

# “The lending channel in emerging economies: are foreign banks different?”

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## The lending channel in emerging economies: are foreign banks different?

### Abstract

This paper assembles a dataset comprising 1,565 banks in 20 Asian and Latin American countries during 1989-2001 and compares the response of the volume of loans, deposits, and bank-specific interest rates on loans and deposits, to various measures of monetary conditions, across domestic and foreign banks. It also looks for systematic differences in the behavior of domestic and foreign banks during periods of financial distress and tranquil times. Using differences in bank ownership as a proxy for financial constraints on banks, the paper finds weak evidence that foreign banks have a lower sensitivity of credit to monetary conditions relative to their domestic competitors, with the differences driven by banks with lower asset liquidity and/or capitalization. At the same time, the lending and deposit rates of foreign banks tend to be smoother during periods of financial distress, albeit the differences with domestic banks do not appear to be strong. These results provide weak support to the existence of supply-side effects in credit markets and suggest that foreign bank entry in emerging economies may have contributed somewhat to stability in credit markets.

**Keywords:** lending channel, monetary transmission, credit markets, foreign banks.

**JEL Classification:** E51, G21.

### Introduction

Foreign bank entry into emerging market economies has become an important component of financial globalization since the mid-nineties. Facilitated by financial liberalization and the need to recapitalize banking systems in the aftermath of financial crises, the volume of cross-border mergers and acquisitions (M&As) targeting banks in emerging markets surged from about US\$6 billion between 1990-1996, to almost US\$50 billion – roughly one-third of the global amount – between 1997-2000 (BIS 2004). The increase in foreign bank presence in emerging markets has been uneven, entailing significant changes in the structure of bank ownership in many recipient countries such as Mexico, where the share of banking system assets controlled by foreign institutions increased from 2 percent in 1990 to 82 percent in 2004.

The speed and depth of foreign bank entry have potentially important implications for financial and macroeconomic stability in recipient countries, and arguments have been made in both directions. On the one hand, it has been argued that foreign banks could play a stabilizing role in the supply of credit and deposits through upstream financing from their mother companies and reputation effects, particularly during periods of financial distress. On the other hand, foreign banks might be quick to pull out from emerging markets and could transmit external shocks into host countries. Empirical evidence on the implications of foreign bank entry

for financial and macroeconomic stability in emerging markets, however, is limited to a paper by Dages, Goldberg, and Kinney (2000) analyzing the behavior of domestic and foreign banks in Mexico and Argentina during the Tequila crisis, and a paper by Detragiache and Gupta (2004), using data for Malaysia during the Asian crisis. Overall, these two papers find mild support to the first view. On the other hand, evidence from the 2002 crisis in Argentina seems to be more mixed, with some foreign banks opting to exit in the context of a broader international asset relocation, and others reducing their lending activities in line with the behavior of domestic banks.

At a more general level, the view that banks may play a non-trivial role in the transmission of shocks into credit markets, via supply-side effects, has received considerable attention in the literature of monetary policy transmission. Early work includes Bernanke and Blinder (1988), Kashyap et al. (1993), Bernanke and Gertler (1995), Kashyap and Stein (1995). The basic idea is that financial constraints on banks impair their ability to offset negative shocks to deposits with alternative financing sources, generating supply-side effects in credit markets, and amplifying economic fluctuations. While the evidence seems to be broadly consistent with this proposal, identifying suitable proxies for unobserved financial constraints on banks has been a key challenge.

This paper is based on the idea that differences in bank ownership can serve as a proxy for unobserved financial constraints on banks, and combined with other observable bank characteristics (such as asset liquidity and capitalization) to identify changes in credit supply. To implement this, it uses a panel dataset of 1,565 banks in 20 Asian and Latin American countries during the period of 1989-2001 and tests for systematic differences in the sensitivity

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of loans, deposits, and bank-specific lending and deposit rates, to various measures of monetary conditions, across domestic and foreign banks. It also looks for systematic differences in the behavior of domestic and foreign banks during tranquil times and periods of financial distress, exploiting various definitions of banking and currency crises available in the literature. The regions studied here are relevant to the issues at hand, as they endured several financial crises during the 1990s. In addition, Latin America concentrated 48 percent of all cross-border M&A targeting banks in emerging markets between 1991-2005, followed by Asia, with an additional 36 percent.

The results indicate that domestic and foreign banks behave roughly similarly along the dimensions considered, providing only weak support to the existence of supply-side effects in credit markets. In particular, loan and deposit growths are highly sensitive to economic activity, in a manner that does not differ significantly across domestic and foreign banks. At the same time, periods of tighter monetary conditions are associated with lower loan and deposit growths, with foreign banks displaying a somewhat lower sensitivity. This finding is driven by banks with relatively less liquid assets and/or lower capitalization, suggesting that it is not entirely attributable to potential differences in the characteristics of the borrowers and depositors of foreign banks. The results also show slight differences in the cross-sectional behavior of interest rates. Lending and deposit rates of foreign banks tend to react less during periods of financial distress. Taken together, these results indicate that foreign bank participation in emerging economies has not led to increased instability in credit markets, and may have even played a beneficial effect.

The main contributions of the paper are as follows. First, it adds to the literature on the effects of foreign bank entry on financial stability, exploiting a comprehensive bank-level panel dataset that covers the main Latin American and emerging Asian countries during the nineties. The paper tracks the evolution of bank ownership by crossing the sample of banks with a complete list of mergers and acquisitions during the sample period. Second, it adds to the literature on the lending channel outside the United States, particularly in emerging markets<sup>1</sup> by exploiting differences in bank ownership to identify supply-side effects in credit markets. As a by-product, the paper provides a novel dataset on reserve requirements for the countries in the sample using information from central bank reports.

The rest of the paper is organized as follows. Section 1 places the paper in the context of the literature. Section 2 discusses the methodology and the hypotheses tested, as well as potential endogeneity problems and sources of bias. Section 3 describes the data. Section 4 compares the response of selected financial variables (including loan growth, deposit growth, and bank-level lending and deposit rates) to various measures of monetary conditions, across domestic and foreign banks. Section 5 focuses more closely on the response of loan growth to monetary conditions across domestic and foreign banks after splitting the sample by capitalization and liquidity levels. Section 6 explores for systematic differences in the behavior of domestic and foreign banks during tranquil and crises periods. The final Section concludes.

## 1. Related literature

Most studies comparing the behavior of domestic and foreign banks in emerging economies focus on the efficiency effects of foreign bank entry<sup>2</sup>. An incipient strand of the literature, to which this paper belongs, looks at the effects of foreign bank entry on financial stability and the response of credit markets to domestic and external shocks. Dages, Goldberg, and Kinney (2000) compared the behavior of bank lending across domestic and foreign banks in Mexico and Argentina during the Tequila crisis and concluded that foreign banks exhibited stronger and less volatile loans growth than domestic banks, but differences in asset quality, rather than ownership, appeared to be decisive in explaining the behavior of bank credit. Using data for Malaysia, Detragiache and Gupta (2004) found evidence that foreign banks with sufficient international diversification played a stabilizing role during the Asian crisis, while the behavior of foreign banks with operations concentrated in Asia was roughly similar to the behavior of domestic banks.

This paper is also related to the literature on the lending channel of monetary transmission, which focuses on the potential role of banks propagating shocks via loan-supply effects. The basic hypothesis is that capital market imperfections may prevent (at least some) banks from freely substituting away a negative shock to deposits with other sources of funding. In consequence, financially-constrained banks may optimally choose to cut lending in response to a shock to deposits, thereby affecting the availability of funds to bank-dependent firms. The chief obstacle in testing the lending channel is disentangling whether the response of credit to monetary shocks originates

<sup>1</sup> Studies in this area include: Edwards and Vegh (1997), who address the role of banks in the transmission of nominal shocks in Mexico and Chile, Agung (1998) who examines Indonesia, a volume edited by the BIS (1998) that looks at the lending channel in a sample of developing countries, and a cross-country study by Vázquez (2001).

<sup>2</sup> The evidence seems to indicate that competitive pressures caused by foreign entry have led to improvements in banking system efficiency; for example, Barajas, Steiner, and Salazar (2000), Claessens and Glaessner (1999), Claessens, Demirgüç-Kunt, and H. Huizinga (2001), and Crystal, Dages, and Goldberg (2001).

from loan demand – as implied by interest rate channels – or from changes in loan supply.

To get around the identification problem, empirical studies now generally resort to bank-level data, testing for cross-sectional differences in the response of bank lending to monetary shocks across banks with different degrees of financial constraints. Since financial constraints are not directly observable, they have been usually proxied by bank characteristics such as liquidity, size, and capitalization (for example, Jayaratne and Morgan (2000), Kishan and Opiela (2000), Kashyap and Stein (2000)). Financial constraints have been also proxied by bank ownership. Houston et al. (1997) explored the role of internal markets in banking in the U.S. and found that the loan growth of bank subsidiaries is sensitive to the financial position of their holding companies. A similar approach was implemented by Ashcraft (2000), who exploited a panel database of U.S. banks and used bank affiliation with multi-bank holding companies to proxy for financial constraints. In the international context, Peek and Rosengren (1997) looked at data on Japanese banks operating in the United States and found that binding risk-based capital requirements associated with the Japanese stock market decline of end-1980s translated into a decline in lending by their U.S. branches.

This paper follows a similar approach, exploiting the presence of internal capital markets as a source of cross-sectional variation between domestic and foreign banks. To the extent that foreign banks are less financially-constrained than domestic banks, comparing the sensitivity of loan growth to monetary conditions across domestic and foreign banks may identify supply-side effects in credit markets. This test, however, hinges on the validity of two assumptions. First, all else being equal (i.e., capitalization, asset liquidity, and other bank characteristics), foreign banks have to be less financially-constrained than domestic ones, either because they can resort to funding from their parent institutions, or because they enjoy a more stable deposit base. Second, the loan demand facing domestic banks cannot be systematically different than the loan demand of foreign banks.

This identification strategy is implemented with the use of bank-level fixed effects regressions, splitting the sample of banks between domestic and foreign with the use of a dummy variable. A baseline exercise compares the response of selected balance sheet components to monetary conditions across domestic and foreign banks, after controlling for changes in loan demand, proxied by GDP growth, and observable bank characteristics such as size, liquidity and capitalization. The second, more

restrictive set of tests further explores systematic differences in the response of loan growth to monetary conditions across domestic and foreign banks, in the subsets of banks with lower liquidity and capitalization with respect to other banks in the same country. Lastly, the third test uses various definitions of currency, banking and debt crises and compares the behavior of domestic and foreign banks throughout crises and tranquil periods.

A few comments are convenient to place this paper in context. While the literature on the lending channel focuses on the role of banks in the transmission of *monetary policy* to the credit market, this paper takes a broader approach. It studies the effects of changes in *monetary conditions* on the credit market, regardless of whether changes are induced, or not, by monetary policy. This difference in emphasis is necessary since the paper focuses on emerging markets, where monetary conditions are typically affected by an open capital account. Consequently, monetary conditions here not only include money market rates, as usual in the lending channel literature, but also international interest rates and the change of the foreign exchange rate, exploiting the uncovered interest parity condition. The justification for the latter is straightforward, since currency depreciation increases the opportunity cost of holding bank deposits denominated in local currency, affecting their stability. Monetary conditions in this paper also include reserve requirements which are safely ignored in the lending channel literature as they are no longer used as a monetary policy tool in the United States. In contrast, reserve requirements are still a commonly used policy instrument in many emerging markets<sup>1</sup>.

## 2. Methodology

A series of tests were implemented to explore the response of selected balance sheet and income statement components to changes in monetary conditions, across domestic and foreign banks, after controlling for some observable bank characteristics. More specifically, the tests comprised six separate specifications sharing the general form:

$$y_{i,c,t} = \alpha_i + \sum_{s=1}^r \beta_s x_{c,t-s} + \rho z_{i,c,t-1} + \sum_{s=1}^q \delta_s m_{c,t-s} + u_{it}, \quad (1)$$

where  $i = 1, \dots, N$  refers to individual banks (panels),  $c = 1, \dots, C$  to countries, and  $t = 1, \dots, T_i$  to the time dimension (the sample is unbalanced, so  $T_i$  varies across banks). The constants,  $\alpha_i$ , are the bank-level fixed effects.

<sup>1</sup> Reinhart and Reinhart (1999) provide a discussion of the use and effects of reserve requirements in a small open economy.



Each specification used a different (bank-level) dependent variable,  $y_{ict}$ . A first set of regressions employed quantity-related dependent variables: LOAN GROWTH, DEPOSIT GROWTH, the ratio of net LOANS TO DEPOSITS. The second set of regressions employed price-related dependent variables: LENDING RATES, DEPOSIT RATES, and LENDING MINUS DEPOSIT SPREADS. Loan and deposit growths were computed by first differencing the logarithm of the corresponding series, measured in constant (1995) local currency units. Bank-specific lending and deposit rates were estimated by combining information from income statements and balance sheets. Specifically, lending rates were obtained by dividing interest revenues over average loan volume, and deposit rates were obtained by dividing interest expenses over average deposit volume. The spreads between lending and deposit rates were computed as the difference between these two. Admittedly, these variables are noisy indicators of the target series, as interest revenues include interests received from investments, while interest expenses are affected by interests paid on liabilities other than deposits. These, however, seem to be the best available indicators of bank-specific interest rates.

