these bank-specific characteristics, along with a generalized method of moments (GMM) estimation methodology.

The macroeconomic variables in the host country, collected from the *International Financial Statistics* database, are used to control for the role of the aggregate demand faced by banks in the determination of loan growth. We use real GDP growth rates, which are expected to be positively correlated with an increase in loans, and the first-difference in the annual unemployment rate, which is expected to be negatively correlated with credit growth. Worthy of note is that while the introduction of this control for demand, along with using country-fixed effects, helps to mitigate concerns regarding the potential demand-side effects of differences in the demand for credit across host countries, it still does not allow us to fully control for this effect. For that we would need demand data at the bank level,

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[7]   The bank lending channel was pioneered by Bernanke and Blinder (1988, 1992) and further explored by Kashyap and Stein (1995, 2000), Cetorelli and Goldberg (2008), and many others. Kashyap and Stein (2000) find that more liquid banks exhibit higher lending growth than less liquid banks, and more so during periods of monetary tightening.

[8]   Although it is true that a better measure of banks' capitalization is the ratio of capital to total assets, unfortunately this measure is available for only a limited number of banks. Still, our measure is strongly correlated with the more traditional measure.

[9]   Kishan and Opiela (2000) find that bank loan growth due to changes in monetary policy depend on bank capitalization and size. Peek and Rosengren (1995) also find that capital plays an important role in determining banks' credit growth, but they do not examine bank size as another important factor.

which are unavailable to us.[10] Moreover, it should be noted that there are reasons to believe that the subsidiaries' ability to generate own funding in the host country is most likely correlated with aggregate demand in these host countries.[11] We explore this issue further in section 3.7 below.

Prior studies have illustrated the role played by banks in transmitting monetary policy shocks to bank lending, and eventually to the real economy. Therefore, we also add a variable to capture the effects of monetary policy as measured by changes in interest rates in the host economies. The criterion used to select the interest rates is as follows: we use the Treasury bill rate if available; if it is not, we use the money market rate; if both are unavailable, we use the discount rate. We then construct a dummy variable, equal to 1 (0) if the first-difference of the annual interest rate is negative (positive), which indicates an expansionary (contractionary) monetary policy adjustment. A positive coefficient on this dummy variable indicates that banks would accelerate loan growth when monetary policy is eased.

Since our interest is focused on whether and how parent banks would affect the lending of their foreign subsidiaries, we also include parent bank variables and home country macroeconomic variables among the regressors. The characteristics of parent banks include liquidity and capitalization, which are measured using the same methodology as for subsidiaries.[12] The macroeconomic variables for the home country are the same as those for the host countries.

2.2   Data

We construct an unbalanced panel dataset by using bank-level annual observations retrieved from Bureau van Dijk's *BankScope* database on balance sheet and income statements, covering 368 subsidiaries of 68 multinational banks from 25 home countries for the period 1994-2008. All selected multinational banks are universally regarded as large with average assets of at least $521 billion and average loans of at least $228 billion.[13] Only commercial bank subsidiaries are included in the dataset to reduce the possible bias arising from the various characteristics and business scopes of banks with different objectives and conducting business in different specializations. Since we are interested in subsidiaries located in emerging and developing countries, only multinational banks with subsidiary presence in those countries are selected.[14] These subsidiaries are distributed among 47 emerging

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[10]   We introduce bank-specific fixed effects in our estimation, which is expected to mitigate concerns on imperfect control for demand factors at the individual bank level.

[11]   The authors appreciate the referee's suggestion on this point.

[12]   We also use contemporaneous observations for the financial characteristics of parent banks, since the subsidiaries are all small members in the conglomerate, and hence, they take liquidity and capitalization of the entire conglomerate as exogenous. Summarizing, we do not have endogeneity concerns regarding the financial characteristics of parent banks and therefore, we do not need to use the lagged values in this case.

[13]   In our sample, 53 out of 68 multinational banks were listed among the largest 100 banks in the world in 2005 (in terms of the book value of equity capital). See *The Banker*, 2005, Vol. 155, No. 953.

[14]   For example, while Wells Fargo is without doubt a giant global financial institution, it is not included in our sample because it has no subsidiaries established in any emerging or developing country.

and developing economies, so that in our sample each parent bank has 5.4 subsidiaries on average. The list of selected multinational banks and the distribution of their subsidiaries across countries and regions are provided in Tables A1 and A2 of Appendix A.

A foreign bank is defined as a foreign subsidiary if it is incorporated in the host country and at least 50 percent of its voting stocks are owned by a foreign parent bank. The main sources of information on the ownership of individual banks for the identification of foreign subsidiaries include *BankScope* and websites of parent banks and foreign subsidiaries. We also searched through *SDC Platinum*, which records mergers and acquisitions information, and provides information on the date when a bank is absorbed into the conglomerate of the parent bank. For the complete identification of a bank's ownership, we also resort to various other sources of information, such as banks' annual reports, central banks' publications and Internet news reports on changes in the bank's ownership and affiliation. For subsidiaries we use unconsolidated data except for the cases when unconsolidated data are not available, for which we use consolidated data. In our dataset, only 6% of the observations are consolidated for subsidiaries. Conversely, for parent banks we use consolidated data to reflect the state of the conglomerate instead of that of the holding company only.[15] Since all selected subsidiaries are small units in the multinational banking conglomerate (in terms of assets), using consolidated data for the parent bank does not cause a serious endogeneity problem.

Foreign subsidiaries' average assets and loans are $2.4 billion and $1.2 billion, respectively. The ratio of a foreign subsidiary's total assets to the multinational banking conglomerate's total assets is around 0.5%-1% on average. Still, the growth rate of subsidiaries' loans of 17.8% is significantly higher than that of parent banks, 9.1%. Subsidiaries are shown to exhibit higher liquidity, capitalization and profitability ratios than parent banks (see Figure 1). Applying various threshold values adopted from related literature, we delete obvious outliers from the initial data set.[16] Data summary statistics for this study are provided in Appendix B.

2.3   Estimation Methodology

We estimate our empirical model of equation (1) using four alternative econometric methodologies. These alternative estimation methods address various econometric issues including the endogeneity caused by having the lagged dependent variable among the regressors, the fact that the subsidiaries' characteristics may be endogenous to their own loan growth, and the presence of cross-sectional fixed effects. Consistent results from all specifications allow us to conclude that our estimation results

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[15]   For the various merits and considerations on using banks' consolidate vs. non-consolidated balance sheets data for assessing system-wide funding risks and analyzing banks' role in the transmission of shocks across countries, see Fender and McGuire (2010).

[16]   To screen out obvious outliers from the raw data, we drop the following sets of observations: first, observations for which the growth rate of total assets held by subsidiaries exceeds 300%, which could be the result of mergers and acquisitions; second, observations for which the loan growth rate is higher than 400%, which could occur in the early years of the subsidiaries' lives or during a period of financial turmoil; third, cases for which the subsidiaries' riskiness is larger than 100% or the profitability is lower than -50%; fourth, banks for which the subsidiaries' ratio of internally generated funds is higher than 200% or lower than -200%; and finally, the observations for which the parent bank's ratio of internally generated funds is either higher than 100% or lower than -100%.

are robust. Bank, year, home and host country fixed effects are included in various specifications to account for cross-sectional heterogeneity. We next discuss each of these methodologies in detail.

The dynamic specification in equation (1) requires a correction for the endogeneity caused by having the lagged dependent variable among the regressors. Thus, to obtain unbiased and consistent coefficients we adopt two alternative GMM estimators: the difference GMM and the system GMM estimators. The difference GMM estimator estimates the coefficients following Arellano and Bond (1991) where only differenced equations are used, and the lagged dependent variable is instrumented by lags of the levels of the explanatory and dependent variables. The system GMM estimator follows Arellano and Bover (1995) and Blundell and Bond (1998), where both level and differenced equations are used, and the lagged dependent variable is instrumented using lagged differences for the level equation and lagged levels for the differenced equation. The two extended GMM estimators using the proper instrumental variables described above account for the endogeneity of the lagged dependent variable, as well as for other potentially endogenous explanatory variables in a dynamic panel model. We assume that subsidiaries' liquidity, capitalization and riskiness are predetermined endogenous, instead of strictly exogenous, variables, since the error term at time t may have feedback effects on the subsequent realization of those variables.

Because both difference GMM and system GMM estimators require no autocorrelation in the idiosyncratic errors, we test for first- and second-order autocorrelation in the first-differenced errors. We find that they are first-order serially correlated, but not second-order serially correlated. This supports the validity of the moment conditions used by both the difference GMM and the system GMM estimators. We also estimate equation (1) using feasible GLS (FGLS), which corrects for AR(1) autocorrelation within banks, cross-sectional heteroskedasticity across banks, and contemporaneous correlation of the disturbances.[17]

Finally, since in most cases we find that the coefficient on the lagged dependent variable is not statistically significant, we also examine a specification where we remove the lagged dependent variable from the regressors.

3.   Empirical Results

3.1   Baseline Estimation Results

We investigate whether and how internal capital markets in multinational banking affect foreign subsidiaries' lending and, thereby, transmit financial shocks from the parent bank in the home country to their foreign subsidiaries in host countries. Using the four different estimation methodologies

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[17]   The goodness of fit statistics for FGLS, difference GMM and system GMM estimators are calculated as the square of the correlation coefficients between the actual and the fitted values of the dependent variable.

discussed earlier, we estimate the subsidiaries loan growth equation (1). The estimation results are reported in Table 1.

Overall, the baseline estimations fit the data relatively well, and the estimation results are reasonable. A bank's loan growth is shown to be determined by its financial strength. Higher liquidity and capitalization tend to support a higher growth rate of bank credit, which is consistent with prior studies including Kashyap and Stein (2000), Kishan and Opiela (2000) and Gambacorta (2005). Large banks tend to increase their credit at slower rates, and less risky banks tend to increase their credit faster. Macroeconomic conditions in the host country affect subsidiaries' lending as well.[18] The coefficient on the growth rate of real GDP is positive and statistically significant in all estimations, suggesting that faster economic growth stimulates a higher demand for bank credit. The negative coefficient on the annual unemployment rate implies that the demand for credit tends to fall when the economy lacks in job creation.[19] Bank credit grows significantly faster when the central bank in the host country conducts an expansionary monetary policy.

We now examine the coefficients related to internal capital markets and the transmission of financial shocks from parent banks to their foreign subsidiaries.

First, we find that the coefficient on subsidiaries' internally generated funds is positive and statistically significant in all regressions. The abundance of subsidiaries' own internally generated funds is shown to have a significant explanatory power on their lending, which can be interpreted as providing evidence that it is more costly to finance funds for lending from external sources (such as uninsured deposits, or the issuance of equity or debt). This is consistent with the theory on financial frictions faced by banks to raise external funds (for example, see Houston et al. (1997) and Campello (2002)). When subsidiaries generate more abundant funds internally, they are able to let their loan supply grow at a faster rate. The magnitude of this coefficient is interpreted as the degree of sensitivity of subsidiaries' lending to their own internally generated funds. Thus, taking the FGLS results as an example, when the abundance of a subsidiary's internally generated funds (relative to its loans) increases by one percentage point, the growth rate of its lending increases by 0.674 percentage points.