The vector  $x$  contains country-level variables, aimed to control for changes in loan demand. Here the specification includes GDP GROWTH, also measured in 1995 local currency. The vector  $z$  contains bank-level characteristics to control for financial constraints. Following a standard practice in the monetary transmission literature, three indicators were used: a measure of bank size, an indicator of asset liquidity, and an indicator of bank capitalization. Regarding bank size, the presumption is that bigger banks face lower external finance premiums and are, thus, better equipped to substitute away a negative shock to deposits with other sources of financing. To eliminate possible trends in bank SIZE, the estimation uses a relative measure, computed as the difference between the log of assets of a bank in a given year (in 1995 local currency) and the average computed over all banks in the same country and year:

$$Size_{i,c,t} = \ln(Asset_{i,c,t}) - \frac{\sum_{i \in c} \ln(Asset_{i,c,t})}{N_{c,t}}, \text{ for } c = 1, \dots, C,$$

where  $N_{ct}$  stands for the number of banks in country  $c$  in year  $t$ . Therefore, the resulting measure is a normalized variable with zero mean for each country and year. The second variable, asset LIQUIDITY, was computed as the proportion of liquid assets to total assets<sup>1</sup>. The inclusion of this variable follows the presumption that banks with more liquid

assets are better positioned to meet loan demand in the face of unexpected shocks to deposits. The third variable, CAPITALIZATION, was defined as equity capital over total assets. The presumption is that better-capitalized banks tend to pay lower risk premiums on non-insured debt and, therefore, face lower financing restrictions. These two variables were normalized with respect to the sample averages of each country. For example, the transformation applied to liquidity was:

$$Liquidity_{i,c,t} = Liquidity_{i,c,t} - \frac{\sum_t \sum_i Liquidity_{i,c,t}}{N_c},$$

where  $N_c$  is the number of observations in country  $c$  over the whole period. Capitalization was treated similarly. Potential endogeneity problems and sources of bias associated with these variables are discussed below.

Going back to the specification, the vector  $m$  contains two measures of monetary conditions. First, the evolution of liquidity in the banking system was captured by the interest rates on short-term lending between financial institutions, MONEY MARKET RATES. Second, the evolution of required reserves was tracked with RESERVE REQUIREMENTS, an indicator variable constructed on the basis of central bank reports (see Appendices B to D for details). This indicator was allowed to vary on a scale from 1 to 5, with a larger number indicating higher reserve requirements<sup>2</sup>. A comparison between these two variables on a country-by-country basis suggests that they convey complementary information on monetary conditions (Figures 1 and 2, Appendix A).

As a robustness check, an alternative set of monetary conditions was used exploiting the uncovered interest parity. In particular, MONEY MARKET RATES were replaced by two variables: the yearly percent change of the average market exchange rate, DEPRECIATION, and the three-month U.S. Treasury bill rate, T-BILL. The inclusion of these two variables follows from the fact that all countries studied here are small open economies, and the stability of bank deposits may be influenced by developments in the foreign exchange market.

In all the regressions, the target parameters are the coefficients of the monetary conditions (i.e., the  $\delta$ 's). Differences across domestic and foreign banks were tested by interacting each explanatory variable with a dummy FOREIGN, which equals one for foreign banks and zero for domestic ones. An additional, more restrictive test was also implemented by further

<sup>1</sup> Liquid assets include cash and reserves, government bonds, and other marketable securities.

<sup>2</sup> The indicator relied on judgment, as the structure of reserve requirements can be quite complicated (i.e., they can be defined on marginal vs. average deposits, and differentiated by deposit types).

splitting the sample by bank characteristics. In particular, dummy variables were created to separate banks with lagged capitalization above the 75<sup>th</sup> percentile with respect to the sample of banks operating in the same country. Similarly, another set of dummy variables was created to separate banks with lagged liquidity above the 75<sup>th</sup> percentile with respect to the rest of banks in the same country. As a by-product, the coefficients associated with GDP growth (the  $\beta$ 's) also allow to explore for systematic differences in the cyclical behavior of the selected endogenous variables, across domestic and foreign banks.

Separate regressions were estimated for Asia and Latin America on the notion that differences in macroeconomic performance and banking practices between these two regions render the population parameters different. It is well recognized, for example, that foreign bank entry into emerging markets has led to the emergence of "regional evolvers", that is, banks that use their relative advantages in a region (i.e., historic and cultural links with host countries) to focus their international expansion, as in the case of Spanish banks in Latin America and Japanese banks in East Asia.

**2.1. Expected results.** Consider the set of regressions dealing with quantity-related endogenous variables (i.e., loans and deposits). The first specification provides a test for the sensitivity of LOAN GROWTH to changes in monetary conditions. Under the lending channel hypothesis, financially-constrained banks are expected to be more sensitive to monetary conditions, implying that the coefficients associated with domestic banks are higher in absolute value (i.e., more negative) than those for foreign banks. The second specification further explores for differences in the sensitivity of DEPOSIT GROWTH to monetary conditions across domestic and foreign banks. If banks have the capacity to adjust their deposit rates to partially offset a negative shock to deposits, the lending channel hypothesis would imply a *lower* sensitivity of deposits to monetary conditions for more financially-constrained banks – as they are less capable to substitute them with other sources of funds. The third specification is a combination of the previous two. It checks for the sensitivity of LOAN TO DEPOSIT ratios to changes in monetary conditions. The lending channel hypothesis implies that the associated coefficient has to be non-significant for more financially-constrained banks, and positive for less financially-constrained banks, since the latter would tend to finance a lower proportion of loans with customer deposits in response to tighter monetary conditions.

Consider now the models with price-related endogenous variables (i.e., deposit rates, lending

rates, and lending minus deposit spreads). The lending channel hypothesis implies that financially-constrained banks display a larger response of lending and deposit rates to monetary conditions. Moreover, the lending minus deposit spread is expected to increase under tighter monetary conditions for financially-constrained banks. This is because, in response to a negative shock to deposits, banks would try to resort to alternative forms of financing, increasing their premium on non-insured debt and, by cost minimization, their equilibrium deposit rates. This increase would tend to be translated more than proportionally into lending rates due to the tax-like effect of reserve requirements on insured deposits and the cost of maintaining precautionary liquid assets.

## 2.2. Sources of bias and endogeneity problems.

As with any reduced-form estimations, there are potential endogeneity problems and bias associated with the use of bank characteristics (i.e., size, liquidity, and capitalization). Regarding size, there is possible joint determination since a bank may actually become larger precisely because of large deposit (and loan) growth. Regarding capitalization, a financially-constrained bank may *choose* to be more capitalized, eroding the usefulness of this indicator as a measure of financial constraints. In fact, as shown below, balance sheet data indicate that capitalization decreases systematically with bank size, suggesting that it may be a poor indicator of financial constraints on banks. A similar problem arises with the use of liquidity ratios. A bank may optimally *choose* to have a more liquid asset structure to compensate for higher financial constraints. Again, it is unclear whether a less liquid asset structure is a clear-cut indicator of higher financial constraints. To reduce these endogeneity problems, the regressions use lagged values of bank-level characteristics.

A related problem, spurious correlation induced by mean-reversion may arise from the use of liquidity ratios as defined. To see why, suppose that bank assets are composed only of liquid instruments and loans. In this simplified balance sheet, a bank with higher-than-average liquid assets in period  $t-1$  will tend to display a higher-than-average loan growth in year  $t$ . Thus, interacting monetary conditions with a liquidity indicator will tend to erode the power of the test, biasing the results in favor of the lending channel hypothesis (i.e., banks with more liquid balance sheets having a lower sensitivity of loan growth to monetary disturbances). This problem can be avoided by choosing a different scaling variable. For example, liquid assets could be scaled by total deposits, which, in fact, seem to be the relevant measure if deposits are the main source of shocks to bank's liabilities. For comparative purposes, this

paper computes liquidity in the usual way (scaling liquid assets by total assets), but an additional exercise was implemented using deposits as the scaling variable with similar qualitative results.

### 3. Data

Macro data come from the International Financial Statistics. The series include MONEY MARKET RATES (series 60b), the yearly percent change of the average market exchange rate, DEPRECIATION (series rf), the three-month U.S. Treasury bill rate, T-BILL (series 11160c), and GDP GROWTH (series 99b), expressed in constant (1995) local currency units using consumer price indexes (series 64)<sup>1</sup>.

Bank-level data (i.e., financial statements) come from the Bankscope database. Series are yearly, covering a sample of 1,565 banks in 20 countries during the period of 1989-2001. The sample of countries includes all major Latin American and Southeast Asian countries<sup>2</sup>. Comparing the behavior of domestic and foreign banks in this sample offers a rich experiment, since it covers pre- and post-entry years, as well as several banking and balance of payment crisis. In total, the sample has 8,574 observations, distributed across time and countries as shown in Table 1 (Appendix A). The decrease in the number of banks in Asia after 1997 reflects the consolidation process following the Asian crisis.

Using the Bankscope database has two major advantages. First, the coverage is fairly comprehensive, with sampled banks accounting for about 90 percent of total assets in each country, according to the source. Second, the accounting information at the bank level is presented in standardized form, after making adjustments for differences in accounting and reporting standards across countries. On the other hand, the data have some limitations. First, there is a sample-selection bias in favor of large banks which weakens somewhat its usefulness, as small banks may tend to be more financially constrained than large banks. Second, the data do not provide a breakdown of loan portfolios by sectors or by borrower types, precluding the use of controls for bank-specific changes in loan demand. Third, the data do not provide information on the currency composition of loans and deposits, which could be a potentially useful source of cross-sectional variation in the open economy context.

While in many cases Bankscope reports both consolidated and unconsolidated financial statements, this paper uses unconsolidated figures to the extent possible, to reduce variations arising from changes in subsidiaries' ownership and to work with comparable accounting data. From the original source, unconsolidated figures were available in all but 73 cases. For the purposes of the exercises below, balance sheet figures were converted into constant 1995 local currency using consumer price indexes (series 64 of the IMF: *International Financial Statistics*). Series in constant 1995 US\$ were also computed using the average market exchange rate for each country (series rf of the IMF: *International Financial Statistics*).

Outliers were identified through the application of several filters, including limits on the yearly change in total assets, on the yearly growth rate of loans and deposits, and on the ratio of net loans to deposits. Few cases with other data deficiencies and with negative equity were also removed<sup>3</sup>.

The identification of foreign banks in each country was achieved through several complementary steps aimed to minimize misclassifications. A bank was classified as "foreign" in a given year if it had at least 51 percent of its capital in the hands of residents of industrial OECD countries (i.e., excluding Mexico and Korea). The ownership structure at the end of 2001, for each bank in the sample, was obtained from Bankscope and from central banks. To reconstruct backwards the chronological evolution of ownership throughout the period, the list of banks was intersected with a comprehensive list of mergers and acquisitions targeting financial institutions in the sampled countries (a detailed description is given in Appendix E). Due to data limitations, no distinction was made between subsidiaries and branches of foreign banks – an otherwise relevant separation, to the extent that subsidiaries' access to capital from their parent institutions may not be automatic, as in the case of branches.

Descriptive evidence on the structure of balance sheets across regions and bank sizes is presented in Table 2 (Appendix A). No clear patterns arise in the balance sheets of banks operating in Latin America. On the other hand, banks operating in Asia display some regularities similar to those reported in Kayshap and Stein (1994). In particular, larger banks tend to have a higher proportion of loans to assets, and they

<sup>1</sup> For countries with incomplete or unavailable information on money market rates, an alternative indicator was used. Deposit rates (series 60L) were used for Bolivia, Chile, Colombia, Panamá, Paraguay, and Venezuela; the call money rate (series 60) was used for India; the one-month average interbank offer rate for Hong Kong; and the interbank rate for Taiwan.

<sup>2</sup> For Latin America, the list of countries includes: Argentina, Bolivia, Brazil, Chile, Colombia, Mexico, Panama, Paraguay, Peru, Uruguay, and Venezuela. For East Asia: Hong Kong, India, Indonesia, South Korea, Malaysia, Philippines, Singapore, Thailand, and Taiwan.

<sup>3</sup> Specifically, the following filters were used. First, 31 observations where yearly asset growth in constant US\$ exceeded 200 percent in absolute terms were removed. Second, 57 cases where the yearly loan growth exceeded 300 percent in absolute terms, and 77 cases where the yearly deposit growth exceeded 300 percent in absolute terms were also removed. Third, 27 cases where loans represented more than 100 times the value of deposits were removed. Finally, 66 cases with negative deposits and 94 cases with negative equity capital were also removed. In total, 316 observations were eliminated, as some of the filters affected the same observations.



rely more on non-deposit financing, and less on equity. These patterns have been interpreted as consistent with the presence of imperfect substitution between deposits and other sources of financing, especially for smaller banks. If small banks cannot completely offset shocks to deposits with other financing sources, they will optimally hold a buffer stock of liquid assets to reduce the costs of early loan liquidation. In equilibrium, they will also tend to rely less on non-deposit financing and more on internal capital.

This presumption can be further checked by splitting the sample across domestic and foreign banks. Foreign banks could be more aggressive in lending if they have access to internal financial resources from their mother institutions. Also, they could have systematic differences in the liability structure of their balance sheets with respect to domestic banks. Table 3 (Appendix A) presents summary statistics on loan growth, deposit growth, and several indicators of the structure of balance sheets for domestic and foreign banks, and by regions. On average, foreign banks in Latin America have higher rates of deposit and loan growth than domestic banks, but the opposite holds true for Asia. In general, there are not strong differences in the structure of balance sheets across domestic and foreign banks, so the data do not seem to fit into the hypothesized pattern.