Second, we find some evidence that subsidiaries' lending is associated with the financial strength of their parent bank. The coefficient on the internally generated funds of parent banks is positive and

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[18]   We also estimate our baseline model by excluding the macroeconomic variables of host countries or both home and host countries. We find that removing the macroeconomic controls does not affect our estimates substantially. The coefficients on our variables of interest (*subsidiaries' internal funds* and *subsidiary internal funds× parent internal funds*) are still statistically significant. We also find that the coefficient on *subsidiaries' internal funds* becomes slightly larger when the macroeconomic variables of host countries are excluded from the regressions, indicating a need for the macroeconomic control in our baseline model estimation. The estimation results without macroeconomic variables are available from the authors upon request.

[19]   We also estimated the loan growth equation by dropping unemployment due to a potential multicollinearity with real GDP growth rates. We find that there is no significant change in the results. The correlation between real GDP growth rates and unemployment rates is not large: the correlation coefficient is -0.358 for host countries and -0.256 for home countries on average.

statistically significant in all estimations. This suggests that foreign subsidiaries increase their loans more aggressively when their parent bank enjoys more abundant cash flow. However, we find only very weak evidence for the role played by the liquidity of parent banks, and no evidence on the importance of capitalization of parent banks in affecting subsidiaries' loan growth.[20] This is consistent with the findings by De Haas and Lelyveld (2010). In addition, the coefficients on the parent's internally generated funds are significantly larger than those on subsidiaries' internal funds, suggesting that loan growth at subsidiaries is more sensitive to the parent bank's than to the subsidiaries' cash flow (see Houston et al. (1997) for similar findings in the U.S. case).[21]

Third, the coefficient on the interaction term, *subsidiary internal funds× parent internal funds,* is negative and statistically significant in all estimations. This indicates that, for loan provision, subsidiaries depend less on their own internally generated funds when their parent bank enjoys an abundant cash flow. This provides significant evidence for the existence and operation of internal capital markets within multinational conglomerate banks. When parent banks are able to allocate their funds to finance the lending of subsidiaries, subsidiaries are shown to be less dependent on their own internally generated funds. An alternative potential interpretation is that the capital market frictions faced by subsidiaries are alleviated by parent banks' establishing internal capital markets.

This dampening effect of parent banks' funds on subsidiaries' dependence on their own funds for lending is also *economically* significant. Here, we calculate the overall effect of subsidiaries' own internal funds on their lending, taking into account the buffering effect of parent banks' internal funds on the subsidiaries' reliance on their own funds. The overall effect is reported in Table 1. Taking the estimation of FGLS as an example, a one percentage point increase in the net income of a parent bank relative to its total loans tends to reduce the overall sensitivity of its subsidiaries to their own cash flow by 0.368 (= 0.208 x 1.77, using the mean value of the parent bank's internally generated funds ratio of 1.77) percentage points from 0.674 percentage points to 0.306 percentage points. This result suggests that the frictions faced by subsidiaries in raising external funds are substantially compensated by the support from their parent banks. Our results are in line with the findings of other work on bank holding companies and their subsidiaries (see, for instance, Houston et al. (1997) and Ashcraft (2008) for the case of the U.S.). We only interact subsidiaries' own cash flow with parent

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[20]   De Haas and Lelyveld (2010) report the *negative* association of subsidiaries' loan growth to their own and parents' liquidity (total liquid assets to total assets) and own solvency (total equity to total assets) in a sample of 46 host countries (mainly industrial countries) during the period 1992-2004. They interpret these seemingly counter-intuitive findings that solvent and liquid banks are more risk averse and grow more slowly (see also Derviz and Podpiera (2007) who provide empirical evidence that high parent's loan-loss-reserves to total loans slow loan growth of its foreign subsidiaries). This is because they invest mainly in own liquid assets, and parent banks use resources more to support weak subsidiaries for the stability of the whole group rather than to support more profitable subsidiaries in order to maximize profit of the entire conglomerate.

[21]   Since in our model the *internally generated funds of parent banks* interact with *subsidiaries' internally generated funds*, the stand-alone term of *internally generated funds of parent banks* is interpreted as *other* "effects" from parent banks on their subsidiaries. For example, the headquarter of a global banking conglomerate may own more advanced screening and monitoring technology which contributes to higher earnings in the parent bank, and this technology can be "exported" to the subsidiaries, which might result in higher credit expansion. Hence, we would observe a "co-movement" of the subsidiaries' lending with the earnings of parent banks, which is captured by the stand-alone term of *internally generated funds of parent banks*.

banks' cash flow since the parent banks' liquidity and capitalization are not found to play a significant role in affecting subsidiaries' lending.[22]

The results of our benchmark regression suggest that internal capital markets within global banking conglomerates could be a double-edged sword. Internal capital markets could enable the headquarters of multinational banks in the home country to provide more financial support to their foreign subsidiaries in host countries, thus making the subsidiaries not necessarily curtail their lending when their own internally generated funds are inadequate. In this case, internal capital markets would work to stabilize credit in host banking markets. However, internal capital markets could also be a channel of transmission of adverse financial shocks or crises from the home country to the host countries. Suppose the parent bank in the home country is hit by a negative shock, then, its foreign subsidiaries' loan growth is expected to be slower due to the reduced availability of the parent bank's fund via internal capital markets. As the financial strength of the parent bank to support its foreign subsidiaries is decreased, the subsidiaries would have to rely more on their own internal funds. If their own internal funds are already standing at a low level, foreign subsidiaries would be forced to cut their loan supply.

Considering the fact that the subsidiaries banks in our sample are all located in emerging and developing economies and that the parent banks are headquartered mainly in industrialized countries, our results suggest the possibility that the banking sector of an emerging market with a dominant foreign presence would be exposed to the spillover effects of a credit crunch originated from developed countries.[23] Internal capital markets in multinational banking are shown to play an important role in spreading financial shocks, favorable as well as adverse, across countries.

To better understand the role of internal capital markets in multinational banking as a channel of the international transmission of financial shocks, we conduct various empirical exercises. These exercises are aimed at answering the following questions: (1) Are the pattern and extent of the shock transmission via internal capital markets in multinational banking different by type of shock, favorable or adverse? (2) Are there any differences in the role played by internal capital markets across different regions, namely Central and Eastern Europe, Asia and Latin America? (3) Is contagion via internal capital markets in multinational banking sensitive to distance? i.e., do internal capital markets

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[22]   When we include additional interaction terms of subsidiary liquidity x parent bank liquidity and subsidiary capitalization x parent bank capitalization in the estimation, the coefficients on these two interaction terms are found statistically not significant, and our main results from using the interaction term, *subsidiary internal funds × parent internal funds,* do not change.

[23]   This is evidenced by a recent case of Banco Santander SA (see footnote 1). De Haas and Naaborg (2006) also document some real cases of multinational banks transferring funds reversely from their subsidiaries in emerging markets to the headquarters of parent banks located mainly in developed countries. They report that German banks shipped subsidiaries' earnings to headquarters through an extraordinarily high dividend distribution when the German economy was slowing down. The extraction of subsidiaries' income would force subsidiaries to contract their lending activity correspondingly. Hryckiewicz and Kowalewski (2010) test the relationship between the decision of multinational banks to close their subsidiaries overseas and the performance of both subsidiaries and parent banks before the closure. They find that although closure decisions are made when profitability is low for parent banks and their subsidiaries, the low profitability of parent banks is a more important driver of closure decisions.

contribute to contagion at the global level or only at the regional level? and (4) Has the role of internal capital markets as a contagion channel changed over time? We examine each of these issues next.

3.2   Transmission of Favorable Shocks vs. Adverse Shocks

In this section, we test whether the effects of internal capital markets on subsidiaries' reliance on their own internal funds for lending vary depending on types of shock imposed on their parent banks. That is, we expect that when parent banks enjoy a larger (smaller) cash flow, their support for subsidiaries is expected to increase (decrease), thus decreasing (increasing) the sensitivity of subsidiaries to their own internally generated funds for lending. In the case that parent banks are hit by an adverse shock of income loss, their support for subsidiaries might be substantially drained, forcing subsidiaries to be more dependent on their own internal funds.

We divide our sample into three groups based on parent banks' abundance of internal funds: "negative income periods" when parent banks suffer loss in their net income; "low income periods" when net income is positive but below the lowest quartile of the distribution of the parent banks' net income rate; and "positive income periods" for the rest of the observations for the 2nd - 4th quartiles of the distribution of the net income ratio.[24] We report the estimation results in Table 2. To save space, we only report the coefficients on the most relevant variables. We also calculate the overall effect of subsidiaries' internal funds on their lending, taking into account the effects of parent banks' support for subsidiaries' financing for lending, which is measured by $\beta + \rho$ *x mean (parfund)* (see Panel B of Table 2).[25]

The results lend support to the hypothesis that internal capital markets play a role as a channel of the international transmission of both favorable and adverse shocks in multinational banking. As the regression results show, the coefficient on subsidiaries' own internal funds is positive and statistically significant in almost all estimations. The coefficient on the interaction term, *subsidiary internal funds × parent internal funds,* is negative with statistical significance in most cases of both "positive income" and "low income" scenarios, as reported in Panels A and B of Table 2. During "positive income" periods, the "overall effect" is the smallest, compared to other periods, suggesting that the subsidiaries' lending sensitivity to their own internal funds is substantially weakened due to the financial support from their parent banks during periods when the parent banks enjoy positive net income. This indicates a positive role played by parent banks in enhancing the stability of their foreign subsidiaries, and hence of the banking sector in host countries.

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[24]   Alternatively, we experiment by separating samples into two groups according to whether parent banks' internally generated funds are rising vs. falling. Although not reported here, the results are qualitatively consistent. When parent banks' internal funds are rising, implying an increase in parent banks' ability to support their affiliates, the coefficient on the interaction term, *subsidiary internal funds × parent internal funds*, is negative and statistically significant in all estimations. However, when parent banks' support to subsidiaries is weakened, indicated by a fall of parent banks' internal funds, the coefficient on the interaction term remains negative but loses its statistical significance. Subsidiaries' overall sensitivity to their own internal funds, controlled for the dampening effect from parent banks' funds, is significantly higher in the latter scenario. These results are available upon request.

Although internal capital markets still play a role during "low income" periods (the coefficient on the interaction term, *subsidiary internal funds × parent internal funds*, remains statistically significant in all cases), its effects to alleviate subsidiaries' reliance on their own internal funds becomes drastically weaker, as reflected by higher values of the "overall effect" than during "positive income" periods. This result implies that when the parent bank experiences an unfavorable shock, resulting in lower net income and thus limited strength to support their subsidiaries, foreign subsidiaries will be forced to rely more on their own internal funds. If the subsidiaries' internal funds are also inadequate, they would then have to downsize their lending.

When parent banks incur a loss in their net income during "negative income" periods,[26] however, the coefficient on the interaction term, *subsidiary internal funds × parent internal funds*, loses statistical significance (see Panel C of Table 2). This empirical result is consistent with the proposition that parent banks which suffer income losses are not able to support their foreign affiliates' loss in net income using internal capital markets. Measured by the "overall effect," we find that the reliance of subsidiaries' lending on their own funds is forced to rise even more than during "low income" periods. This implies that parent banks which suffer from income losses actually drain funds from subsidiaries' internally generated funds. This channel helps the transmission of adverse shocks from parent banks to their subsidiaries overseas, inflicting a greater burden on subsidiaries' financing for lending. This indicates a negative role played by parent banks on the stability of foreign subsidiaries and the banking sector in the host country during "negative income" periods.

3.3   Transmission of Financial Shocks during Crisis Periods vs. Tranquil Periods

In this section, we examine whether the effects of internal capital markets on subsidiaries' lending are different between crisis periods and non-crisis periods for the banking sector in the home economies of parent banks. We divide our sample into two groups: for the years when home countries experience a systemic banking crisis vs. for the tranquil, non-crisis years. We include the year 2007 and 2008 in the banking crisis periods, and the years when home countries suffer from systemic banking crises. We identify specific countries and years of banking crises following Laeven and Valencia (2008), Demirguc-Kunt and Detragiache (2005), and Caprio and Klingebiel (2003).[27]

The estimation results are reported in Table 3. We find that the coefficient on subsidiaries' own internal funds is statistically significant in most of the regressions. For the non-crisis, tranquil years, the coefficient on the interaction term remains negative and statistically significant, suggesting that more abundant parent banks' funds would dampen the dependence of subsidiaries on their own internal funds for lending (see Panel A, Table 3). However, as shown in Panel B of Table 3, when

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[25]   We also obtain the overall effects using statistically significant coefficients only. We find it does not significantly change our main results.

[26]   "Negative income periods" for parent banks are observed in 15 multinational banks of 6 countries in 9 years.

[27]   The counties and years of banking crisis prior to 2007 for our data are identified as: Japan 1994-2006, Brazil 1994-99, France 1994-95, and Italy 1994-95.

home countries are hit by systemic banking crises, causing much smaller funds generated by parent banks in home countries, the coefficient on the interaction term is small and negative, turns to be even positive in one of four regressions, and remain statistically insignificant in all regressions.

These findings provide evidence that internal capital markets in multinational banking play a different role during tranquil periods vs. crisis periods. Parent banks seem to use internal capital markets to support lending activity by their foreign subsidiaries during tranquil periods, whereas during crisis periods parent banks curtail a role of supporting for subsidiaries' lending by retrenching their funds transfer to the subsidiaries, or even reverse the role by retrieving funds from their subsidiaries abroad. A systemic banking crisis in the home economy could cause a decrease in parent banks' net income and thus the availability of their cash flows to support subsidiaries abroad. The reduced support for funds from parent banks will enforce the subsidiaries to rely more on their own internal funds. In terms of the overall effects of subsidiaries' own internal funds on lending, they are significantly higher in the crisis years than in tranquil, non-crisis years.

3.4   The Effect of Internal Capital Markets Across Regions

In this section we study whether the transmission of financial shocks via internal capital markets in multinational banking varies across regions. In order to do so, we split foreign subsidiaries into three location subsamples: Central and Eastern Europe, Asia, and Latin America. We report the estimation results in Table 4.

These results provide evidence that the strength of this transmission is heterogeneous across regions. We find that all but one of the coefficients on the interaction term are negative and statistically significant, and that they are significantly different across regions, being the largest in Central and Eastern Europe, and the lowest in Latin America. Taking the FGLS estimates as an example, a one percentage point decrease in parent banks' funds would cause their emerging European subsidiaries' dependence on own funds to increase by 0.746 percentage points. In comparison, the subsidiaries in Latin America would be impacted less, since their sensitivity to own funds for lending would only increase by 0.127 percentage points. This empirical finding implies that the transmission of financial shocks via internal capital markets in multinational banking is strongest among subsidiaries in Central and Eastern Europe, followed by Asia and Latin America.[28]

Our finding is consistent with the fact documented by Kamil and Rai (2010) that the contagion of the recent global financial crunch is relatively muted in Latin America in comparison to emerging Europe and Asia.[29] They attribute the differences in the extent of contagion across the three regions to the

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[28]   Our finding is consistent with an argument that internal capital markets will tend to be the most effective financial arrangement when external markets are relatively underdeveloped and therefore credit constraints are very binding, as this is more so in Eastern Europe than Asia or Latin America (see Stein (1997), p. 129).

[29]   Kamil and Rai (2010) also show that the growth rate of lending by foreign banks, *prior to the recent global financial crisis,* was the highest in emerging Europe, followed by Asia and Latin America. Foreign banks in emerging Europe may rely more on parent banks' funds to support their high credit expansion, compared to banks in Asia and Latin America.

fact that foreign banks in Latin America are funded primarily through domestic deposits, while those in emerging Central and Eastern Europe depend heavily on their parent banks located mostly in Western Europe.

3.5   Global Contagion or Regional Contagion?

The above results on the heterogeneous effects of internal capital markets across regions might be induced by the fact that multinational banks prefer establishing their presence in nearby countries. Hence, it is likely that the linkage between parent banks and their foreign subsidiaries is a function of the distance between them. If so, distant subsidiaries would be relatively less affected by the shocks imposed on their parent bank, which would limit the international transmission of financial shocks via internal capital markets to be only a regional phenomenon. We test whether the effects of internal capital markets in multinational banking on subsidiaries' lending are heterogeneous among foreign subsidiaries located at various distances from their headquarters in the home country.

We divide the sample according to whether the subsidiary is placed in the same region (continent) as the headquarters of the parent bank. A subsidiary located in a different region from (same region as) the headquarters of its parent bank is regarded as a "distant" ("near") affiliate. The regions are categorized as: Europe, Asia, North and Latin America, and other regions. We report the estimation results in Table 5.

The results show that the impact of internal capital markets on the sensitivity of subsidiaries' lending to their own cash flow is independent of the distance between subsidiaries and the headquarters of its parent bank.[30] The coefficient on the interaction term, *subsidiary internal funds× parent internal funds,* is negative and statistically significant in most regressions of the two subsamples of distant affiliates and near affiliates. In addition, the magnitudes of this coefficient in these two groups are very close, which implies that the transmission of financial shocks through internal capital markets in multinational banking seems to be a global phenomenon, rather than just a regional one.

This finding sheds some light on the transmission of recent financial crises from developed countries to emerging and developing markets. As multinational banks experience a decrease in their cash flow, they reduce the financial support to their subsidiaries globally. This will cause subsidiaries to be more constrained by their own cash flows and potentially, a credit crunch in close and distant host markets alike.

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[30]   Cetorelli and Goldberg (2011) report that, during the 2007-9 global financial crisis, internal lending and borrowing between parent banks in the U.S. and their foreign subsidiaries were affected by various measures of physical and non-physical distance between the two.

3.6   The Changing Effect of Internal Capital Markets over Time

Foreign bank penetration in emerging economies started in the 1980s but only surged in the recent decade, likely reflecting the increasing importance of emerging markets in the business of multinational banks.[31] Therefore, in this section we are interested in testing whether the role of internal capital markets in multinational banking has changed over time.

We split the sample into two groups: before and after 2001.[32] Year 2001 is selected as the split point not only because it is in the middle of our period of study (1994-2008), but also because it witnessed the peak of foreign bank entry in emerging economies (see McCauley et al. (2010), Jeon et al. (2011), and Wu et al. (2011)). We report the estimation results in Table 6.

We find that the impact of internal capital markets varies over the years. The coefficient on the interaction term, *subsidiary internal funds× parent internal funds,* although negative in both periods, is statistically significant in more cases in the period after 2001. As a result, after taking into account the effect of internal funds from parent banks, in most estimations the subsidiaries' overall sensitivity to their own internal funds is significantly lower in the years after 2001 than before 2001. This evidence reflects the growing use of internal capital markets in multinational banking in recent years, which strengthens the linkage between multinational banks and their affiliates in emerging markets. Subsidiaries in emerging and developing economies are more significantly affected by the availability of funds from parent banks during the recent period of increased foreign bank penetration in these economies.

3.7   A Robustness Check

In this section we explore the potential bias to our results generated by the fact that the subsidiaries' ability to generate their own funds in the host countries may be correlated with our demand-side control as measured by macroeconomic variables in the host country.

To address this issue, we first calculate the pairwise correlation coefficients between subsidiaries' internal funds and host country macro variables. We find that internal funds are statistically significantly correlated only with the real GDP growth rate and that the coefficient is very small (0.064, see Part A of Table 7).

We also extend our benchmark empirical model of equation (1) to include additional interaction terms between subsidiaries' internally generated funds variable and the demand-side indicators in the host

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[31]   Havrylchyk and Jurzyk (2006) document that the profit ratio of foreign banks in Central and Eastern European countries exceeds that of their parent banks. In our sample, the profitability (profit/total earning assets) is 1.1% for parent banks, and 1.4% for their foreign subsidiaries. For a more detailed survey on the evolution of entry of multinational banks in host emerging and developing countries (see Claessens et al. (2008)).

[32]   We also try alternative cut-offs (year 2000 and 2002) in our sample, and the results are qualitatively consistent.

country—first, real GDP growth rates only and second, all three macroeconomic indicators including unemployment rate changes and monetary policy. The estimation results are reported in Parts B and C in Table 7. The coefficient on the interaction term between s*ubsidiary internal funds* and *parent internal funds,* which is the variable we use to measure the strength of internal capital markets, remains negative and highly significant in all regressions. However, the value of the coefficient of the interaction term obtained using above additional interaction terms is slightly smaller than the coefficient obtained in our benchmark specification (see Tables 1 and 7). This suggests that the small correlation between subsidiaries' internally generated funds and macroeconomic variables in the host country seems to induce us to very slightly overestimate the effects of internal capital markets. However, it does not affect our qualitative conclusion.

4. Search for Conditions for Stronger Transmission of Financial Shocks

The strength of internal capital markets in affecting the subsidiaries' sensitivity to their own cash flow may vary depending on various factors such as the degree of subsidiaries' reliance on financial support from the parent bank, mode of entry to host markets, and the degrees of financial openness and banking market concentration in the host countries. We examine each of these factors as potential conditions for the international transmission of financial shocks via internal capital markets in multinational banking.

4.1 The Loan-to-Deposit Ratio: Subsidiaries' Need to Rely on Parents' Funds

It has been argued in the literature that the deposit-to-asset ratio of subsidiary banks is one of the reliable indicators of the strength of internal capital markets within conglomerates.[33] In this section we examine this issue. We test how internal capital markets may exert a different force among subsidiaries depending on their degree of reliance on funds from parent banks for lending as measured by the ratio of a subsidiary's loans to its deposits. When there are financial frictions and limited access to alternative sources of financing, which is particularly true in emerging and developing economies, subsidiaries are unable to sufficiently finance their lending with their own liabilities, they seek financial support from their parent bank. Therefore, it is expected that the higher the loan-to-deposit ratio and the stronger their liquidity constraints, the more subsidiaries would seek the parent bank's funds, and the more pronounced the effects of internal capital markets would be.

We divide our sample between banks with a low and high loan-to-deposit ratio, with a threshold of 0.9, which is the highest quartile of the distribution of this ratio.[34] We report the estimation results in Table 8. The coefficient on the interaction term, *subsidiary internal funds× parent internal funds,* is negative

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[33]   For example, Havrylchyk and Jurzyk (2006) suggest that the high average deposit-to-asset ratio of 79 percent for a
         subsidiary bank is an indicator of only minimal operation of internal capital markets within the bank conglomerate.