#### 4. Baseline results

The results of baseline regressions for the Asian and Latin American sub-samples are presented in Tables 4 and 5 (Appendix A). Given the nature of the data, which combine a cross-section and a time-series dimension, the equations were estimated with Generalized Least Squares (GLS) to accommodate possible autocorrelation within panels and heteroscedasticity across panels. The estimation allowed for panel-specific AR(1) processes. Cross-sectional correlations between panels were not considered since the number of panels is much larger than the time series dimension.

For each sub-sample, six regressions were computed, using identical specifications except for the dependent variables. Those presented in the first three columns are quantity-related (LOAN GROWTH, DEPOSIT GROWTH, and LOAN TO DEPOSIT ratios), and those in columns four to six are price-related (LENDING RATES, DEPOSIT RATES, and LENDING MINUS DEPOSIT spreads). To facilitate reading, the explanatory variables are divided in two panels. The upper panel includes GDP GROWTH and the bank-level controls, while the lower panel groups the monetary conditions. To compare the responses across domestic and foreign banks, all the explanatory variables were interacted with a dummy variable, FOREIGN, which equals one for foreign banks and zero otherwise. Robust standard errors are reported in square brackets.

In the first two columns, the results show that loan and deposit growths tend to be highly procyclical (especially the former), with no statistically significant differences across domestic and foreign banks. A similar result was obtained in Dages, Goldberg and Kinney (2000) for Mexico and Argentina. In addition, banks with higher asset liquidity or capitalization at the end of the previous year tend to display stronger loan growth, with some indication that the response is larger within the subset of foreign banks. Going to the lower panel, loan growth decelerates in response to tighter monetary conditions, with some support for the view that loan growth of foreign banks tends to be less sensitive to changes in money market rates. Interestingly, the results in the third column indicate that loans and deposits move one-for-one at the one year frequency, independently of the economic cycle, monetary conditions, and bank characteristics, including ownership.

Going to columns four to six, the upper panel shows that deposit rates tend to be countercyclical, with some evidence suggesting that this is less intense in the case of foreign banks in the Asian sub-sample. Banks with higher liquidity tend to pay lower deposit rates and also charge lower interest spreads, a result that appears to be mainly attributable to changes in lending rates. However, no significant differences arise between domestic and foreign banks. In the lower panel, periods of tight monetary conditions are associated with higher lending and deposit rates, with inconclusive results in terms of spreads (for example, spreads go up for the Latin American sub-sample, and decrease for the Asian sub-sample). In the Asian sub-sample, foreign banks tend to display a lower sensitivity of lending and deposit rates to changes in monetary conditions.

Overall, the results tend to provide only weak support to the lending channel hypothesis. In particular, loan growth of foreign banks is less sensitive to money market rates in both Asia and Latin America, and some evidence suggests that deposits on foreign banks are also less sensitive to monetary conditions (in the Latin America sub-sample). On the other hand, the results show no statistically significant differences in the response of loan growth to changes in reserve requirements across domestic and foreign banks. All these results were qualitatively robust to the removal of 58 banks changing ownership during the period.

#### 5. A closer look to loan growth

This section focuses more closely on the response of *loan growth* to monetary conditions given its importance in the monetary transmission mechanism. The regressions parallel those presented before, but adding interacting terms between bank ownership and other bank characteristics. In



particular, besides partitioning the sample across domestic and foreign banks, the sample was first split by capitalization, separating banks with capitalization above (and below) the 75<sup>th</sup> percentile with respect to other banks operating in the same country<sup>1</sup>. Second, the sample was split by asset liquidity, separating banks above (and below) the 75<sup>th</sup> liquidity percentile with respect to other banks operating in the same country. Subject to the caveats discussed above, banks with stronger capitalization and more liquid assets could be considered less financially-constrained, and therefore, better equipped to isolate loan growth from changes in monetary conditions. Therefore, the differences between domestic and foreign banks reported before are expected to be larger in the sub-samples of banks with lower liquidity and/or capitalization.

Summary results of three sets of regressions, using LOAN GROWTH as dependent variable, are presented in Tables 6 and 7 (Appendix A). To facilitate the reading, the only coefficients reported are those associated with the monetary conditions (i.e., MONEY MARKET RATE and RESERVE REQUIREMENTS). The upper panel displays the results of the regressions covering the whole sample (and are, therefore, identical to those presented before). The regression in the middle panel splits the sample by bank ownership and capitalization, and the regression in the lower panel splits the sample by bank ownership and liquidity. Each panel displays the coefficients of domestic banks alongside the matching coefficients for foreign banks, and the p-values for the null(s) of coefficient equality between square brackets.

Going to the upper panel, the coefficients associated with the money market rate are statistically significant and have the expected (negative) sign for domestic banks, but are not different from zero in the case of foreign banks. As discussed before, the null of coefficient equality across domestic and foreign banks can be rejected in both the Latin American and the Asian sub-samples. The results in the two lower panels indicate that loan growth of banks with lower capitalization and/or liquidity tends to be more sensitive to changes in money market rates in the two sub-samples. While this applies to both domestic and foreign banks, the coefficients of the latter are not significantly different from zero in most cases. A stricter comparison indicates that the null of coefficient equality across domestic and foreign banks can be rejected only when the sample is partitioned by liquidity, but not by capitalization, with the evidence providing some support to the

lending channel hypothesis. On the other hand, a look at the coefficients associated with reserve requirements indicates that, while they have the expected negative sign, their standard errors are too large and the null of coefficient equality between domestic and foreign banks cannot be rejected in most cases.

As a complementary exercise, parallel regressions were computed using an alternative set of indicators of monetary conditions. The new set also included reserve requirements, but replaced money market rates with the nominal exchange rate depreciation and international interest rates (proxied by the federal funds rate). The results, presented in Tables 8 and 9 (Appendix A) are roughly comparable to those reported above, providing some evidence in support of the lending channel hypothesis. In both sub-samples, loan growth decelerates with exchange rate depreciation, with foreign banks generally displaying a lower sensitivity. Moreover, the differences appear to be driven by less liquid and/or less capitalized banks.

The coefficients associated with reserve requirements and the federal funds rate are less conclusive. For the Latin American sub-sample both coefficients have the expected (negative) sign but the standard errors are too high to be conclusive, and there are no significant differences across domestic or foreign banks. For the Asian sub-sample, foreign banks display a larger sensitivity to reserve requirements than domestic ones, which runs contrary to expectations, while the coefficients of the federal funds rate are either not significant or have the wrong sign. Similar results were obtained using the money market rates of Japan and Australia as alternative measures of international interest rates, possibly reflecting the fact that Asian countries were mostly non-reliant on foreign capital inflows.

Summing up, the results indicate that loan growth of well capitalized and/or more liquid banks is less sensitive to changes in monetary conditions. While in most cases the differences between domestic and foreign banks are not statistically significant, a few exceptions tend to support the lending channel hypothesis.

The results obtained so far implicitly assume that the behavior of domestic and foreign banks is regular during tranquil times and during periods of financial distress. Differences in the behavior of domestic and foreign banks (and their depositors), however, could be magnified during periods of financial distress. The next section provides a closer look into this.

## 6. Are foreign banks different during crisis periods?

A related comparison between domestic and foreign banks can be performed by separating tranquil periods and episodes of financial distress. Arguably, the latter entail larger financial constraints on banks, as well as changes in depositors' behavior that may

<sup>1</sup> In other words, the percentiles of capitalization were computed on a country-by-country basis, and the sample was partitioned between banks above (and below) the 75<sup>th</sup> percentile.

induce relocations of deposits toward larger or sounder banks. Therefore, potential asymmetries in financial constraints across domestic and foreign banks would tend to increase during crises periods, especially if foreign banks are perceived as safer than domestic. The sample of countries included in this study offers a rich information set to address this issue, since half of them underwent some type of financial crisis during the nineties.

To implement this exercise, three types of (related) crises are considered: currency, banking, and debt crises. The definitions of each type of crises, and the series, are borrowed from previous studies. A first exercise exploits the currency and banking crises defined in Kaminsky and Reinhart (1999)<sup>1</sup>, and the debt crises provided in Detragiache and Spilimbergo (2001)<sup>2</sup>. As in the original series, each crisis variable is a dummy that takes the value of one at the crisis year and zero elsewhere.

The first pass at the evidence is provided with the help of a set of crisis windows spanning three years and centered around banking, currency, or debt crisis. The close relationship between these three types of crises – both within and between countries – tends to produce clustering, and therefore, the size of the window exceeds the three-year period in many countries. For example, the Mexican currency crisis of 1994 was preceded by a banking crisis in 1992, and, therefore, the associated crisis window spans over five years (1991–1995). Similarly, the Venezuelan currency crisis of 1994–1995 was preceded by a banking crisis that started in 1993, and, thus, the crisis window also spans over five years (1992–1996). In other cases, such as Malaysia and Philippines during the 1997 Asian Crisis, the currency and banking crises occurred simultaneously, and the crisis window covers three years (1996–1998).

Figure 3 (Appendix A) presents the behavior of loan growth across domestic and foreign banks for each country, both during crises and tranquil periods<sup>3</sup>. The graphs illustrate two results. First, not

surprisingly, loan growth decreases sharply at the beginning of the crisis window and tends to recover toward the end. Second, the behavior of loan growth across domestic and foreign banks is remarkably similar, even during periods of financial distress.

A more systematic test comparing the behavior of domestic and foreign banks across crises and tranquil periods was performed by running panel regressions with bank-level fixed effects, and splitting the sample of banks between domestic and foreign with the use of a dummy variable. The results, presented in Tables 10 and 11 (Appendix A) are qualitatively similar for the Asian and Latin American sub-samples. The first two columns indicate that both loan and deposit growths decrease during crises periods, with mild or not significant differences between domestic and foreign banks, with the exception of deposit growth in Asia, which shows a larger contraction for the subset of foreign banks. The third column, which uses the ratio of loans to deposits as dependent variable, indicates that the proportion of loans financed through deposits remains roughly constant during crises periods. In other words, changes in loans are matched one-for-one by changes in deposits both during crises and tranquil periods, and this tends to apply equally to domestic and foreign banks.

Interestingly, differences across domestic and foreign banks during crises periods appear to be related to the behavior of interest rates. The regressions presented in the fifth and sixth columns indicate that bank-specific deposit and lending rates increase during crises periods, with a smoother patterns for foreign banks. The behavior of bank spreads during crises periods, however, is less conclusive, and the results in all cases show no differences between domestic and foreign banks.

A potential drawback of these results is that they are obtained from a crisis window that may be too large, as differences in the behavior of domestic and foreign banks may tend to disappear as the size of the crisis window increases. To take this into account, the same regressions were computed again using a slightly richer set of crisis variables. Specifically, three yearly dummy variables were created to isolate potential differences in bank behavior around crisis episodes. The first variable, CRISIS T-1, equals one for the year preceding the crisis and zero elsewhere, the second, CRISIS T, equals one in the year of the crisis and zero elsewhere, and the third, CRISIS T+1, equals one for the year immediately after the crisis and zero elsewhere. The behavior of domestic and foreign banks around, and during crisis periods, was then compared.

The results displayed in the first two columns of Tables 12 and 13 (Appendix A) indicate that both loan and deposit growths tend to be slightly above average in the year preceding the onset of the crises,

<sup>1</sup> In Kaminsky and Reinhart (1999), the dating of currency crises is based on an index of currency market turbulence, computed as a weighted average of exchange rate changes and reserve changes. A currency crisis occurs when the index reaches (or surpasses) three standard deviations above the mean. In turn, (the beginning of) a banking crisis is defined by two types of events: (i) bank runs that lead to the closure, merging, or takeover by the public sector of one or more financial institutions; or (ii) if there are no runs, the closure, merging, takeover, or large-scale government assistance of an important financial institution (or group of institutions) that marks the start of a string of similar outcomes for other financial institutions.

<sup>2</sup> In Detragiache and Spilimbergo (2001), a debt crisis occurs when either (or both) of the following conditions occur: (i) there are arrears of principal or interest on external obligations towards commercial creditors (banks or bondholders) of more than 5 percent of total commercial debt outstanding; (2) there is a rescheduling or debt restructuring agreement with commercial creditors as listed in the Global Development Finance (World Bank Debt Tables).

<sup>3</sup> Loan growth was computed as the median taken over all banks operating in the same country in a given year.

and sharply collapse immediately after, with mild evidence indicating a less pronounced decline of credit in the case of foreign banks operating in Latin America, but the opposite in Asia. Looking at the third column, the ratio of loans to deposits tends to decrease during and after crises episodes, but the differences with tranquil periods tend to be insignificant. In other words, the data strongly indicate that loans and deposits of both domestic and foreign banks move one-to-one during tranquil and crises periods.

Going to the last three columns, lending rates increase above average one year before the crises, and remain high thereafter (within the crises window considered). Deposit rates, on the other hand, appear to react more sluggishly, since they do not increase significantly during the year preceding the crises.

To check the sensitivity of the results, the regressions were computed again using two alternative definitions of banking crises: Frankel and Rose (1996), and Caprio and Klingebiel (1996). Summary results of these regressions, provided in Tables 14 and 15 (Appendix A), support the previous conclusions, in the sense that no systematic differences in loan and deposit growth arise between domestic and foreign banks, regardless of the operational definition of crises employed. On the other hand, the behavior of deposit and lending rates across domestic and foreign banks tends to differ during crises periods, with foreign banks displaying, in general, a somewhat lower sensitivity to market conditions.

### Concluding remarks

The increase of foreign bank presence in emerging markets has generated debate on its potential effects

on financial stability and the transmission of domestic and external shocks into credit markets. The results reported in this paper tend to fall on neutral grounds. There is some evidence that loan growth of foreign banks is less sensitive to changes in monetary conditions in host countries, a result driven by banks with lower asset liquidity and/or capitalization. Within the group of banks with stronger balance sheets, however, there is a strong similarity in the response of loans and deposits to monetary conditions across domestic and foreign banks.

These findings offer some evidence supporting the existence of supply-side effects in credit markets, provided that differences in bank ownership are a good proxy for financial constraints on banks, and that no systematic differences arise in loan demand across domestic and foreign banks. While the latter may be unlikely, the fact that the differences are driven by less liquid and/or less capitalized banks offers an additional support.

At a more general level, the results indicate that foreign bank participation in emerging markets has not led to increased instability in credit markets. The response of credit to economic activity and monetary conditions seems to be roughly similar across domestic and foreign banks. Differences, if any, appear to be more closely related to the behavior of interest rates. In particular, deposit and lending rates of foreign banks tend to be less sensitive to changes in monetary conditions, and smoother during periods of financial turmoil in host countries, which suggest that foreign banks may have an advantage over their domestic peers in attracting deposits.

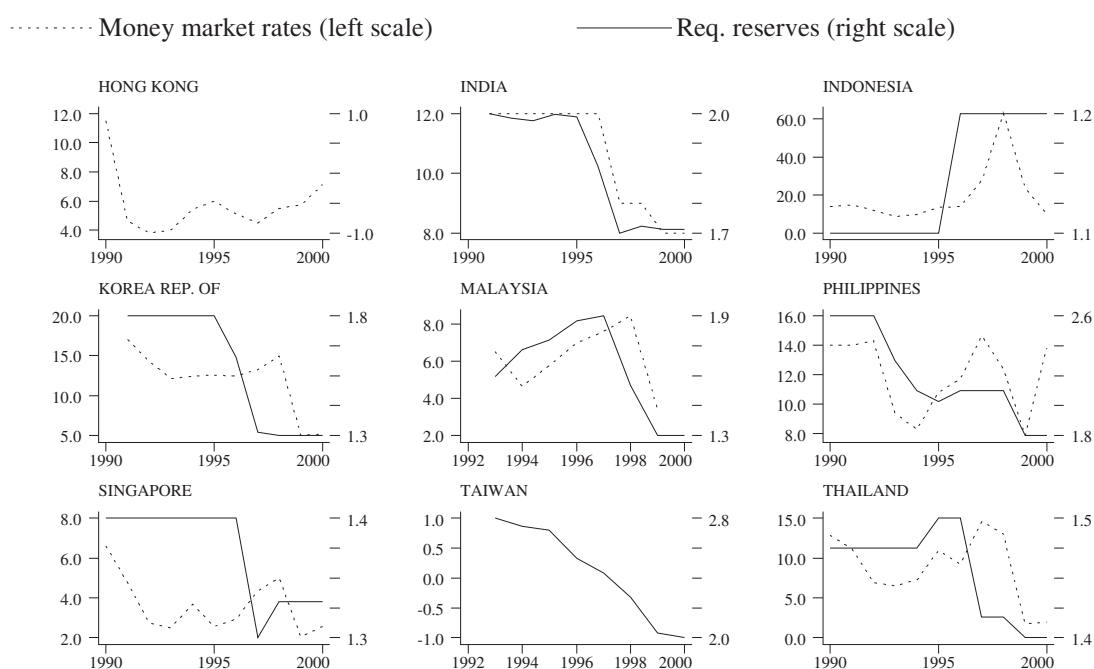
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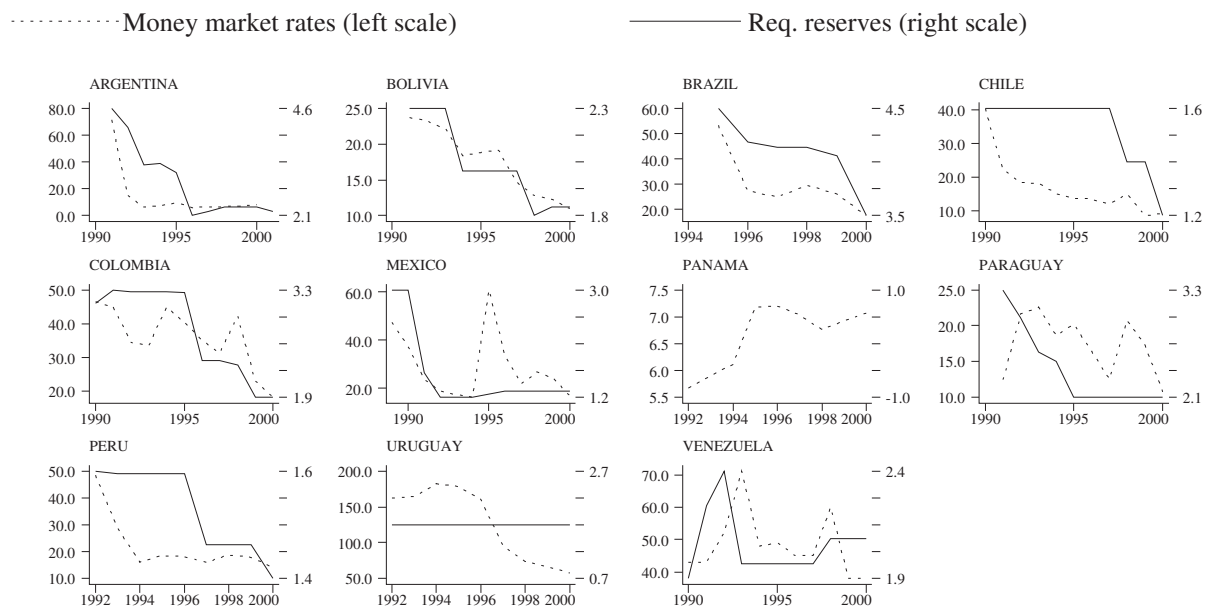
## Appendix A



Notes: For countries with incomplete or not available information on money market rates, an alternative indicator was used. The call money rate (series 60) was used for India, the 1-month average interbank offer rate for Hong Kong, and the interbank rate for Taiwan. Source: Central Bank reports and International Financial Statistics.

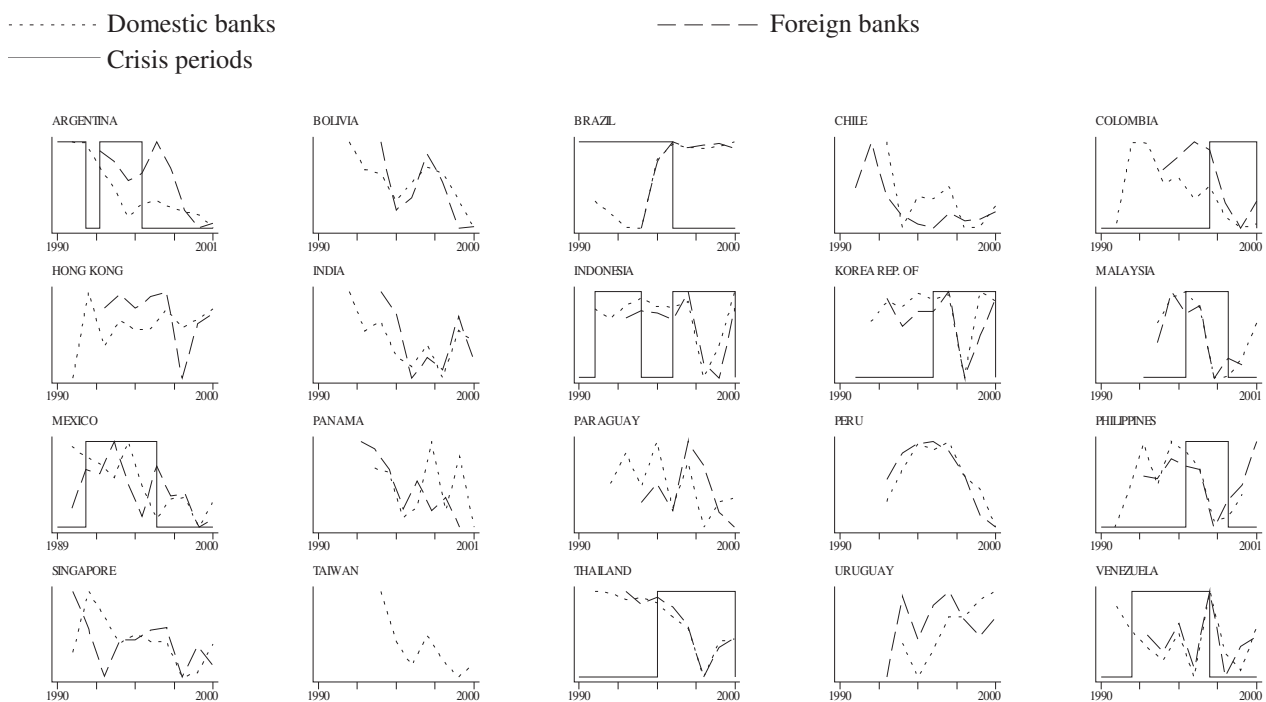
**Fig. 1. Money market rates and reserve requirements, Asian countries, 1990-2000**





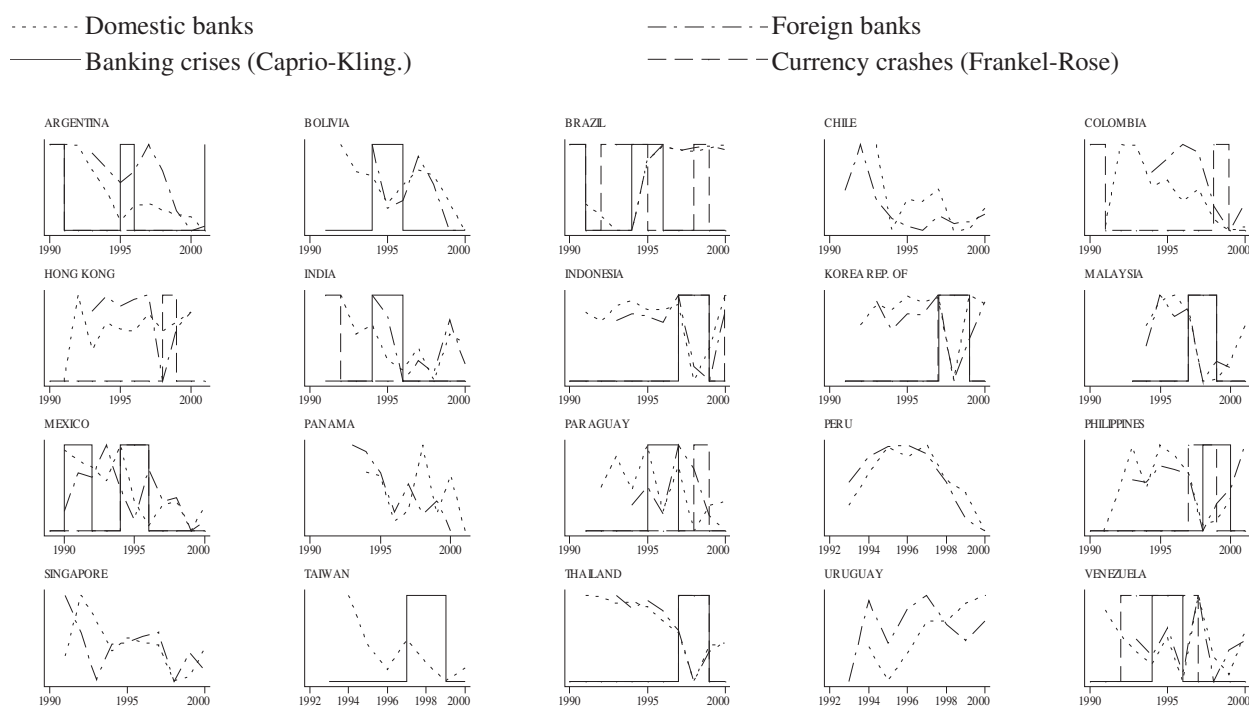
Notes: For countries with incomplete or not available information on money market rates, an alternative indicator was used. Deposit rates (series 60L) were used for Bolivia, Chile, Colombia, Panamá, Paraguay, and Venezuela.  
Source: Central Bank reports and International Financial Statistics.

**Fig. 2. Money market rates and reserve requirements, Latin America, 1990-2000**



Notes: This figure presents the evolution of loan growth in constant local currency units for domestic and foreign banks. For each country, loan growth is computed as the median across sampled banks. A crisis window, covering a three-year period around either a currency, banking or debt crisis (based on banking and currency crises by Kaminsky-Reinhart, and debt crises by Detragiache-Spilimbergo) is also plotted.

**Fig. 3. Loan growth of domestic and foreign banks and financial crises (Kaminsky-Reinhart)**



Notes: This figure presents the evolution of loan growth in constant local currency units for domestic and foreign banks. For each country, loan growth is computed as the median across sampled banks. A crisis window, covering a three-year period around either a currency, banking or debt crisis (based on Caprio-Klingebiel and Frankel-Rose) is also plotted.