[34]   As a robustness check, we also tried using the 50th percentile of the distribution of the loan-to-deposit ratio, and the
         results are qualitatively the same.

and statistically significant in almost all estimations for both groups. This suggests that internal capital markets operate in both subsamples. Meanwhile, the coefficient on the interaction term is significantly higher among the subsidiaries with high loan-to-deposit ratios, which are more likely to be reliant on parent banks' funds. This finding implies that intra-bank internal capital markets exert a more pronounced effect on those subsidiaries.[35] The implication of this finding is twofold.

First, it is in line with the hypothesis that in the presence of financial frictions, the parent bank allocates financial resources among its subsidiaries according to their demand, which is indicated by different levels of the loan-to-deposit ratio.[36] Parent banks seem to allocate more resources to the subsidiaries facing higher liquidity constraints. Second, those less independent subsidiaries will be more affected by the transmission of financial shocks via internal capital markets. When parent banks have a hard time to lend financial support, the subsidiaries with higher reliance on parent banks would find it difficult to promptly and effectively resort to alternative sources to finance their credit, being potentially forced to cut down their lending.

A policy lesson for financial regulators in host countries is that they should be more cautious in the supervision of those foreign bank subsidiaries with a relatively higher loan-to-deposit ratio. They seem to be more vulnerable to the international transmission of external shocks via internal capital markets in multinational banking.

4.2   Subsidiaries' Entry Mode

Global banks enter foreign markets adopting different modes of entry. We conjecture that the entry mode of foreign subsidiaries matters for the degree of the international transmission of financial shocks since the entry mode might reflect the extent through which foreign subsidiaries are integrated within the global conglomerate. The closer this integration, the easier it might be for the subsidiary to receive support from the parent bank via internal capital markets. We derive this conjecture from both theoretical implications and empirical findings in previous studies that we discuss briefly below.

First, the literature has argued that since M&A banks typically acquire troubled domestic institutions, they might find it harder to improve credit standards or risk management procedures, but that they have better access to the incumbent borrowers' information. Greenfield banks are initially healthier, but they are at a disadvantage in terms of getting access to borrowers' information. It has also been

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[35]   Although the effect of internal capital markets is more pronounced for subsidiaries more reliant on parent banks' funds, it is not sufficient to offset their dependence on their own internal funds. That is, these banks' overall sensitivity to own internal funds is still higher than banks less reliant on parent funds.

[36]   Several papers argue that this may cause an inefficient outcome (for example, see Scharfstein and Stein (2000) and Campello (2002)).

argued that funds are more easily moved to/from greenfield institutions than to/from M&A banks that have large deposit networks and are thus more independent from parent banks in their financing.[37]

Second, typically greenfield subsidiaries are more closely integrated within the conglomerate, and have better access to their internal capital markets and management resources (see De Haas and Lelyveld (2006) and Havrylchyk and Jurzyk (2006)). In contrast, M&A banks take the existing personnel and portfolio of the incumbent institutions and therefore, are typically less integrated within the conglomerate. Furthermore, M&A banks seem to have better and faster access to the local deposits of the acquired bank, which might enable them to depend less on the multinational group's internal capital markets (see Curry, Fung and Harper (2003)).

Third, the theoretical literature on international M&As emphasizes that FDI through greenfield investments and through cross-border acquisitions are not "perfect substitutes" as entry modes (see Blonigen (1997, 2005), Mattoo et al. (2004) and Nocke and Yeaple (2006, 2008)). This theory shows that systematic differences in affiliate performance can emerge between entry modes due to synergies and market power effects from acquisitions (Bertrand et al., 2007).[38] The implications from this theory are supported by the empirical results reported in Majnoni et al. (2003), Martínez-Peria and Mody (2004), Havrylchyk (2006), Havrylchyk and Jurzyk (2006), Vo Thi and Vencappa (2008) and Degryse et al. (2009) who show that greenfields tend to outperform M&As.

Fourth, there is also evidence that greenfield banks tend to extend more loans in foreign currency, which might reflect that they lend more to multinational corporations and exporting firms and/or their better access to foreign currency funding in international capital markets either directly or via their parent companies (see Degryse et al. (2009)). It has also been shown that greenfield banks tend to extend loans at shorter maturities than their counterparts, which might reflect a more short-term commitment to host economies (Degryse et al., 2009). Therefore, it could be argued that this reduced commitment can increase the reliance of these subsidiaries' on funds from internal capital markets.

Last, Lehner (2009) identifies a tendency towards acquisition entry in small, less developed economies and towards greenfield entry in larger, developed host countries. Thus, if the transmission of financial shocks between parent banks and subsidiaries is stronger when the latter are located in larger host countries, the difference in results across entry modes can be capturing the different trend in entry modes across small and large economies.

Summarizing, if greenfield and M&A subsidiaries differ in the extent through which they are integrated with their headquarters, then the role of internal capital markets in the transmission of financial shocks

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[37]   Also, communication of soft information on borrowers' creditworthiness from subsidiaries in host countries to parent banks in home countries can be interfered by the hierarchy and by cultural and linguistic barriers (Stein, 2002; Berger et al., 2005).

[38]   Claeys & Hainz (2006a, 2006b) provide a model that outlines how the distribution of information between foreign and domestic banks may differ depending on the mode of entry, and show that market competition is stronger when market entry occurs through greenfield investments, which also leads domestic banks to cut their interest rates.

might differ across these two groups. In this section, we study whether internal capital markets work differently among de novo greenfield and M&A subsidiaries in affecting the subsidiaries' loan reliance on their own funds. Using *SDC Platinum*, banks' annual reports and Internet news reports, we identify the mode of entry to host markets by each of the foreign subsidiaries of multinational banks in our sample. We report the estimation results in Table 9.

We find strong evidence that de novo subsidiaries are more closely integrated with their parent banks via internal capital markets than M&A subsidiaries. The coefficient on the interaction term is large and statistically significant in all regressions for de novo subsidiaries. In contrast, this coefficient is small and only marginally significant in the regressions for M&A subsidiaries. Our finding, which is consistent with De Haas and Lelyveld (2010), implies that de novo subsidiaries might receive more financial support from their parent banks, and thus might be less dependent on their own internally generated funds. This suggests that de novo subsidiaries are more likely to be exposed to the transmission of financial shocks than M&A subsidiaries.

4.3   Financial Openness in Host Countries

 Parent banks can ship funds to their subsidiaries overseas in exchange for either new shares or debt titles (De Haas and Naaborg, 2006). However, capital flows from the home country to the host country are often subject to the capital control measures imposed by the monetary authority or government in the host country. This is particularly true for developing and emerging economies. If the host country adopts tight capital account controls, it becomes more difficult for parent banks to transfer funds to their subsidiaries overseas. Then the abundance of funds in parent banks would play a limited role in buffering the reliance of subsidiaries' lending on their own funds.

On the contrary, in host countries where the extent of capital account openness is high, capital can move more easily from parent banks to their foreign subsidiaries, thus inducing an increased importance of internal capital markets in multinational banking. Therefore, we expect that the effects of internal capital markets should be more (less) pronounced for subsidiaries located in countries that are more (less) financially open.

We use the Chinn-Ito index to measure the extent of capital account openness. A higher index value represents higher openness in the capital account.[39] We divide our sample in two subsamples comprising those banks for which the value of the Chinn-Ito index in the host country is below and above 1.70, which is the highest quartile of its distribution. We report the estimation results in Table 10.

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[39]   As an increasingly popular index used in the literature to measure capital account openness, the Chinn-Ito index has the advantage of measuring the *intensity* of capital controls. More details about this index can be found in Chinn and Ito (2008).

The results show that the coefficients on the interaction term are negative and statistically significant in all regressions. This implies that the internal capital markets' attenuating effect on the subsidiaries' reliance on their own internal funds operates regardless of the level of financial openness in the host countries. However, the coefficient is significantly higher in the host countries with higher capital account openness. This finding suggests that a higher financial openness facilitates intra-bank cross-border capital flows, and more effectively lowers the dependence of subsidiaries on their own cash flow for lending. This makes subsidiaries' lending in those countries more deeply associated with their parent banks' funds.

In host countries where more constraints are imposed on the capital account, subsidiaries cannot fully utilize the advantages of abundant funds available from their parent bank. This reduces the importance of internal capital markets for these subsidiaries. However, although the effect of internal capital markets is more pronounced in host countries where capital account openness is high, the overall sensitivity of lending by subsidiaries located in these countries to their own internal funds is still higher than their peers located in countries where capital account openness is low. The reason might be that higher openness to external capital also induces banks to provide credit more aggressively.

4.4   Banking Concentration in the Host Countries

In this section we argue that the transmission of financial shocks through internal capital markets in multinational banking may depend on the degree of banking concentration in host emerging countries. The intuition is that after entering a host market with a lower concentration level, foreign banks may face more intense competition. Therefore, they may resort to parent banks' support via internal capital markets more aggressively and frequently. Hryckiewicz and Kowalewski (2010) document closures of foreign subsidiaries by multinational banks during the period 1997-2009. In emerging economies the highest number of bank closures is 11 cases in Argentina, 8 cases in Brazil, and 7 cases in Indonesia. It may not be just coincidental that the banking concentration ratios in all these countries are within the first quartile of the distribution of the banking concentration measure in our sample, implying a competitive banking sector.

In this section we test the above hypothesis by observing how the impact of internal capital markets on the international transmission of financial shocks depends on the level of market concentration in the banking sector of the host country. We use the 3-firm concentration ratio (CR3, defined as the share of total assets held by the largest 3 banks), as the measure of concentration. A higher concentration level tends to indicate less competitive pressure in the industry. We divide our sample into two subsamples comprising those banks in markets with a concentration level below vs. above 0.41, which is the first quartile of the distribution of the concentration measure (i.e. the subsample that

is likely to include the most competitive banking markets).[40] We report the estimation results in Table 11.

We find evidence in line with our hypothesis. In both subsamples we find evidence for the operation of internal capital markets since the abundance of parent banks' cash flow offsets the sensitivity of subsidiaries' lending to their own cash flow. However, in highly competitive banking sectors for which the 3-firm concentration ratio (CR3) is below 0.41, the coefficients on the interaction term are larger and more statistically significant in all regressions (Panel A), than the coefficients for less competitive and more concentrated host markets (Panel B). This result implies that cash flow-constrained foreign subsidiaries seem to seek support from parent banks more actively when they face stronger competitive pressure for survival in their host markets.

5.   Conclusion

Foreign subsidiaries of multinational banks often establish and use internal capital markets within the conglomerate to overcome the financial market frictions and informational asymmetries that they face in raising their own funds in host countries. Using internal capital markets, multinational banks are able to both shift risk and re-allocate revenues between the parent bank and its foreign subsidiaries or among the global network of branches and subsidiaries. Since the presence of foreign banks in emerging and developing economies has increased rapidly in recent years, and since the banking industry has become more global, the importance of internal capital markets in multinational banking has grown, especially, in transmitting financial shocks within financial conglomerates, across global banks, and across countries.

Using bank-level data from 1994 to 2008 on 368 subsidiaries of 68 multinational banks located in 47 emerging and developing countries, we present consistent evidence that intra-bank internal capital markets contribute to the transmission of financial shocks from parent banks in the home country to their foreign subsidiaries in host emerging countries. We find that internal capital markets transmit both favorable and adverse shocks by affecting subsidiaries' reliance on their own internal funds. We also find that this international transmission mechanism of financial shocks is varying in strength during tranquil periods vs. crisis periods; is strongest among subsidiaries in Central and Eastern Europe, followed by Asia and Latin America; global rather than only regional; and more conspicuous in recent years than before 2001.

We also explore various conditions under which the international transmission of financial shocks via internal capital markets in multinational banking becomes stronger. It does so as subsidiaries rely more heavily on their parent bank's funds than on domestic deposits, as they enter host banking

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[40]   Since concentration is inversely related to the intensity of competition, the division at the bottom 25th percentile of the distribution of concentration is consistent with a division by the top 25th percentile of the distribution of banking competition. We also tried alternative cut-off criteria: the 50th percentile and 75th percentile of the concentration level. The results are qualitatively similar. The evidence on the effects of internal capital markets is less statistically significant in less competitive markets, but remains highly significant in more competitive markets.

markets via a greenfield rather than M&A entry mode, as the host countries are more financially open, and as subsidiaries operate in less concentrated and more competitive host banking markets.

Our main findings have useful policy implications. Bank regulators in emerging economies need to take into account the environment and conditions that we identify in this paper under which the international transmission of financial shocks via internal capital markets imperils the stability and efficiency of domestic banking markets. The instability is caused by transmitting adverse financial shocks from abroad. Specifically, regulators should pay special attention to foreign bank subsidiaries with higher loans-to-deposits ratios, to greenfield or de novo established subsidiaries, and to those operating in more financially open or in less concentrated host banking markets. This is particularly important during the recent global financial and banking crisis, during which many multinational banks headquartered in industrial countries are facing severe income and liquidity constraints.

We also expect internal capital markets in multinational banking to play a role in transmitting business cycles across countries in the long run (see, for example, Olivero (2010)). The study of the long-run implications of multinational banking for the international transmission of financial shocks and business cycle comovement is left for future research.

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Table 1. The Impact of Internal Capital Markets in Multinational Banking on Foreign Bank Subsidiaries' Loan Growth

Dependent variable: *Growth rate of real loans*				
	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Foreign subsidiary variables				
Growth rate of loans (lagged)	.011	-.047	-.031	
	(0.566)	(0.197)	(0.466)	
Internally generated funds	.674***	.731***	.539*	.750***
	(0.000)	(0.004)	(0.056)	(0.001)
Liquidity	.076	1.385***	.748***	.792***
	(0.120)	(0.000)	(0.000)	(0.000)
Capitalization	.142	2.465***	1.101***	1.598***
	(0.244)	(0.000)	(0.002)	(0.000)
Size	-.725***	-6.476***	-.747*	-4.334***
	(0.000)	(0.000)	(0.0569)	(0.000)
Riskiness	-.537***	-.839***	-1.282***	-.702**
	(0.007)	(0.009)	(0.000)	(0.018)
Host country macroeconomic variables				
Growth rate of real GDP	.885***	.668*	1.115**	.934***
	(0.000)	(0.085)	(0.040)	(0.007)
Δunemployment rate	-.719	-2.326***	-2.466**	-1.447
	(0.130)	(0.008)	(0.011)	(0.103)
Monetary policy	3.615***	3.028	4.296	4.140
	(0.005)	(0.227)	(0.109)	(0.115)
Parent bank variables				
Internally generated funds	2.662***	2.283**	2.543**	2.101*
	(0.000)	(0.022)	(0.024)	(0.058)
Liquidity	-.451***	-.410	-.483	-.475
	(0.000)	(0.263)	(0.171)	(0.124)
Capitalization	-1.169	-1.425	.114	-2.627
	(0.135)	(0.576)	(0.966)	(0.196)
Interaction term				
Subsidiary internal funds× parent	-.208***	-.283**	-.311***	-.275***
internal funds	(0.000)	(0.012)	(0.005)	(0.010)
Home country macroeconomic variables				
Growth rate of real GDP	.097	-.092	-.041	.120
	(0.765)	(0.918)	(0.965)	(0.880)
Δunemployment rate	.633	.297	-1.714	-.252
	(0.362)	(0.837)	(0.246)	(0.860)
Monetary policy	-.664	-2.151	-1.812	-3.080
	(0.719)	(0.637)	(0.678)	(0.446)
Constant	69.648	-45.284*	-35.011	-7.367
	(0.227)	(0.095)	(0.154)	(0.737)
Bank-specific fixed effects	no	yes	yes	yes
Overall effect	.306	.229	-.011	.261
Observations (number of banks)	1119	875	1154	1154
	(233)	(232)	(268)	(268)
Goodness of fit	.209	.005	.040	.226

Notes: This table reports the results from regressions where we regress multinational bank subsidiaries' loan growth on internally generated funds held by the subsidiary and the parent bank, controlling for bank-specific characteristics and the macroeconomic conditions in the host and home countries. We use unbalanced bank-level panel data which covers 368 subsidiaries in 47 host emerging countries of 68 multinational banks from 25 mostly industrial countries for the period 1994-2008. The estimation results provide us with the degree of the reliance/sensitivity of subsidiaries' loan growth to their own internally generated funds and the impact of parent banks' internally generated funds on the subsidiaries' loan growth via internal capital markets activated. The model estimated is:

$$gr(loans)_{i,j,m,t} = c + \alpha \cdot gr(loans)_{i,j,m,t-1} + \beta \cdot subfund_{i,j,m,t} + \delta \cdot subchar_{i,j,m,t} + \phi \cdot hostmacro_{m,t}$$

$$+ \gamma \cdot parfund_{j,t} + \eta \cdot parchar_{j,t} + \lambda \cdot homemacro_{n,t} + \rho \cdot subfund_{i,j,m,t} \times parfund_{j,t} + \varepsilon_{i,j,m,t}$$

(1)

"Overall effects", which estimate the sensitivity of subsidiaries' real loan growth to their own internally generated funds, with the indirect effect from parent banks' internally generated funds being taken into account, are obtained as $\beta + (\rho \times mean\ parfund)$. For the estimation, we apply four different methodologies to address the endogeneity concerns and fixed effects at various levels. They are feasible GLS (FGLS), difference GMM, system GMM and fixed effects estimations, and the estimation results are reported in columns (1)–(4), respectively. Bank-specific effects are included in all regressions except for the FGLS estimation. In all estimations, year-fixed effects are incorporated. In addition, FGLS estimations include both host country dummies and home country dummies. The goodness of fit statistics for FGLS, difference GMM and system GMM estimators are calculated as the square of the correlation coefficients between actual and fitted values of the dependent variable. The numbers in parentheses are *p*-values. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% level, respectively.

Table 2. Effects of Internal Capital Markets on Foreign Bank Subsidiaries' Loan Growth: Favorable vs. Adverse Financial Shocks to Parent Banks

Part A. Estimation results

Dependent variable: *Growth rate of real loans*

	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Panel A: The periods when parent banks experience higher positive income Foreign subsidiary variables				
Internally generated funds	.675***	.938	1.324*	1.225**
	(.001)	(.110)	(.086)	(.046)
Interaction term				
Subsidiary internal funds× parent internal funds	-.167**	-.325	-.432*	-.332*
	(.021)	(.111)	(.090)	(.099)
Overall effects	.269	.151	.277	.421
Observations (number of banks)	809	648	848	850
	(190)	(202)	(235)	(236)
Panel B: The periods when parent banks experience positive but lower income Foreign subsidiary variables				
Internally generated funds	1.771**	1.203**	1.265***	5.068**
	(.045)	(.020)	(.002)	(.016)
Interaction term				
Subsidiary internal funds× parent internal funds	-1.583	-.396*	-.372*	-6.522**
	(.288)	(.090)	(.058)	(.042)
Overall effects	.940	.995	1.069	1.643
Observations (number of banks)	162	153	217	217
	(52)	(84)	(109)	(109)
Panel C: The periods when parent banks incur income loss Foreign subsidiary variables				
Internally generated funds	3.231***	1.597**	1.383**	3.257***
	(.000)	(.017)	(.050)	(.001)
Interaction term				
Subsidiary internal funds× parent internal funds	.496	-.768	-.712	.921
	(.168)	(.230)	(.286)	(.268)
Overall effects	2.260	3.100	2.776	1.455
Observations (number of banks)	68	67	84	84
	(25)	(34)	(41)	(41)

Part B. The parent bank's internally generated funds ratio by period of income status

	Mean	Stand. dev.	Median
High income periods	2.422	1.632	1.988
Low income periods	.525	.239	.575
Negative income periods	-1.956	3.925	-.805

Notes: The sample is divided into three periods to account for the three different types of financial shocks. They are defined as: 'high income periods' as the periods when parent banks' *internally generated funds* are above the top 75th percentile of its distribution; 'low income periods' as the periods when parent banks' *internally generated funds* are higher than zero but below the bottom 25th percentile; 'negative income periods' as the periods when parent banks' *internally generated funds* are negative. The estimations results are reported for high income periods in Panel A, for low income periods in Panel B, and for negative income periods in Panel C. "Overall effects" are obtained as $\beta + (\rho \times$ mean *parfund*) from eq. (1). More detailed information on the regression equation and the definitions of the variables are referred to the notes in Table 1. We report the estimated coefficients only related to internal capital markets. Other variables in regressions, but not reported to save space, include: *one-year lag of the dependent variable* (except in fixed effects estimation), subsidiaries' *liquidity, capitalization, size* and *riskiness,* parent banks' *internally generated funds, liquidity* and *capitalization,* and host and home countries' *growth rates of GDP, first differences in unemployment* and *monetary policy.* We apply four different estimation methodologies, namely, feasible GLS (FGLS), difference GMM, system GMM and fixed effects estimation, respectively reported in columns (1)–(4). The numbers in parentheses are *p*-values. ***, **, and * indicate the statistical significance at the 1%, 5%, and * 10% level, respectively. In Part B, we report the descriptive statistics of parent banks' *internally generated funds* for each of the three periods with different types of shocks to parent banks.

Table 3. Effects of Internal Capital Markets on Foreign Bank Subsidiaries' Loan Growth: Tranquil Periods vs. Crisis Periods

Part A. Estimation results

Dependent variable: *Growth rate of real loans*	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Panel A: Tranquil periods				
Foreign subsidiary variables				
Internally generated funds	.692***	.740**	.436	.855***
	(.000)	(.014)	(.149)	(.007)
Interaction term				
Subsidiary internal funds× parent internal funds	-.214***	-.288**	-.289**	-.335**
	(.000)	(.019)	(.015)	(.013)
Overall effects	.278	.183	-.122	.207
Observations (number of banks)	1012	787	1048	1048
	(217)	(215)	(253)	(253)
Panel B: Crisis periods				
Foreign subsidiary variables				
Internally generated funds	.792***	.475**	.559**	.364**
	(.000)	(.032)	(.022)	(.044)
Interaction term				
Subsidiary internal funds× parent internal funds	.167	-.146	-.290	-.053
	(.554)	(.763)	(.497)	(.778)
Overall effects	.856	.418	.446	.343
Observations (number of banks)	60	88	106	106
	(12)	(49)	(58)	(58)

Part B. The parent bank's internally generated funds ratio by period

	Mean	Stand. dev.	Median
Tranquil periods	1.933	1.696	1.625
Crisis periods	.387	4.200	.687

Note: Crisis periods and countries are identified by following Laeven and Valencia (2008), Demirguc-Kunt and Detragiache (2005), and Caprio and Klingebiel (2003). Years of 2007 and 2008 are also defined as part of crisis periods for all home countries of parent banks. More detailed information on the regression equation and the definitions of the variables are referred to the notes in Table 1 and 2. We report the estimated coefficients only related to internal capital markets.