**Fig. 4. Loan growth of domestic and foreign banks and financial crises (Caprio-Klingebiel and Frankel-Rose)**

**Table 1. Sample coverage by regions and bank ownership**

	Asia			Latin America			Total observations		
	Domestic	Foreign	Total	Domestic	Foreign	Total	Freq.	Percent	Cum.
1989			0	2	1	3	3	0.03	0.03
1990	9	2	11	9	3	12	23	0.27	0.30
1991	28	5	33	20	3	23	56	0.65	0.96
1992	84	31	115	42	13	55	170	1.98	2.94
1993	280	101	381	159	96	255	636	7.42	10.36
1994	366	132	498	294	157	451	949	11.07	21.43
1995	424	164	588	321	195	516	1104	12.88	34.30
1996	452	182	634	346	212	558	1192	13.90	48.20
1997	411	189	600	329	220	549	1149	13.40	61.60
1998	399	190	589	336	241	577	1166	13.60	75.20
1999	365	172	537	335	235	570	1107	12.91	88.12
2000	281	142	423	319	250	569	992	11.57	99.69
2001	5	1	6	14	7	21	27	0.31	100.00
Total	3104	1311	4415	2526	1633	4159	8574	100	

Notes: This table shows the temporal distribution of the bank-level data. The sample comes from the BankScope database, and covers 20 emerging economies in Asia and Latin America.

**Table 2. Balance sheet structure by regions and quintiles of bank size**

Quintiles of bank size	Asian					Latin America				
	0-20	20-40	40-60	60-80	80-100	0-20	20-40	40-60	60-80	80-100
Total loans	50.8	51.5	52.2	57.8	60.4	51.5	54.7	53.2	47.9	50.0
Problem loans	3.0	3.8	2.0	2.7	3.8	3.1	2.4	2.1	2.4	4.7
Loan loss reserves	4.9	2.6	1.6	1.7	1.6	4.5	3.1	2.6	2.2	3.0
Net loans	45.9	49.1	50.7	56.4	59.2	48.1	52.9	51.7	47.1	49.8
Deposits with banks	16.6	13.2	11.9	9.2	11.4	10.4	9.0	8.6	7.0	4.8
Securities	14.8	12.4	14.5	13.8	10.4	15.9	15.2	18.0	21.6	18.7
Equity investment	5.0	7.4	6.1	2.6	1.9	2.8	2.4	1.8	2.5	3.4
Total other earning assets	44.2	43.0	41.5	34.8	30.7	33.1	31.4	33.6	36.9	34.6

Table 2 (cont.). Balance sheet structure by regions and quintiles of bank size

	Asian					Latin America				
Total non-earning assets	7.2	6.2	5.8	6.6	7.9	13.9	12.2	11.5	13.3	12.9
Fixed assets	2.7	1.7	2.0	2.2	2.2	4.9	3.5	3.2	2.7	2.6
Total assets	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total deposits	53.8	59.1	61.2	72.6	76.8	58.9	66.7	65.8	59.3	56.1
Money market funding	9.6	8.2	8.4	4.7	3.6	8.0	9.3	12.0	14.8	16.4
Other funding	3.5	4.9	8.5	4.7	6.1	2.0	2.8	4.0	6.5	9.7
Other liabilities	5.5	5.4	5.3	6.5	6.8	6.0	5.9	6.5	8.6	9.0
Total liabilities	72.4	77.6	83.4	88.6	93.2	75.0	84.8	88.2	89.2	91.2
Equity	27.6	22.5	16.6	11.4	6.7	25.0	15.2	11.8	10.8	8.8
Total liabilities and equity	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. observations	578	761	888	972	1204	1131	948	821	737	504
Median assets (million 1995 US\$)	58	210	489	1,591	6,351	50	199	486	1,443	6,392
Mean assets (million 1995 US\$)	58	212	517	1,685	12,615	54	203	512	1,561	11,498

Notes: Other earning assets include due from Central Banks, deposits with banks, bonds, securities, and equity investments. Total deposits include demand deposits, saving deposits, certificates of deposits, and banks deposits. Equity includes equity reserves and share capital.

Table 3. Summary statistics by regions and bank ownership

	Domestic banks				Foreign banks			
	Mean	Median	Max.	Min.	Mean	Median	Max.	Min.
A) Asia								
Loan growth	11.2	10.5	240.4	-128.6	5.1	8.3	218.2	-206.9
Deposit growth	11.0	9.3	215.7	-183.8	8.3	8.4	216.2	-108.1
Net loans/Total deposits	81.8	75.9	484.0	21.1	88.8	80.7	465.0	22.0
Net loans/Total assets	56.1	57.4	87.1	11.8	54.5	58.0	87.0	10.0
Other earning assets/Total assets	31.4	28.5	78.4	5.2	32.7	30.0	75.9	6.1
Non earning assets/Total assets	9.9	8.0	74.4	5.0	11.2	8.3	71.2	5.0
Total deposits/Total assets	75.2	79.5	94.9	5.2	68.9	74.8	94.9	7.2
Money market funding/Total assets	4.1	0.9	77.2	0.0	4.4	0.0	73.3	0.0
Total liabilities/Total assets	90.1	92.3	99.7	40.9	86.1	89.9	99.8	40.3
Net worth/Total assets	9.9	7.7	59.1	0.3	13.9	10.1	59.7	0.2
Effective bank spread	3.8	3.8	19.0	-14.9	5.1	3.7	135.3	-4.4
B) Latin America								
Loan growth	3.4	5.0	202.4	-237.0	8.0	7.0	247.9	-209.2
Deposit growth	3.6	5.3	229.8	-236.6	5.4	5.8	196.2	-181.8
Net loans/Total deposits	89.0	80.4	494.1	20.1	89.1	81.2	478.3	20.6
Net loans/Total assets	52.5	54.6	86.3	10.2	50.4	53.0	87.8	10.1
Other earning assets/Total assets	28.4	25.7	79.5	5.0	31.1	26.8	78.8	5.0
Non earning assets/Total assets	14.7	12.4	75.0	5.0	16.0	13.1	77.4	5.0
Total deposits/Total assets	65.2	69.7	93.7	5.4	62.7	69.8	94.9	5.5
Money market funding/Total assets	9.0	2.2	64.3	0.0	12.5	3.3	74.1	0.0
Total liabilities/Total assets	85.1	87.8	99.9	40.0	86.5	89.4	99.9	40.2
Net worth/Total assets	14.9	12.2	60.0	0.1	13.5	10.6	59.8	0.1
Effective bank spread	8.9	7.0	82.2	-19.6	7.8	6.0	101.4	-31.0
B) Whole sample								
Loan growth	6.9	8.0	240.4	-237.0	7.2	7.5	247.9	-209.2
Deposit growth	6.9	7.7	229.8	-236.6	6.1	6.3	216.2	-181.8
Net loans/Total deposits	85.8	78.7	494.1	20.1	89.0	81.1	478.3	20.6
Net loans/Total assets	54.1	55.6	87.1	10.2	51.5	54.4	87.8	10.0
Other earning assets/Total assets	29.7	26.7	79.5	5.0	31.5	27.7	78.8	5.0
Non earning assets/Total assets	12.6	9.7	75.0	5.0	14.8	11.5	77.4	5.0
Total deposits/Total assets	69.6	74.6	94.9	5.2	64.3	71.0	94.9	5.5
Money market funding/Total assets	6.7	1.1	77.2	0.0	10.3	1.2	74.1	0.0
Total liabilities/Total assets	87.3	89.6	99.9	40.0	86.4	89.5	99.9	40.2
Net worth/Total assets	12.7	10.4	60.0	0.1	13.6	10.5	59.8	0.1
Effective bank spread	6.6	4.7	82.2	-19.6	7.1	5.2	135.3	-31.0

Table 4. GLS estimates of selected variables on monetary conditions, Latin-American sub-sample

	[1] Loan growth	[2] Deposit growth	[3] Loans/Deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Controls						
GDP growth	2.016 [0.369]***	1.695 [0.391]***	0.938 [1.838]	0.011 [0.047]	-0.129 [0.065]**	-0.107 [0.065]
Foreign*GDP growth	-0.329 [0.582]	-0.063 [0.614]	-2.619 [2.906]	-0.039 [0.072]	-0.111 [0.072]	-0.108 [0.115]
Size	0.316 [0.032]***	0.377 [0.032]***	-0.242 [0.185]	-0.005 [0.007]	0.002 [0.185]	-0.008 [0.007]
Foreign*size	0.008 [0.040]	0.011 [0.040]	0.068 [0.239]	0.0080 [0.009]	-0.007 [0.007]	-0.006 [0.239]
Liquidity (t-1)	0.837 [0.127]***	-0.043 [0.129]	-1.052 [0.686]	-0.036 [0.016]**	-0.048 [0.022]**	-0.068 [0.025]***
Foreign*liquidity (t-1)	0.046 [0.188]	-0.010 [0.190]	1.796 [1.022]*	0.005 [0.039]	-0.002 [0.032]	-0.010 [0.039]
Capitalization (t-1)	1.109 [0.212]***	2.178 [0.215]***	-1.351 [1.058]	-0.065 [0.215]**	0.050 [0.035]	0.026 [0.040]
Foreign*capitalization (t-1)	0.704 [0.376]*	1.337 [0.378]***	0.386 [1.950]	0.039 [0.047]	-0.017 [0.063]	-0.015 [1.950]
Monetary conditions						
Reserve requirements	-0.088 [0.043]**	-0.028 [0.047]	0.048 [0.204]	-0.001 [0.008]	-0.002 [0.047]	-0.004 [0.008]
Foreign*reserve requirements	0.007 [0.082]	-0.046 [0.088]	0.227 [0.394]	-0.017 [0.010]*	0.029 [0.014]**	0.014 [0.015]
Money market rate	-0.042 [0.006]***	-0.055 [0.007]***	0.0 [0.029]	0.106 [0.028]***	0.233 [0.039]***	0.388 [0.045]***
Foreign*money market rate	0.056 [0.034]*	0.399 [0.102]***	-0.013 [0.065]	0.0 [0.039]*	0.026 [0.039]	0.107 [0.061]*
Observations	2317	2350	2324	2194	2235	2197
Groups	591	599	593	582	595	584
R. Sq.	0.17	0.22	0.040	0.04	0.07	0.13
Rho AR(1)	0.18	0.06	0.55	0.42	0.09	0.31

Notes: This table presents the results of GLS panel regressions with bank-level fixed effects, and allowing for panel-specific AR(1) errors. The sample comes from the Bankscope database and covers banks operating in selected Latin American countries from 1989 to 2001. Robust standard errors are reported in square brackets. Statistical significance at 1, 5 and 10% levels, is indicated by \*\*\*, \*\*, \*, respectively. Six models are considered, each one presented in a separate column. Each model uses a different dependent variable, specified in the first row of the table. All models share the same set of explanatory variables, including country-level controls (GDP growth), bank-level controls (bank size, bank liquidity, and bank capitalization), and two indicators of monetary conditions (an index that tracks the evolution of reserve requirements, and the money market rate). The sample is split across domestic and foreign banks with the use of a dummy ("Foreign") which equals one for foreign banks and zero otherwise.

Table 5. GLS estimates of selected variables on monetary conditions, Asian sub-sample

	[1] Loan growth	[2] Deposit growth	[3] Loans/Deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Controls						
GDP growth	1.906 [0.238]***	1.364 [0.268]***	-0.101 [1.260]	0.073 [0.268]***	-0.099 [0.018]***	-0.027 [0.031]
Foreign*GDP growth	0.389 [0.351]	1.202 [0.393]***	-0.944 [1.887]	0.004 [0.040]	0.071 [0.028]**	0.063 [0.028]
Size	0.281 [0.032]***	0.315 [0.035]***	0.126 [0.193]	0.001 [0.005]	-0.002 [0.002]	0.000 [0.035]
Foreign*size	0.127 [0.044]***	0.209 [0.047]***	0.303 [0.264]	0.009 [0.006]	-0.001 [0.003]	0.005 [0.264]
Liquidity (t-1)	0.856 [0.107]***	-0.224 [0.119]*	-1.537 [0.646]**	-0.025 [0.013]*	-0.066 [0.008]***	-0.066 [0.015]***
Foreign*liquidity (t-1)	0.309 [0.171]*	0.595 [0.189]***	0.602 [1.005]	1.0 [0.021]	0.011 [0.013]	0.016 [0.025]
Capitalization (t-1)	0.870 [0.138]***	0.924 [0.156]***	0.365 [0.156]	0.047 [0.156]***	-0.013 [0.806]	0.033 [0.015]*



Table 5 (cont.). GLS estimates of selected variables on monetary conditions, Asian sub-sample

	[1] Loan growth	[2] Deposit growth	[3] Loans/Deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Foreign*capitalization (t-1)	0.045 [0.216]	0.544 [0.238]**	-0.221 [0.015]	-0.032 [0.029]	0.046 [0.015]***	-0.002 [0.029]
Monetary conditions						
Reserve requirements	-0.033 [0.089]	0.111 [0.099]	-0.091 [0.473]	0.1 [0.099]	0.023 [0.006]***	0.011 [0.011]
Foreign*Reserve requirements	-0.352 [0.196]*	-0.329 [0.219]	-0.064 [1.039]	-0.011 [0.219]	-0.026 [0.014]*	-0.025 [0.025]
Money market rate	-0.793 [0.177]***	30.25 [0.195]	-1.245 [0.998]	-0.063 [0.019]***	0.254 [0.013]***	0.200 [0.023]***
Foreign*money market rate	0.569 [0.260]**	-0.169 [0.288]	0.052 [1.435]	0.094 [0.029]***	-0.158 [0.029]***	-0.052 [0.034]
Observations	2631	2623	2582	2308	2380	2314
Groups	627	628	613	571	593	573
R. Sq.	0.26	0.17	0.01	0.04	0.40	0.15
Rho AR(1)	0.15	0.02	0.45	0.450	-0.01	0.42

Notes: This table presents the results of GLS panel regressions with bank-level fixed effects, and allowing for panel-specific AR(1) errors. The sample comes from the Bankscope database and covers banks operating in selected Latin American countries from the period of 1989-2001. Robust standard errors are reported in square brackets. Statistical significance at 1, 5 and 10% levels, is indicated by \*\*\*, \*\*, \*, respectively. Six models are considered, each one presented in a separate column. Each model uses a different dependent variable, specified in the first row of the table. All models share the same set of explanatory variables, including country-level controls (GDP growth), bank-level controls (bank size, bank liquidity, and bank capitalization), and two indicators of monetary conditions (an index that tracks the evolution of reserve requirements, and the money market rate). The sample is split across domestic and foreign banks with the use of a dummy ("Foreign") which equals one for foreign banks and zero otherwise.

Table 6. GLS regressions of loan growth on monetary conditions (I), Latin America

	Domestic banks	Foreign banks	H0: Domestic = Foreign		
Whole sample					
Money market rate	-0.042 *** (0.0064)	0.013 (0.0332)	[0.10]	Obs.	2317
Reserve requirements	-0.088 ** (0.0431)	-0.081 (0.0697)	[0.93]	Groups	591
				R-Squared	0.167
				Rho AR(1)	0.175
Capitalization below 75 percentile					
Money market rate	-0.042 *** (0.0060)	-0.019 (0.0304)	[0.46]	Obs.	1759
Reserve requirements	-0.094 * (0.0482)	-0.057 (0.0748)	[0.68]	Groups	483
				R-Squared	0.179
				Rho AR(1)	0.207
Capitalization above 75 percentile					
Money market rate	0.028 (0.0336)	1.232 (1.1285)	[0.29]	Obs.	401
Reserve requirements	0.014 (0.0895)	0.188 (0.1743)	[0.38]	Groups	165
				R-Squared	0.269
				Rho AR(1)	0.359
Liquidity below 75 percentile					
Money market rate	-0.042 *** (0.0053)	-0.003 (0.0184)	[0.04]	Obs.	1718
Reserve requirements	-0.028 (0.0392)	-0.040 (0.0663)	[0.88]	Groups	501
				R-Squared	0.272
				Rho AR(1)	0.259
Liquidity above 75 percentile					
Money market rate	0.984 (1.2471)	0.778 (1.2656)	[0.91]	Obs.	377
Reserve requirements	-0.603 ** (0.3016)	-0.206 (0.2861)	[0.34]	Groups	171
				R-Squared	0.102
				Rho AR(1)	0.195

Notes: This table presents selected coefficients from six sets of fixed-effects panel regressions. In all cases, the dependent variable is loan growth in constant local currency units. The reported coefficients are those associated with monetary conditions, measured by money market rates and an indicator of reserve requirements (which goes from 1 to 5 where a higher number indicates higher reserves). Controls, not reported here, include GDP growth and a set of bank characteristics (size, asset liquidity and capitalization). The table is divided into three panels. The upper displays the results of the regression based on the whole sample. The middle panel reports the results of two regressions, splitting the sample between banks with capitalization above (and below) the 75 percentile

relative to other banks operating in the same country. The lower panel follows a similar structure, but the sample is split by liquidity levels. The estimation is based on GLS, allowing for panel-specific AR(1) processes. Standard errors are in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. The p-values corresponding to the null of coefficient equality across domestic and foreign banks are in [square] brackets.

Table 7. GLS regressions of loan growth on monetary conditions (I), Asia

	Domestic banks	Foreign banks	H0: Domestic = Foreign		
Whole sample					
Money market rate	-0.793 ***	-0.224	[0.03]	Obs.	2631
	(0.1770)	(0.2034)		Groups	627
Reserve requirements	-0.033	-0.384 **	[0.07]	R-Squared	0.2614
	(0.0893)	(0.1760)		Rho AR(1)	0.151788
Capitalization below 75 percentile					
Money market rate	-0.647 ***	-0.382	[0.42]	Obs.	2032
	(0.2000)	(0.2724)		Groups	511
Reserve requirements	-0.022	-0.254	[0.22]	R-Squared	0.2515
	(0.0882)	(0.1670)		Rho AR(1)	0.162126
Capitalization above 75 percentile					
Money market rate	-0.825	-0.059	[0.29]	Obs.	442
	(0.5376)	(0.5424)		Groups	181
Reserve requirements	0.031	-0.541	[0.58]	R-Squared	0.3708
	(0.3771)	(0.9635)		Rho AR(1)	0.206858
Liquidity below 75 percentile					
Money market rate	-1.030 ****	-0.518 ***	[0.02]	Obs.	2105
	(0.1560)	(0.1778)		Groups	527
Reserve requirements	-0.040	-0.447 ***	[0.01]	R-Squared	0.343
	(0.0730)	(0.1435)		Rho AR(1)	0.295
Liquidity above 75 percentile					
Money market rate	-0.623	0.767	[0.45]	Obs.	358
	(1.4300)	(1.1636)		Groups	161
Reserve requirements	-0.225	-1.232	[0.47]	R-Squared	0.274
	(0.5974)	(1.2425)		Rho AR(1)	0.242

Notes: This table presents selected coefficients from six sets of fixed-effects panel regressions. In all cases, the dependent variable is loan growth in constant local currency units. The reported coefficients are those associated with monetary conditions, measured by money market rates and an indicator of reserve requirements (which goes from 1 to 5 where a higher number indicates higher reserves). Controls, not reported here, include GDP growth and a set of bank characteristics (size, asset liquidity and capitalization). The table is divided into three panels. The upper displays the results of the regression based on the whole sample. The middle panel reports the results of two regressions, splitting the sample between banks with capitalization above (and below) the 75 percentile relative to other banks operating in the same country. The lower panel follows a similar structure, but the sample is split by liquidity levels. The estimation is based on GLS, allowing for panel-specific AR(1) processes. Standard errors are in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. The p-values corresponding to the null of coefficient equality across domestic and foreign banks are in [square] brackets.

Table 8. GLS regressions of loan growth on monetary conditions (II), Latin America

	Domestic banks	Foreign banks	H0: Domestic = Foreign		
Whole sample					
Exchange rate depreciation	-0.4138 ***	0.0482	[0.00]	Obs.	2299
	(0.0751)	(0.1345)		Groups	589
Reserve requirements	-0.080 *	-0.081	[0.98]	R-Squared	0.16
	(0.0438)	(0.0707)		Rho AR(1)	0.19
US Federal Funds rate	-0.035	-0.049 *	[0.45]		
	(0.0248)	(0.0263)			
Capitalization below 75 percentile					
Exchange rate depreciation	-0.4398 ***	0.0914	[0.00]	Obs.	1744
	(0.0750)	(0.1314)		Groups	483
Reserve requirements	-0.094 *	-0.056	[0.68]	R-Squared	0.17
	(0.0488)	(0.0762)		Rho AR(1)	0.22
US Federal Funds rate	-0.048 *	-0.057 **	[0.68]		
	(0.0263)	(0.0272)			

Table 8 (cont.). GLS regressions of loan growth on monetary conditions (II), Latin America

	Domestic banks	Foreign banks	H0: Domestic = Foreign		
Capitalization above 75 percentile					
Exchange rate depreciation	-0.0729	0.0362	[0.78]	Obs.	398
	(0.2306)	(0.1450)		Groups	162
Reserve requirements	0.022	-0.039	[0.32]	R-Squared	0.27
	(0.0922)	(0.0676)		Rho AR(1)	0.39
US Federal Funds rate	-0.011	-0.004	[0.28]		
	(0.0663)	(0.0250)			
Liquidity below 75 percentile					
Exchange rate depreciation	-0.4186 ***	0.0966	[0.00]	Obs.	1707
	(0.0727)	(0.5544)		Groups	497
Reserve requirements	-0.029	0.217	[0.90]	R-Squared	0.26
	(0.0404)	(0.1743)		Rho AR(1)	0.25
US Federal Funds rate	0.005	0.060	[0.60]		
	(0.0221)	(0.0671)			
Liquidity above 75 percentile					
Exchange rate depreciation	-0.1468	0.0966	[0.90]	Obs.	373
	(0.3556)	(0.5544)		Groups	169
Reserve requirements	-0.425	0.217	[0.78]	R-Squared	0.13
	(0.2939)	(0.1743)		Rho AR(1)	0.20
US Federal Funds rate	-0.012	0.060	[0.08]		
	(0.1363)	(0.0671)			

Notes: This table presents selected coefficients from six sets of fixed-effects panel regressions. In all cases, the dependent variable is loan growth in constant local currency units. The reported coefficients are those associated with monetary conditions, measured by the Federal Funds rate, the yearly variation of the exchange rate (increase = depreciation) and an indicator of reserve requirements (which goes from 1 to 5 where a higher number indicates higher reserves). Controls, not reported here, include GDP growth and a set of bank characteristics (size, asset liquidity and capitalization). The table is divided into three panels. The upper displays the results of the regression based on the whole sample. The middle panel reports the results of two regressions, splitting the sample between banks with capitalization above (and below) the 75 percentile relative to other banks operating in the same country. The lower panel follows a similar structure, but the sample is split by liquidity levels. The estimation is based on GLS, allowing for panel-specific AR(1) processes. Standard errors are in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. The p-values corresponding to the null of coefficient equality across domestic and foreign banks are in [square] brackets.

Table 9. GLS regressions of loan growth on monetary conditions (II), Asia

	Domestic banks	Foreign banks	H0: Domestic = Foreign		
Whole sample					
Exchange rate depreciation	-0.1188 *	0.2317 ***	[0.00]	Obs.	2631
	(0.0691)	(0.0722)		Groups	627
Reserve requirements	-0.075	-0.461 ***	[0.05]	R-Squared	0.26
	(0.0922)	(0.1759)		Rho AR(1)	0.14
US Federal Funds rate	0.039 **	-0.013	[0.00]		
	(0.0165)	(0.0197)			
Capitalization below 75 percentile					
Exchange rate depreciation	-0.2040 **	0.2345 ***	[0.00]	Obs.	2032
	(0.0802)	(0.0905)		Groups	511
Reserve requirements	-0.032	-0.328 **	[0.12]	R-Squared	0.26
	(0.0915)	(0.1658)		Rho AR(1)	0.15
US Federal Funds rate	0.054 ***	-0.018	[0.00]		
	(0.0171)	(0.0202)			
Capitalization above 75 percentile					
Exchange rate depreciation	0.3491 *	0.0683	[0.62]	Obs.	442
	(0.1861)	(0.0623)		Groups	181
Reserve requirements	-0.253	-0.515 ***	[0.81]	R-Squared	0.38
	(0.3863)	(0.1440)		Rho AR(1)	0.21
US Federal Funds rate	-0.052	-0.028 *	[0.59]		
	(0.0555)	(0.0162)			
Liquidity below 75 percentile					
Exchange rate depreciation	-0.3327 ***	0.2154	[0.00]	Obs.	2105
	(0.0647)	(0.1917)		Groups	527

Table 9 (cont.). GLS regressions of loan growth on monetary conditions (II), Asia

	Domestic banks	Foreign banks	H0: Domestic = Foreign		
Reserve requirements	-0.025 (0.0770)	-0.496 (0.9463)	[0.00]	R-Squared	0.34
US Federal Funds rate	0.040 *** (0.0134)	-0.019 (0.0627)	[0.00]	Rho AR(1)	0.28
Liquidity above 75 percentile					
Exchange rate depreciation	-0.0347 (0.3986)	0.2154 (0.1917)	[0.36]	Obs.	358
				Groups	161
Reserve requirements	-0.238 (0.6127)	-0.496 (0.9463)	[0.51]	R-Squared	0.29
				Rho AR(1)	0.25
US Federal Funds rate	-0.061 (0.0899)	-0.019 (0.0627)	[0.18]		

Notes: This table presents selected coefficients from six sets of fixed-effects panel regressions. In all cases, the dependent variable is loan growth in constant local currency units. The reported coefficients are those associated with monetary conditions, measured by the Federal Funds rate, the yearly variation of the exchange rate (increase = depreciation) and an indicator of reserve requirements (which goes from 1 to 5 where a higher number indicates higher reserves). Controls, not reported here, include GDP growth and a set of bank characteristics (size, asset liquidity and capitalization). The table is divided into three panels. The upper displays the results of the regression based on the whole sample. The middle panel reports the results of two regressions, splitting the sample between banks with capitalization above (and below) the 75 percentile relative to other banks operating in the same country. The lower panel follows a similar structure, but the sample is split by liquidity levels. The estimation is based on GLS, allowing for panel-specific AR(1) processes. Standard errors are in parentheses. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. The p-values corresponding to the null of coefficient equality across domestic and foreign banks are in [square] brackets.