Table 4. Effects of Internal Capital Markets on Foreign Subsidiaries' Loan Growth across Regions: Central and East Europe, Asia and Latin America

Part A. Estimation results

Dependent variable: *Growth rate of real loans*	(1) FGLS	(2) Difference	(3) System GMM	(4) Fixed effects
Panel A: Subsidiaries in Central and Eastern Europe				
Foreign subsidiary variables				
Internally generated funds	2.321***	2.698***	2.113***	2.815***
	(.000)	(.000)	(.010)	(.000)
Interaction term				
Subsidiary internal funds× parent internal funds	-.746**	-.482	-.770*	-.541*
	(.013)	(.154)	(.068)	(.098)
Overall effects	1.735	2.069	1.108	2.109
Observations (number of banks)	426 (101)	323 (101)	446 (121)	446 (121)
Panel B: Subsidiaries in Asia				
Foreign subsidiary variables				
Internally generated funds	1.653***	1.399***	1.911***	1.311***
	(.000)	(.000)	(.000)	(.000)
Interaction term				
Subsidiary internal funds× parent internal funds	-.528***	-.344**	-.579***	-.347**
	(.001)	(.019)	(.000)	(.020)
Overall effects	0.774	0.826	0.947	0.733
Observations (number of banks)	173 (32)	140 (31)	178 (37)	178 (37)
Panel C: Subsidiaries in Latin America				
Foreign subsidiary variables				
Internally generated funds	.380***	.439*	.434	.443*
	(.000)	(.068)	(.112)	(.079)
Interaction term				
Subsidiary internal funds× parent internal funds	-.127***	-.215**	-.269***	-.221*
	(.006)	(.045)	(.010)	(.064)
Overall effects	0.116	-0.008	-0.125	-0.016
Observations (number of banks)	469 (88)	375 (88)	477 (96)	477 (96)

Part B. The parent bank's internally generated funds ratio by region

	Mean	Stand. dev.	Median
Central and Eastern Europe	1.305	1.378	1.133
Asia	1.665	1.401	1.610
Latin America	2.077	2.722	1.964

Notes: The sample is divided into three groups according to the geographical regions where the subsidiaries operate, namely Central and Eastern Europe, Asia and Latin America. In Part A, we report the results from regressions for each of the three different regions, in which we regress multinational bank subsidiaries' loan growth on internally generated funds held by the subsidiary and the parent bank, controlling for bank-specific characteristics of the subsidiary and the parent bank, and the macroeconomic conditions in the host and home countries. The estimations results for the subsidiaries in Central and Eastern Europe are reported in Panel A of Part A, those for the subsidiaries in Asia are reported in Panel B, and those for the subsidiaries in Latin America are reported in Panel C. "Overall effects" are obtained as β + (ρ x *mean parfund*) from eq. (1). We report the estimated coefficients only related to internal capital markets. The numbers in parentheses are *p*-values. ***, **, and * indicate the statistical significance at the 1%, 5%, and * 10% level, respectively. In Part B, we report the descriptive statistics of parent banks' *internally generated funds* for each of the three groups of subsidiaries operating in Central and Eastern Europe, Asia, and Latin America, respectively.

Table 5. Effects of Internal Capital Markets on Foreign Subsidiaries' Loan Growth: Global or Regional Contagion?

Part A. Estimation results

Dependent variable: *Growth rate of real loans*	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Panel A: Headquarters and subsidiaries are based in the same region Foreign subsidiary variables				
Internally generated funds	.848***	.859*	.513	.716
	(.001)	(.080)	(.360)	(.120)
Interaction term				
Subsidiary internal funds× parent internal funds	-.224***	-.310*	-.299*	-.256
	(.004)	(.082)	(.098)	(.111)
Overall effects	.450	.308	-.016	.261
Observations (number of banks)	638	495	665	665
	(138)	(138)	(165)	(165)
Panel B: Headquarters and subsidiaries are based in different regions Foreign subsidiary variables				
Internally generated funds	.560***	.480*	.524**	.598**
	(.000)	(.063)	(.044)	(.023)
Interaction term				
Subsidiary internal funds× parent internal funds	-.255***	-.181	-.337**	-.243*
	(.000)	(.178)	(.021)	(.084)
Overall effects	.148	.188	-.019	.204
Observations (number of banks)	480	380	489	489
	(95)	(94)	(104)	(104)

Part B. The parent bank's internally generated funds ratio by subsidiaries' proximity to headquarters

	Mean	Stand. dev.	Median
Headquarter and subsidiaries are based in the same region	1.773	2.383	1.446
Headquarter and subsidiaries are based in different regions	1.615	1.175	1.603

Notes: We split the sample into two groups using the criterion of whether or not subsidiaries are placed in the same region (continent) as the headquarters of their parent bank. A subsidiary located in a different (same) region from its headquarters is regarded as a "distant" ("near") affiliate. The regions for subsidiaries' presence are categorized as: Europe, Asia, North and Latin America, and other regions. In Part A, we report the results from regressions for each of the two sub-samples of distant affiliates and near affiliates. The estimations results for the near affiliates are reported in Panel A of Part A, and those for the distant affiliates are reported in Panel B. "Overall effects" are obtained as $\beta + (\rho \times$ *mean parfund*$)$ from eq. (1). More detailed information on the regression equation and the definitions of the variables are referred to the notes in Table 1. We report the estimated coefficients only related to internal capital markets. The numbers in parentheses are *p*-values. ***, **, and * indicate the statistical significance at the 1%, 5%, and * 10% level, respectively. In Part B, we report the descriptive statistics of parent banks' *internally generated funds* for each of the two groups of subsidiaries whose head offices are located in the same region or different regions.

Table 6. Effects of Internal Capital Markets on Foreign Subsidiaries' Loan Growth: Before 2001 vs. after 2001 periods

Part A. Estimation results

Dependent variable: *Growth rate of real loans*				
	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Panel A: Before year 2001 Foreign subsidiary variables				
Internally generated funds	1.254***	.822	.973	.913
	(.000)	(.173)	(.227)	(.128)
Interaction term				
Subsidiary internal funds×parent internal funds	-.280**	-.151	-.315	-.200
	(.013)	(.433)	(.266)	(.346)
Overall effect	.791	.573	.454	.582
Observations (number of banks)	405	286	447	447
	(117)	(116)	(159)	(159)
Panel B: After year 2001 Foreign subsidiary variables				
Internally generated funds	.605***	.607**	.288	.489**
	(.000)	(.011)	(.156)	(.044)
Interaction term				
Subsidiary internal funds× parent internal funds	-.286***	-.341***	-.301***	-.312***
	(.000)	(.000)	(.000)	(.000)
Overall effect	.069	-.030	-.274	-.093
Observations (number of banks)	666	589	707	707
	(198)	(208)	(239)	(239)

Part B. The Parent bank's internally generated funds ratio by years

	Mean	Stand. dev.	Median
Before 2001	1.647	2.458	1.556
After 2001	1.869	1.874	1.625

Notes: The sample is split into two groups: before and after 2001. In Part A, we report the results from regressions for each of the two sub-samples where we regress multinational bank subsidiaries' loan growth on internally generated funds held by the subsidiary and the parent bank, controlling for bank-specific characteristics of the subsidiary and the parent bank, and the macroeconomic conditions in the host and home countries. The estimations results for the prior-to-2001 period are reported in Panel A of Part A, and those for the post-to-2001 period are reported in Panel B. "Overall effects" are obtained as $\beta + (\rho \times$ *mean parfund*) from eq. (1). More detailed information on the regression equation and the definitions of the variables are referred to the notes in Table I. We apply four different estimation methodologies, namely, feasible GLS (FGLS), difference GMM, system GMM and fixed effects estimation, respectively reported in columns (1)–(4). We report the estimated coefficients only related to internal capital markets. The numbers in parentheses are *p*-values. ***, **, and * indicate the statistical significance at the 1%, 5%, and * 10% level, respectively. In Part B, we report the descriptive statistics of parent banks' *internally generated funds* for each of the two subsamples of before and after 2001.

Table 7. A Robustness Test for Internal Capital Markets When the Subsidiaries' Ability to Generate Own Funds is Allowed to be Correlated with Macroeconomic Demand Effects in Host Countries

Part A. Correlation of internally generated funds of subsidiaries and host macroeconomic variables

	Internally generated funds	Growth rate of real GDP	Δunemployment rate	Monetary policy
Internally generated funds	1			
Growth rate of real GDP	.064 ***	1		
Δunemployment rate	.005	-.389***	1	
Monetary policy	.030	.105***	-.021	1

Note: *** denotes the statistical significance at the 1% level.

Part B. The estimation results when we add only one more interaction term of subsidiary internal funds and real GDP growth rates

Dependent variable: Growth rate of real loans				
	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Foreign subsidiary variables				
Internally generated funds	.488***	.585***	.348	.574***
	(.000)	(.002)	(.131)	(.004)
Interaction terms				
Subsidiary internal funds× parent internal funds	-.217***	-.246***	-.272***	-.243***
	(.000)	(.000)	(.000)	(.001)
Subsidiary internal funds× growth rate of real GDP	.071***	.081***	.076***	.074***
	(.000)	(.000)	(.001)	(.000)

Note: p-values in parentheses. *** represents the 1% significance level, ** 5%, and * 10%.

Part C. The estimation results when we add interaction variables between subsidiaries' internal funds and all three macroeconomic variables (real GDP growth rates, unemployment rate changes, and the monetary policy indicator)

Dependent variable: Growth rate of real loans				
	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Foreign subsidiary variables				
Internally generated funds	.419***	.680***	.434**	.610***
	(.000)	(.000)	(.028)	(.001)
Interaction terms				
Subsidiary internal funds× parent internal funds	-.231***	-.242***	-.267***	-.242***
	(.000)	(.000)	(.000)	(.000)
Subsidiary internal funds× growth rate of real GDP	.062***	.095***	.088***	.078***
	(.000)	(.000)	(.001)	(.000)
Subsidiary internal funds× Δunemployment rate	-.003	.080	.089	.034
	(.959)	(.387)	(.432)	(.747)
Subsidiary internal funds× monetary policy	.296*	-.285*	-.262	-.098
	(.058)	(.088)	(.171)	(.531)

Note: p-values in parentheses. *** represents the 1% significance level, ** 5%, and * 10%.

Table 8. Effects of Internal Capital Markets on Foreign Subsidiaries' Loan Growth: Subsidiaries' Reliance on Parent Bank Funds

Part A. Estimation results

Dependent variable: *Growth rate of real loans*	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Panel A: Subsidiaries are more reliant on parent bank's funds (high loan-to-deposit ratio)				
Foreign subsidiary variables				
Internally generated funds	1.626***	1.074***	1.299***	1.392*
	(.000)	(.004)	(.001)	(.094)
Interaction term				
Subsidiary internal funds× parent internal funds	-.369***	-.318***	-.461***	-.349*
	(.000)	(.000)	(.000)	(.071)
Overall effect	.978	.515	.489	.778
Observations (number of banks)	281	242	320	320
	(76)	(97)	(115)	(115)
Panel B: Subsidiaries are less reliant on parent bank's funds (low loan-to-deposit ratio)				
Foreign subsidiary variables				
Internally generated funds	.399***	.395**	.144	.520**
	(.000)	(.044)	(.433)	(.012)
Interaction term				
Subsidiary internal funds× parent internal funds	-.093**	-.160**	-.125	-.141**
	(.029)	(.046)	(.102)	(.043)
Overall effect	.241	.123	-.066	.280
Observations (number of banks)	799	633	834	834
	(189)	(194)	(224)	(224)

Part B. The parent bank' internally generated funds ratio by subsidiaries' reliance on parent funds

	Mean	Stand. dev.	Median
Subsidiaries are more reliant on parent bank's funds	1.757	2.843	1.434
Subsidiaries are less reliant on parent bank's funds	1.690	1.536	1.523

Notes: This table reports the results of estimation which examines how subsidiaries' different degrees of reliance on parent banks' internal funds affect the effects of internal capital markets on foreign subsidiaries' loan growth. The potential reliance of a subsidiary on the financial support from its parent bank is measured by the ratio of subsidiary's loans to its deposits. The sample is divided by the criteria that the loan-to-deposit ratio of subsidiaries is higher (lower) than 0.9, which is the highest quartile of its distribution. In Part A, we report the results from regressions for each of the two sub-samples where we regress multinational bank subsidiaries' loan growth on internally generated funds held by the subsidiary and the parent bank. The estimation results for the subsidiaries which are more reliant on parent bank's funds with a high loan-to-deposit ratio are reported in Panel A, and those for the subsidiaries which are less reliant on parent bank's funds with a low loan-to-deposit ratio are reported in Panel B. "Overall effects" are obtained as $\beta + (\rho \times$ *mean parfund*) from eq. (1). The numbers in parentheses are *p*-values. ***, **, and * indicate the statistical significance at the 1%, 5%, and * 10% level, respectively. In Part B, we report the descriptive statistics of parent banks' *internally generated funds* for each of the two subsamples of the different degrees of subsidiaries' reliance on parent funds.

Table 9. Effects of Internal Capital Markets on Foreign Subsidiaries' Loan Growth: De Novo vs. M&A Subsidiaries

Part A. Estimation results

Dependent variable: *Growth rate of real loans*	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Panel A: Subsidiaries are de novo established Foreign subsidiary variables				
Internally generated funds	.875***	.631***	.640***	.646**
	(.000)	(.002)	(.001)	(.034)
Interaction term				
Subsidiary internal funds× parent internal funds	-.339***	-.242***	-.342***	-.255**
	(.000)	(.000)	(.000)	(.042)
Overall effect	.315	.231	.076	.225
Observations (number of banks)	574	455	598	598
	(110)	(109)	(134)	(134)
Panel B: Subsidiaries are established by M&A Foreign subsidiary variables				
Internally generated funds	.567***	.878***	.527**	.916***
	(.003)	(.000)	(.014)	(.000)
Interaction term				
Subsidiary internal funds× parent internal funds	-.006	-.197*	-.198*	-.189*
	(.935)	(.095)	(.098)	(.056)
Overall effect	.555	.528	.175	.581
Observations (number of banks)	541	420	556	556
	(126)	(126)	(141)	(141)

Part B. The parent bank's internally generated funds ratio by their subsidiaries' entry mode

	Mean	Stand. dev.	Median
Subsidiaries are de novo established	1.649	2.087	1.363
Subsidiaries are established by M&A	1.773	1.870	1.614

Notes: This table reports the results of estimation which examines how subsidiaries' different modes of entry into host banking markets affect the effects of internal capital markets on foreign subsidiaries' loan growth. The sample is split into two groups according to whether the subsidiary is established from scratch (de novo establishment) or by merger & acquisition (M&A establishment). In Part A, we report the results from regressions for each of the two sub-samples where we regress multi-national bank subsidiaries' loan growth on internally generated funds held by the subsidiary and the parent bank. The estimation results for the subsidiaries of de novo establishment are reported in Panel A, and those for the M&A subsidiaries in Panel B. "Overall effects" are obtained as $\beta + (\rho \times$ *mean parfund*$)$ from eq. (1). More detailed information on the regression equation and the definitions of the variables are referred to the notes in Table 1. We report the estimated coefficients only related to internal capital markets. The numbers in parentheses are *p*-values. ***, **, and * indicate the statistical significance at the 1%, 5%, and * 10% level, respectively. In Part B, we report the descriptive statistics of parent banks' *internally generated funds* for each of the two subsamples of de novo established subsidiaries and M&A subsidiaries.

Table 10. Effects of Internal Capital Markets on Foreign Subsidiaries' Loan Growth: High vs. Low Financial Openness in Host Countries

Part A. Estimation results

Dependent variable: *Growth rate of real loans*	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Panel A: Higher capital account openness in host countries Foreign subsidiary variables				
Internally generated funds	3.530***	3.472***	4.469***	3.059***
	(.000)	(.000)	(.000)	(.000)
Interaction term				
Subsidiary internal funds× parent internal funds	-.760**	-.681**	-1.316***	-.584**
	(.022)	(.036)	(.001)	(.042)
Overall effect	2.223	2.300	2.205	2.055
Observations (number of banks)	305	262	334	334
	(78)	(86)	(107)	(107)
Panel B: Lower capital account openness in host countries Foreign subsidiary variables				
Internally generated funds	.581***	.698***	.531*	.640***
	(.000)	(.005)	(.056)	(.010)
Interaction term				
Subsidiary internal funds× parent internal funds	-.252***	-.284***	-.312***	-.269**
	(.000)	(.006)	(.002)	(.011)
Overall effect	.152	.213	-.001	.181
Observations (number of banks)	777	613	820	820
	(174)	(179)	(217)	(217)

Part B. The parent bank's internally generated funds ratio by host country's financial openness

	Mean	Stand. dev.	Median
Higher capital account openness in host countries	1.719	1.924	1.602
Lower capital account openness in host countries	1.704	2.011	1.475

Notes: We use the Chinn-Ito index as the measurement of the extent of capital account openness in host markets, for which a higher index value represents higher openness in the capital account. The sample is divided in two groups comprising those banks for which the value of the Chinn-Ito index in the host country is below and above 1.70, which is the highest quartile of its distribution. In Part A, we report the results from regressions for each of the two sub-samples where we regress multinational bank subsidiaries' loan growth on internally generated funds held by the foreign subsidiary and the parent bank. The estimation results for the subsidiaries operating in the markets with higher capital account openness are reported in Panel A, and those for the subsi-diaries operating in the markets with lower capital account openness are reported in Panel B. "Overall effects" are obtained as β + (ρ x *mean parfund*) from eq. (1). We report the estimated coefficients only related to internal capital markets. The numbers in parentheses are *p*-values. ***, **, and * indicate the statistical significance at the 1%, 5%, and * 10% level, respectively. In Part B, we report the descriptive statistics of parent banks' *internally generated funds* for above two scenarios of high vs. low financial openness of host economies.

Table 11. Effects of Internal Capital Markets on Foreign Subsidiaries' Loan Growth: Concentration in Host Banking Markets

Part A. Estimation results

Dependent variable: *growth rate of real loans*	(1) FGLS	(2) Difference GMM	(3) System GMM	(4) Fixed effects
Panel A: Host banking market is less concentrated (more competitive)				
Foreign subsidiary variables				
Internally generated funds	1.074***	.972**	1.014*	.878
	(.001)	(.043)	(.071)	(.131)
Interaction term				
Subsidiary internal funds× parent internal funds	-.483***	-.397***	-.400**	-.399**
	(.000)	(.005)	(.011)	(.011)
Overall effect	.191	.246	.284	.149
Observations (number of banks)	222	176	247	247
	(58)	(66)	(83)	(83)
Panel B: Host banking market is more concentrated (less competitive)				
Foreign subsidiary variables				
Internally generated funds	.555***	.725***	.641*	.788**
	(.000)	(.004)	(.058)	(.015)
Interaction term				
Subsidiary internal funds× parent internal funds	-.133**	-.273**	-.307**	-.152
	(.016)	(.028)	(.034)	(.280)
Overall effect	.331	.268	.124	.533
Observations (number of banks)	869	699	907	907
	(204)	(211)	(242)	(242)

Part B. The parent bank's internally generated funds ratio by host countries' banking concentration

	Mean	Stand. dev.	Median
Host banking market is less concentrated (more competitive)	1.824	2.295	1.695
Host banking market is more concentrated (less competitive)	1.677	1.892	1.475

Notes: We use the 3-firm concentration ratio (CR3), defined as the share of total market assets held by the largest three banks, as the measure of the level of concentration in the banking sector. The sample is split into two subsamples comprising those banks in the host markets with a concentration level below or above 0.41, which represents the first quartile of the distribution of the concentration measure (i.e. the highest quartile of competitive-ness). In Part A, we report the results from regressions for each of the two sub-samples where we regress multinational bank subsidiaries' loan growth on internally generated funds held by the subsidiary and the parent bank. The estimation results for the subsidiaries operating in the markets where the banking market is less concentrated (more competitive) are reported in Panel A, and those for more concentrated (less competitive) are reported in Panel B. "Overall effects" are obtained as $\beta + (\rho \times mean\ parfund)$ from eq. (1). More detailed information on the regression equation and the definitions of the variables are referred to the notes in Table 1. We report the estimated coefficients only related to internal capital markets. The numbers in parentheses are *p*-values. ***, **, and * indicate the statistical significance at the 1%, 5%, and * 10% level, respectively. In Part B, we report the descriptive statistics of parent banks' *internally generated funds* for above two scenarios of high vs. low levels of concentration in host banking markets where their subsidiaries operate.

Figure 1. The Financial Strength of Parent Banks vs. Their Foreign Subsidiaries in our Sample
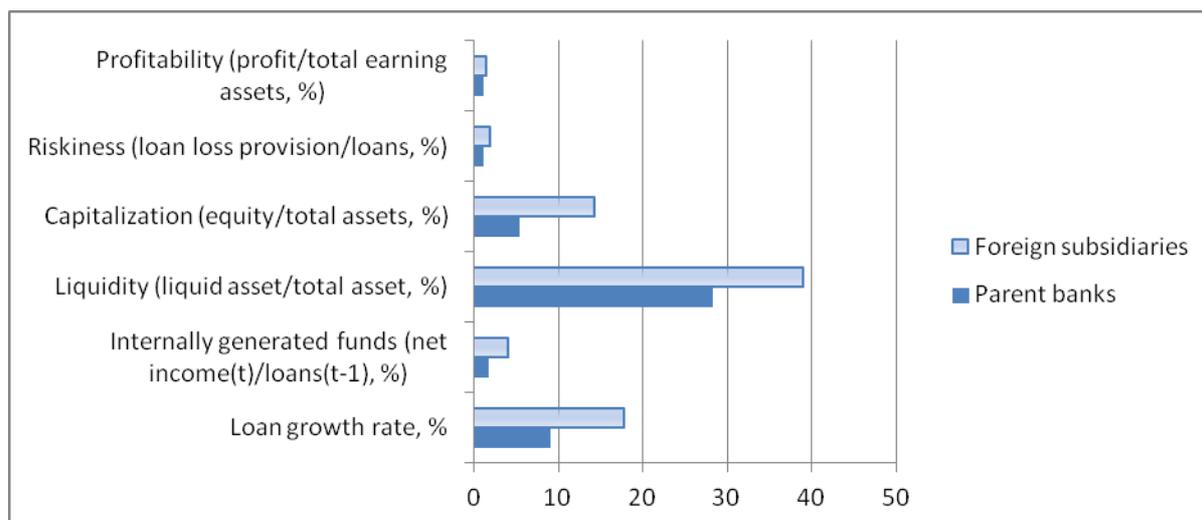
Notes: The figure shows the comparison of financial strength between parent banks and their foreign subsidiaries. Subsidiaries are shown to have higher financial strength than their parent banks in profitability (1.4% vs. 1.1%), liquidity (39.0% vs. 28.3%), capitalization (14.3% vs. 5.4%), and net income (4.0% vs. 1.8%). Subsidiaries also have higher loan loss provision (2.0% vs. 1.2%) and loan growth rate (17.8% vs. 9.1%) than their parent banks.