Table 10. Latin America, regressions using a crises window

	[1] Loan growth	[2] Deposit growth	[3] Loans to deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Bank-level controls						
Size	0.2270 [0.039]***	0.2710 [0.038]***	-0.3110 [0.190]	-0.0130 [0.004]***	0.00 [0.005]**	0.0010 [0.007]
Foreign*size	0.0220 [0.053]	0.0570 [0.052]	0.0130 [0.154]	0.02200.0 [0.006]	-0.0100 [0.006]*	-0.0130 [0.009]
Liquidity (t-1)	0.6740 [0.155]***	-0.0860 [0.139]	-1.6310 [0.778]**	-0.0 [0.019]*	-0.0770 [0.036]**	-1.6310 [0.029]***
Foreign*liquidity (t-1)	0.4110 [0.223]*	0.1140 [0.217]	1.5120 [0.836]*	0.10 [0.036]**	0.1050 [0.042]	0.1050 [0.050]**
Capitalization (t-1)	1.2380 [0.325]***	2.2150 [0.320]***	-1.9040 [1.677]	-0.0030 [0.060]*	0.0800 [0.048]*	0.1170 [0.048]*
Foreign*capitalization (t-1)	0.8360 [0.527]	0.7930 [0.520]	2.3640 [1.791]	0.0410-0 [0.065]	-0.0410 [0.065]	-0.0240 [0.089]
Target variables						
Dummy crises	-0.0980 [0.038]***	-0.1380 [0.038]***	-0.2770 [0.209]	0.0580 [0.005]***	0.0580 [0.011]***	0.0580 [0.038]***
Foreign*dummy crises	0.1340 [0.070]*	0.0710 [0.081]	0.07100 [0.259]	-0.0040 [0.011]	-0.0290 [0.014]**	-0.0270 [0.014]*
Constant	0.0220 [0.014]	0.0260 [0.012]**	1.1860 [0.055]***	0.0710 [0.002]***	0.1210 [0.003]***	0.1930 [0.002]***
Observations	3019	3055	3020	2898	2955	2906
R-squared	0.41	0.37	0.55	0.86	0.60	0.71

Notes: This table compares the response of selected bank-level variables to GDP growth and crises/non-crises period across domestic and foreign banks. The regressions were computed with bank-level fixed effects and robust standard errors. The sample covers the Latin American countries. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 11. Asia, regressions using a crises window

	[1] Loan growth	[2] Deposit growth	[3] Loans to deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Bank-level controls						
Size	0.1270 [0.035]***	0.2060 [0.035]***	0.0780 [0.118]	-0.0080 [0.035]***	0.000 [0.002]	-0.0050 [0.035]
Foreign*size	0.1120 [0.051]**	0.2010 [0.052]***	0.4140 [0.303]	0.000 [0.052]	-0.0020 [0.303]	0.0050 [0.007]



Table 11 (cont.). Asia, regressions using a crises window

	[1] Loan growth	[2] Deposit growth	[3] Loans to deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Liquidity (t-1)	0.7570 [0.145]***	-0.0910 [0.092]	-1.7290 [0.609]***	-0.0220 [0.011]*	-0.0510 [0.010]***	-1.7290 [0.013]***
Foreign*liquidity (t-1)	0.2920 [0.233]	0.4940 [0.208]**	-0.6090 [1.856]	00.0 [0.059]	0.0230 [0.059]	0.0360 [0.073]
Capitalization (t-1)	0.8860 [0.206]***	1.2560 [0.211]***	0.3880 [0.643]	00.0 [0.031]	0.0140 [0.211]	0.0430 [0.031]
Foreign*capitalization (t-1)	0.1720 [0.402]	0.2740 [0.449]	0.2290 [0.831]	00.0 [0.043]	0.0420 [0.831]	0.0420 [0.831]
Target variables						
Dummy crises	-0.0920 [0.019]***	-0.0440 [0.019]**	0.0190 [0.002]	-0.0440 [0.019]**	0.0230 [0.002]***	0.0190 [0.002]***
Foreign*dummy crises	-0.0300 [0.040]	-0.1100 [0.039]***	-0.3190 [0.154]**	0 . 0 0 [0.154]	-0.0030 [0.039]*	-0.3190 [0.006]
Constant	0.1250 [0.008]***	0.1260 [0.010]***	1.2440 [0.040]***	0.0680 [0.010]***	0.0680 [0.010]***	0.1150 [0.010]***
Observations	3343	3327	3271	2956	3050	2965
R-squared	0.43	0.37	0.71	0.92	0.94	0.90

Notes: This table compares the response of selected bank-level variables to GDP growth and crises/non-crises period across domestic and foreign banks. The regressions were computed with bank-level fixed effects and robust standard errors. The sample covers the Asian countries. Robust standard errors are in brackets. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 12. Latin America, regressions specifying pre- and post-crises years

	[1] Loan growth	[2] Deposit growth	[3] Loans to deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Bank-level controls						
Size	0.2330 [0.040]***	0.2790 [0.039]***	-0.3100 [0.187]*	-0.0130 [0.004]***	0.0100 [0.005]**	0.0000 [0.007]
Foreign*size	0.0190 [0.054]	0.0560 [0.053]	0.1010 [0.152]	0.000 [0.006]	-0.0090 [0.006]	-0.0130 [0.009]
Liquidity (t-1)	0.6790 [0.154]***	-0.0790 [0.138]	-1.6320 [0.781]**	-0.0550 [0.019]***	-0.0780 [0.036]**	-0.0840 [0.029]***
Foreign*liquidity (t-1)	0.4030 [0.223]*	0.0910 [0.217]	1.5070 [0.839]*	0.1110 [0.036]***	0.0410 [0.042]	0.1080 [0.050]**
Capitalization (t-1)	1.2350 [0.326]***	2.2250 [0.322]***	-1.9140 [1.670]	-0.0010 [0.035]	0.0750 [0.047]	0.1150 [0.059]*
Foreign*capitalization (t-1)	0.8360 [0.529]	0.7750 [0.523]	2.3690 [1.784]	0.0530 [0.066]	-0.0350 [0.055]	-0.0220 [0.089]
Target variables						
Crises (T-1)	0.0690 [0.066]	0.0620 [0.070]	-0.1570 [0.110]	0.0240 [0.007]***	-0.0060 [0.006]	0.0180 [0.010]*
Foreign*crises (T-1)	0.0850 [0.105]	0.1840 [0.108]*	0.1480 [0.0133]	-0.0080 [0.014]	-0.0100 [0.011]	-0.0180 [0.018]
Crises (T)	-0.0730 [0.069]	-0.0730 [0.076]	-0.2820 [0.138]**	0.0310 [0.007]*	0.0150 [0.007]**	0.0450 [0.010]***
Foreign*crises (T)	0.1120 [0.134]	0.0780 [0.150]	0.0990 [0.141]	-0.0220 [0.015]	-0.0050 [0.014]	-0.0270 [0.019]
Crises (T+1)	-0.1370 [0.040]***	-0.2030 [0.039]***	-0.3030 [0.281]	0.0290 [0.007]***	0.0560 [0.016]***	0.0720 [0.011]***
Foreign*crises (T+1)	0.1690 [0.070]**	0.0680 [0.085]	0.0570 [0.371]	0.0070 [0.014]	-0.0480 [0.019]**	-0.0320 [0.021]
Constant	0.0190 [0.014]	0.0220 [0.012]*	1.1850 [0.054]***	0.0710 [0.002]**	0.1220 [0.003]***	0.1940 [0.002]**
Observations	3019	3055	3020	2898	2955	2906
R-squared	0.41	0.38	0.55	0.86	0.60	0.71

Notes: Robust standard errors are in brackets. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. This table compares the response of selected bank-level variables to GDP growth and crises/non-crises period across domestic and foreign banks. The regressions were computed with bank-level fixed effects and robust standard errors. The sample covers the Latin American countries.

Table 13. Asia, regressions specifying pre- and post-crises years

	[1] Loan growth	[2] Deposit growth	[3] Loans to deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Bank-level controls						
Size	0.1240 [0.035]***	0.2030 [0.035]***	0.0830 [0.118]	-0.0090 [0.035]***	0.2030 [0.002]	-0.0050 [0.035]
Foreign*size	0.1030 [0.050]**	0.1940 [0.052]***	0.0040 [0.305]	0.000 [0.052]	-0.0040 [0.305]	0.0040 [0.007]
Liquidity (t-1)	0.8030 [0.146]***	-0.0650 [0.092]	-1.7330 [0.612]***	-0.0200 [0.011]*	-0.0500 [0.011]**	-0.0770 [0.013]***
Foreign*liquidity (t-1)	0.3410 [0.231]	0.5500 [0.207]***	-0.5260 [1.838]	0.1000 [0.059]	0.0210 [0.059]	0.0330 [0.072]
Capitalization (t-1)	0.8020 [0.204]***	1.2090 [0.214]***	0.3610 [0.648]	0.3610 [0.031]	0.000 [0.012]	0.0390 [0.031]
Foreign*capitalization (t-1)	0.1330 [0.391]	0.2240 [0.446]	0.2730 [0.837]	0.02300 [0.044]	0.0380 [0.020]	0.0380 [0.446]
Target variables						
Crises (T-1)	0.0380 [0.011]***	0.0160 [0.014]	0.0470 [0.002]	0.00 [0.001]**	0.0160 [0.002]	0.0040 [0.001]*
Foreign*crises (T-1)	0.0170 [0.024]	-0.0160 [0.029]	-0.1570 [0.086]*	0.00 [0.004]	0.0040 [0.002]*	0.0040 [0.004]
Crises (T)	-0.0330 [0.013]**	-0.0100 [0.015]	-0.0170 [0.034]	-0.010 [0.015]	0.0180 [0.002]***	0.0150 [0.002]***
Foreign*crises (T)	0.0450 [0.032]	-0.0170 [0.032]	-0.1730 [0.103]*	0.0170 [0.005]	-0.1730 [0.032]	0.0000 [0.005]
Crises (T+1)	-0.1360 [0.016]***	-0.0640 [0.019]***	-0.0310 [0.032]	0.0090 [0.019]	0.0090 [0.002]***	0.0090 [0.002]***
Foreign*crises (T+1)	-0.0540 [0.030]*	-0.1270 [0.031]***	-0.1100 [0.002]	-0.1270 [0.031]	-0.0060 [0.002]	-0.0060 [0.074]
Constant	0.1140 [0.008]***	0.1180 [0.009]***	1.2390 [0.040]***	0.0700 [0.001]***	0.0700 [0.001]***	0.1160 [0.001]***
Observations	3343	3327	3271	2956	3050	2965
R-squared	0.45	0.38	0.71	0.92	0.94	0.90

Notes: Robust standard errors are in brackets. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. This table compares the response of selected bank-level variables to GDP growth and crises/non-crises period across domestic and foreign banks. The regressions were computed with bank-level fixed effects and robust standard errors. The sample covers the Asian countries.

Table 14. Latin America, alternative crises definitions

	[1] Loan growth	[2] Deposit growth	[3] Loans to deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Caprio-Kinglebiel						
Crises C-K (T-1)	0.006 [0.047]	-0.075 [0.045]*	-0.267 [0.127]**	0.025 [0.006]***	0.000 [0.006]	0.026 [0.009]***
Foreign*crises C-K (T-1)	-0.142 [0.082]*	0.005 [0.079]	0.032 [0.135]	-0.024 [0.010]**	-0.008 [0.010]	-0.033 [0.012]***
Crises C-K (T)	-0.101 [0.046]**	-0.171 [0.047]***	50.0450 [0.282]	0.045 [0.047]***	0.045 [0.012]***	0.081 [0.011]***
Foreign*crises C-K (T)	0.136 [0.075]*	0.123 [0.087]	0.019 [0.326]	0.0 [0.011]	-0.057 [0.015]***	-0.051 [0.017]***
Crises C-K (T+1)	0.066 [0.039]*	-0.005 [0.041]	-0.316 [0.275]	0.009 [0.005]*	-0.008 [0.014]	0.013 [0.009]
Foreign*crises C-K (T+1)	0.123 [0.077]	0.042 [0.087]	-0.108 [0.410]	0.023 [0.012]*	-0.014 [0.016]	-0.003 [0.017]
Frankel-Rose						
Crises F-R (T-1)	-0.029 [0.042]	0.157 [0.051]***	0.141 [0.009]	0.002 [0.011]	-0.012 [0.195]	-0.006 [0.195]
Foreign*crises F-R (T-1)	0.034 [0.101]	0.006 [0.107]	0.254 [0.465]	-0.006 [0.107]	-0.005 [0.013]	-0.012 [0.465]