Appendix A. List of Multinational Banks and the Distribution of Foreign Subsidiaries in Emerging and Developing Economies

Table A1. List of Multinational Banks and Their Foreign Subsidiary Locations by Region

	Multinational bank	Home country	Host countries		
			Europe	Asia	Latin and Central America, Caribbean
	The United States of America				
1	American Express	US			BR, CL, MX, UY
2	Bank of America	US		HK, ID	BR(2), MX
3	Citigroup	US	CZ, HU, PL(2), RO, RU, SK, UA	HK(3), KR, KZ, MY, SG	BR, CL, CO, HN, MX(2), PA, PE, PY,TT
4	GE Capital	US	CZ, HU, PL(2)		BR, MX
5	JP Morgan Chase	US		MY	BR, MX(2), VE
	Canada				
6	Bank of Nova Scotia (The) - SCOTIABANK	CA		MY	AR, CL, CR, JM, MX, PE, SV
7	Canadian Imperial Bank of Commerce CIBC	CA		SG	JM
	Asia				
8	Bank of China	CN	RU	HK, MY	
9	Bank of Tokyo - Mitsubishi UFJ	JP	PL	IN, MY	BR, MX
10	DBS Group Holdings Ltd	SG		HK, ID, PH, TH	
11	Kookmin Bank	KR		HK	
12	Oversea-Chinese Banking Corporation Limited OCBC	SG		ID(2), MY	
13	Resona Bank Ltd	JP		ID	
14	Sumitomo Mitsui Banking Corporation	JP		ID	BR
	The Commonwealth of Australia				
15	Australia and New Zealand Banking Group	AU		ID	
16	Commonwealth Bank of Australia	AU		ID	
	Europe				
17	ABN Amro	NL	HU(2), PL, RO	KZ, MY, PH, PK	AR, BR(3), CL, CO, MX
18	Allied Irish Banks plc	IE	PL(2)		
19	Alpha Bank AE	GR	MK, RS, RO		
20	Banca Intesa	IT	BA, HR, RS, RU, SK		PE
21	Banca Nazionale del Lavoro SpA - BNL	IT			AR, BR, UY
22	Banco Bilbao Vizcaya Argentaria SA	ES			AR, CL, CO, MX, PE, PY, UY, VE
23	Banco Comercial Portugues SA	PT	PL, TR		
24	Bank Austria Creditanstalt	AT	CZ, HR, HU, PL, RO, SK, SI		

25	Bayerische Hypo-und Vereinsbank AG	DE	BG, CZ, HR(2), HU, LV, PL, RO, RS, SK(2), SI		
26	Bayerische Landesbank	DE	BG, HU		
27	BNP Paribas	FR	BG, HU, PL, RU(2), UA	CN, ID	BR, MX, PA, PE
28	Commerzbank AG	DE	HU, PL(2), RU	ID	
29	Credit Agricole	FR	AM, CZ, HU, PL(2), RU, RS, SK, TR, UA(2)		AR(2), BR, UY
30	Credit Suisse	CH	RU		BR
31	Creditanstalt	AT	CZ, HU, PL		
32	Danske Bank A/S	DK	PL, RU		
33	Deutsche Bank AG	DE	HU, PL(2), RU	MY	AR(2), BR, CL, UY
34	Dexia	BE	RU, SK, TR		
35	DnB Nor ASA	NO	LT, LV, RU		
36	Dresdner Bank AG	DE	CZ, HR, RU		BR, CL, MX
37	DZ Bank AG	DE	HU, PL		
38	Emporiki Bank of Greece SA	GR	AL, BG, RO		
39	Erste Group Bank AG	AT	CZ(2), HR, HU, RO, RS, SK		
40	Fortis Bank	BE	PL, TR	HK	
41	HSBC	GB	AM, PL, RU, TR	KZ, MY	AR, BR, CL, CO, MX(2), PE, UY
42	Hypo Alpe-Adria Bank	AT	BA(2), HR, RS, SI		
43	ING Bank NV	NL	PL, RU, UA	ID, IN, SG	AR, CL, MX, PY, UY
44	KBC Group	BE	CZ(2), HU, PL(2), RU, SK		
45	Lloyds TSB Bank PLC	GB			AR, BR, CO
46	National Bank of Greece SA	GR	BG, MK, RO, RS, TR		
47	Norddeutsche Landesbank Girozentrale NORD/LB	DE	LV, LT, PL		
48	Nordea Bank AB	SE	PL, RU		
49	Piraeus Bank SA	GR	AL, BG, RO, RS		
50	ProCredit Holding AG	DE	GE, MD, UA		
51	Rabobank Nederland	NL	PL	ID, IN, SG	BR
52	Raiffeisen Zentralbank Oesterreich AG - RZB	AT	AL, BA, BG, BY, CZ(2), HR, HU, PL, RO, RU, RS, SK, SI, UA		
53	Sampo Bank Plc	FI	EE, LV, LT		
54	Sanpaolo IMI	IT	HU, RO, SI		
55	Santander Central Hispano	ES		PH	AR, BR(3), CL(2), CO, MX, PA, PE, UY, VE
56	Skandinaviska Enskilda Banken	SE	EE, LT, LV, UA		
57	Societe Generale	FR	BG, CZ(2), HR, PL, RO, RS, RU, SI(2)	ID	AR, BR, MX

58	Standard Chartered Bank	GB		HK, KR, MY, TH	CO, PE
59	Svenska Handelsbanken	SE	RU		
60	Swedbank AB	SE	EE, LT, LV, RU		
61	UBS	CH			BR(2)
62	UniCredit SpA	IT	BA, BG, CZ, HR(3), HU, LV, PL, RO, RU, SI, SK, TR, UA		
63	Veneto Banca Holding scpa	IT	HR, MD		
64	Volksbank	AT	HR, RO, RS, SK		
65	West LB	DE	HU, PL, RU		BR
	Latin America				
66	Banco Bradesco SA	BR			AR
67	Banco do Brasil S.A.	BR			CL, PA
68	Banco Itau SA	BR			AR

Notes: This table reports the list of multinational banks and the distribution of their foreign subsidiaries in emerging and developing economies in our sample. The codes denote countries as below: AL=Albania, AM=Armenia, AR= Argentina, AT=Austria, AU=Australia, BE=Belgium, BR=Brazil, BG=Bulgaria, BY=Belarus, CA=Canada, CH= Switzerland, CL=Chile, CN=China, CO=Colombia, CR=Costa Rica, CZ=Czech, DE=Germany, DK=Denmark, EE=Estonia, ES=Spain, FI=Finland, FR=France, GB=UK, GE=Georgia, GR=Greece, HK=Hong Kong, HN= Honduras, HR=Croatia, HU=Hungary, ID=Indonesia, IE=Ireland, IN=India, IT=Italy, JM=Jamaica, JP=Japan, KR= Korea (South), KZ=Kazahkstan, LT=Lithuania, LV=Latvia, MD=Moldova, MK=Macedonia, MX=Mexico, MY= Malaysia, NL=Netherland, NO=Norway, PA=Panama, PE=Peru, PH=Philippines, PK=Pakistan, PL=Poland, PT= Portugal, PY=Paraguay, RO=Romania, RS=Serbia, RU=Russia, SE=Sweden, SG=Singapore, SK=Slovakia, SI=Slovenia, SV=El Salvador, TH=Thailand, TR=Turkey, UA=Ukraine, US=United States, UY=Uruguay, VE= Venezuela. The number in parentheses is the number of the parent bank's subsidiaries in the host country. In total, we collect data for 368 foreign subsidiaries, of 68 multinational banks from 25 home developed countries, operating in 47 host emerging and developing countries during the period 1994 - 2008.

Table A2. The Area Distribution of Parent Banks and their Foreign Subsidiaries in Emerging Economies

Parent banks in home countries	No. of parent banks	Subsidiaries in host countries			
		Europe	Asia	Latin America	Total
US/Canada	7	12	12	31	55
Asia	7	2	16	3	21
Europe	49	192	23	73	288
Others	5	0	0	4	4
Total	68	206	51	111	368

Note: The number of home countries is 25, and the number of host countries is 47.

Appendix B. Descriptive Summary Statistics and Pearson Correlation Coefficient Matrix

Bank-specific characteristic variables (subsidiaries and parent banks)	Mean	Std. dev.	Growth rate of real loans	Internally generated funds	Liquidity	Capitali-zation	Size	Riskiness	Parent bank internally generated funds	Parent bank liquidity	Parent bank capitali-zation
Foreign bank subsidiaries											
Growth rate of real loans (%)	17.77	54.74	1.000								
Internally generated funds (*net income$_t$ / loans$_{t-1}$*, %)	3.98	17.54	.054** (.020)	1.000							
Liquidity (*liquid assets$_t$ / total assets$_t$,* %)	38.98	20.52	.041 (.122)	.227*** (.000)	1.000						
Capitalization (*equity$_t$ / total assets$_t$*, %)	14.29	11.88	.073*** (.005)	-.027 (.296)	-.001 (.954)	1.000					
Size (*loans$_t$ / domestic credit by banking sector$_t$,* %)	3.24	6.52	.043 (.102)	-.010 (.698)	-.098*** (.000)	-.176*** (.000)	1.000				
Riskiness (*loan loss provision$_t$ / loans$_t$,* %)	1.95	5.78	-.059** (.024)	-.084*** (.001)	-.069*** (.008)	-.013 (.605)	-.044* (.096)	1.000			
Parent banks											
Parent bank internally generated funds (*net income$_t$ / loans$_{t-1}$*, %)	1.77	2.16	-.046** (.046)	.013 (.581)	-.037 (.156)	.111*** (.000)	-.032 (.218)	.057** (.031)	1.000		
Parent bank liquidity (*liquid assets$_t$ / total assets$_t$,* %)	28.30	12.92	-.065*** (.005)	-.016 (.495)	.102*** (.000)	.190*** (.000)	-.080*** (.002)	-.076*** (.003)	.057** (.015)	1.000	
Parent bank capitalization (*equity$_t$ / total assets$_t$,* %)	5.44	2.09	-.031 (.176)	.033 (.150)	-.144*** (.000)	.156*** (.000)	-.050** (.055)	.112*** (.000)	.464*** (.000)	-.114*** (.000)	1.000

Notes: This table reports the descriptive summary statistics of the bank characteristic variables of foreign subsidiaries and their parent banks, based on the sample used in regression analyses. The measure is defined in the parentheses following the variable. All variables are expressed in percentage. The numbers in parentheses are *p*-values. ***, **, and * indicate the statistical significance at the 1%, 5%, and 10% level, respectively.