Table 14 (cont.). Latin America, alternative crises definitions

	[1] Loan growth	[2] Deposit growth	[3] Loans to deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Crises F-R (T)	-0.226 [0.055]***	-0.026 [0.060]	-0.205 [0.140]	0.011 [0.006]*	0.036 [0.009]***	0.046 [0.011]***
Foreign*crises F-R (T)	0.184 [0.100]*	0.073 [0.111]	0.738 [0.561]	0.009 [0.012]	-0.007 [0.561]	0.003 [0.015]
Crises F-R (T+1)	-0.150 [0.043]***	-0.110 [0.042]***	0.126 [0.011]	0.009 [0.013]	0.043 [0.011]***	0.056 [0.013]***
Foreign*crises F-R (T+1)	0.123 [0.079]	0.091 [0.083]	-0.028 [0.436]	0.005 [0.015]	0.035 [0.020]*	0.038 [0.022]*
Kaminsky-Reinhart						
Crises K-R (T-1)	0.016 [0.057]	0.0160 [0.061]	-0.149 [0.103]	0.024 [0.006]***	0.004 [0.005]	0.027 [0.008]***
Foreign*crises K-R (T-1)	-0.033 [0.089]	0.091 [0.084]	0.046 [0.121]	-0.017 [0.121]	-0.009 [0.007]	-0.025 [0.013]*
Crises K-R (T)	-0.069 [0.069]	-0.069 [0.076]	-0.287 [0.141]**	0.034 [0.007]*	0.025 [0.007]*	0.059 [0.007]***
Foreign*crises K-R (T)	0.116 [0.133]	0.088 [0.149]	0.101 [0.142]	-0.023 [0.017]*	-0.008 [0.013]	-0.031 [0.017]*
Crises K-R (T+1)	-0.147 [0.040]***	-0.213 [0.039]***	-0.302 [0.282]	0.029 [0.007]***	0.059 [0.016]***	0.074 [0.011]***
Foreign*crises K-R (T+1)	0.162 [0.071]**	0.059 [0.086]	0.049 [0.376]	0.007 [0.021]	-0.049 [0.020]**	-0.032 [0.021]

Notes: This table reports selected coefficients from a set of 18 panel regressions that compare the behavior of bank loans, deposits, and interest rates, across domestic and foreign banks, around periods of financial crises. The sample covers 11 Latin American countries during 1989-2001. Each column covers 3 separate regressions that share the same dependent variable, described in the first row, and the same set of (unreported) bank-level controls: size, liquidity, and capitalization. Bank-level controls were lagged one period to reduce potential endogeneity problems. The reported coefficients correspond to a set of dummy variables, generically labeled as "T-1", "T", and "T+1". Those labeled with "T" equal one during banking crises and zero elsewhere. Correspondingly, "T-1" equal one a year before financial crises and zero elsewhere, and "T+1" equal one a year after banking crises, and zero elsewhere. To provide sensitivity analysis, three alternative definitions of banking crises were used: Caprio-Kinglebiel, Frankel-Rose, and Kaminsky-Reinhart. These are reported in the upper-, middle-, and lower-panel, respectively. In order to compare the behavior of domestic and foreign banks, each explanatory variable was interacted with a "foreign bank" dummy. All regressions were computed with bank-level fixed effects and robust standard errors, reported in square brackets. \*, \*\*, and \*\*\* indicate significance at the 10, 5, and 1% levels, respectively.

Table 15. Asia, alternative crises definitions

	[1] Loan growth	[2] Deposit growth	[3] Loans to deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Caprio-Kinglebiel						
Crises C-K (T-1)	0.008 [0.017]	-0.021 [0.021]	0.005 [0.062]	0.004 [0.002]**	0.003 [0.002]*	0.008 [0.002]**
Foreign*crises C-K (T-1)	-0.017 [0.037]	-0.065 [0.050]	-0.208 [0.187]	-0.004 [0.008]	0.011 [0.004]**	0.006 [0.187]
Crises C-K (T)	-0.095 [0.018]***	-0.086 [0.016]***	-0.083 [0.061]	0.004 [0.002]	0.018 [0.002]***	0.021 [0.002]***
Foreign*crises C-K (T)	-0.015 [0.048]	-0.071 [0.044]	-0.217 [0.177]	-0.007 [0.008]	0.005 [0.044]	-0.001 [0.008]
Crises C-K (T+1)	-0.15 [0.024]***	-0.055 [0.020]***	0.017 [0.101]	-0.008 [0.004]**	0.005 [0.001]*	-0.003 [0.004]
Foreign*crises C-K (T+1)	-0.159 [0.057]***	-0.102 [0.059]*	-0.391 [0.169]**	-0.004 [0.059]	-0.005 [0.003]	-0.009 [0.169]
Frankel-Rose						
Crises F-R (T-1)	0.0230 [0.023]	-0.0260 [0.026]	0.0630 [0.096]	-0.0260 [0.026]	0.0050 [0.002]***	0.0050 [0.002]**
Foreign*crises F-R (T-1)	0.0040 [0.043]	-0.0270 [0.065]	-0.00 [0.210]***	-0.0040 [0.065]	0.00 [0.003]	0.0040 [0.008]
Crises F-R (T)	-0.1950 [0.025]***	-0.1580 [0.028]***	-0.1580 [0.081]	0.0140 [0.028]***	0.0310 [0.003]***	0.0140 [0.003]***
Foreign*crises F-R (T)	-0.0460 [0.048]	-0.1180 [0.048]**	-0.8810 [0.231]***	0.0070 [0.006]	-0.0070 [0.231]***	0.0070 [0.006]

Table 15 (cont.). Asia, alternative crises definitions

	[1] Loan growth	[2] Deposit growth	[3] Loans to deposits	[4] Bank spread	[5] Deposit rate	[6] Lending rate
Crises F-R (T+1)	-0.1840 [0.038]***	-0.0990 [0.033]***	-0.0950 [0.060]	-0.00 [0.002]***	0.0080 [0.002]***	-0.0080 [0.033]***
Foreign*Crises F-R (T+1)	0.0820 [0.054]	-0.0120 [0.063]	-0.00300 [0.454]	0.000.0 [0.015]	0.00150 [0.454]	0.0150 [0.018]
Kaminsky-Reinhart						
Crises K-R (T-1)	0.038 [0.020]*	0.005 [0.024]	0.06 [0.002]	0.002 [0.002]	0.009 [0.002]***	0.012 [0.002]***
Foreign*crises K-R (T-1)	0.007 [0.041]	-0.033 [0.052]	-0.279 [0.189]	0.001 [0.052]	0.006 [0.004]	0.006 [0.007]
Crises K-R (T)	-0.122 [0.027]***	-0.048 [0.024]**	-0.049 [0.054]	-0.004 [0.024]*	0.039 [0.002]*	0.032 [0.002]*
Foreign*crises K-R (T)	0.066 [0.055]	-0.057 [0.050]	-0.315 [0.190]*	0.004 [0.007]	-0.012 [0.005]**	-0.005 [0.008]
Crises K-R (T+1)	-0.225 [0.035]***	-0.106 [0.032]**	0.028 [0.058]	-0.011 [0.003]***	0.02 [0.003]***	0.01 [0.003]***
Foreign*crises K-R (T+1)	-0.115 [0.056]**	-0.209 [0.058]***	-0.339 [0.155]**	0.003 [0.005]	-0.01 [0.004]***	-0.008 [0.006]

Notes: This table reports selected coefficients from a set of 18 panel regressions that compare the behavior of bank loans, deposits, and interest rates, across domestic and foreign banks, around periods of financial crises. The sample covers 9 Asian countries during 1989-2001. Each column covers 3 separate regressions that share the same dependent variable, described in the first row, and the same set of (unreported) bank-level controls: size, liquidity, and capitalization. Bank-level controls were lagged one period to reduce potential endogeneity problems. The reported coefficients correspond to a set of dummy variables, generically labeled as "T-1", "T", and "T+1". Those labeled with "T" equal one during banking crises and zero elsewhere. Correspondingly, "T-1" equal one a year before financial crises and zero elsewhere, and "T+1" equal one a year after banking crises, and zero elsewhere. To provide sensitivity analysis, three alternative definitions of banking crises were used: Caprio-Kinglebiel, Frankel-Rose, and Kaminsky-Reinhart. These are reported in the upper-, middle-, and lower-panel, respectively. In order to compare the behavior of domestic and foreign banks, each explanatory variable was interacted with a "foreign bank" dummy. All regressions were computed with bank-level fixed effects and robust standard errors, reported in square brackets. \*, \*\*, and \*\*\* indicate significance at the 10, 5, and 1% levels, respectively.



## Appendix B. Scales for reserve requirements by country

### I. SCALE

IF RESERVE REQUIREMENT IS:

BETWEEN 1% AND 15% :	1-2
BETWEEN 16% AND 30% :	2-3
BETWEEN 31% AND 70% :	3-4
BETWEEN 71% AND 100% :	4-5

#### SUB-CATEGORIES:

BETWEEN 1% AND 15%		BETWEEN 16% AND 30%		BETWEEN 31% AND 70%		BETWEEN 71% AND 100%	
1.00%	1.00	16.00%	2.00	31%	3.00	71%	4.00
3.00%	1.20	19.50%	2.25	40%	3.25	80%	4.30
4.50%	1.30	23.00%	2.50	50%	3.50	85%	4.50
6.00%	1.40	25.00%	2.60	60%	3.75	90%	4.60
7.50%	1.50	26.50%	2.75	70%	3.99	100%	4.99
9.00%	1.60	29.00%	2.95				
10.50%	1.70	30.00%	2.99				
12.00%	1.80						
13.50%	1.90						
15.00%	1.99						

EXAMPLES THAT CAN BE EXTENDED FOR OTHER CASES:

9.00%	1.60	10.50%	1.70
9.25%	1.62	10.75%	1.72
9.50%	1.64	11.00%	1.74
9.75%	1.65	11.25%	1.75
10.00%	1.67	11.50%	1.77
10.25%	1.69	11.75%	1.79
10.50%	1.70	12.00%	1.80

### II. HOW DO WE ASSIGN THE FINAL SCALE?

- 1) For each country, we specify the policy instrument used to construct the reserve requirement index. Most cases use the reserve requirement on demand deposits (first criterium).
- 2) During years with one or more changes in reserve requirements, the index reflects the weighted average of its intra-year values, using the relative time of the policy regimes as weights.
- 3) In cases where reserve requirements on demand deposits in domestic currency were not applicable, or did not show variation, a parallel policy instrument (such as liquidity requirements, reserve requirements on foreign currency deposits, etc.) was also used (second criterium). The list of policy instruments used for each country is presented in Appendix C.

## Appendix C. Criteria for the construction of the reserve requirements index

ARGENTINA
<b>First criterion:</b> Reserve requirements (minimum cash requirement) until 1994 Minimum liquidity requirements since 1995.
<b>Second criterion:</b> Reserve requirements for deposits in foreign currency.
BOLIVIA
<b>First criterion:</b> Reserve requirement on demand deposits (domestic currency).
BRAZIL
<b>First criterion:</b> Reserve requirement on demand deposits (domestic currency).
<b>Second criterion:</b> Reserve requirements for saving and time deposits in domestic currency, and daily balance to be held in banking reserves.
CHILE
<b>First criterion:</b> Reserve requirements on demand deposits (foreign currency).
<b>Second criterion:</b> Reserve requirement on external credits.
COLOMBIA
<b>First criterion:</b> Reserve requirement on demand deposits (domestic currency).
<b>Second criterion:</b> Reserve requirements for saving and time deposits in domestic currency.
INDIA
<b>First criterion:</b> Cash reserve requirement on demand deposits (domestic currency).
<b>Second criterion:</b> Statutory liquidity ratio on demand and time liabilities.
INDONESIA
<b>First criterion:</b> Statutory reserve requirement on demand deposits (domestic currency).

<b>Second criterion:</b> Statutory reserve requirement on foreign currency deposits.
KOREA
<b>First criterion:</b> Reserve requirement on demand deposits (domestic currency). <b>Second criterion:</b> Marginal reserve requirement in domestic and foreign currency.
MALAYSIA
<b>First criterion:</b> Statutory reserve requirement on demand deposits (domestic currency). <b>Second criterion:</b> Liquidity requirement.
MEXICO
<b>First criterion:</b> Reserve requirement on demand deposits (domestic currency) until 1988. Liquidity coefficient from 1989 to 1990. Liquidity coefficient for deposits in foreign currency 1991 (August) to 1994.
PARAGUAY
<b>First criterion:</b> Reserve requirement on demand deposits (domestic currency).
PERU
<b>First criterion:</b> Reserve requirement (domestic currency). <b>Second criterion:</b> Reserve requirements for deposits in foreign currency.
PHILIPPINES
<b>First criterion:</b> Reserve requirement on demand deposits (domestic currency). The reserve requirement against peso demand is the sum of the statutory and the liquidity reserve ratios.
SINGAPORE
<b>First criterion:</b> Minimum cash balance on demand deposits (domestic currency).
TAIWAN
<b>First criterion:</b> Reserve requirement ratio on demand deposits (domestic currency). <b>Second criterion:</b> The required reserve ratio for passbook saving deposits, time saving deposits and time deposits.
THAILAND
<b>First criterion:</b> Liquidity requirement ratio on demand deposits (domestic currency). <b>Second criterion:</b> Minimum reserve requirement on non-resident bank deposits.
URUGUAY
<b>First criterion:</b> The remunerated reserve requirement on sight deposits in local currency.
VENEZUELA
<b>First criterion:</b> Reserve requirement on demand deposits (domestic currency).

## Appendix D. Reserve requirements index

ARGENTINA		
Year	Code	Reserve requirements
1986	4.580	Reserve requirements were kept at 89,5% on demand deposits.
1989	4.500	The average reserve requirement of the system was 71% in June. There was a reduction of reserve requirements for deposits in foreign currency.
1990	4.575	As from July, reserve requirements were reduced by 3% in cases of technical reserves for demand deposits and by 1.5% additional for fixed time deposits. By September, the contractionary monetary policy was further deepened, so the backing figures returned to their previous high levels.
1991	4.555	In December, the Central Bank reduced minimum cash requirements to 79% on demand deposits.
1992	4.120	There were not substantial variations in minimum cash requirements. Requirements on deposits whose holders belonged to the non-financial public sector were reduced by 6%. As of October 1, the Central Bank reduced by 2% the minimum cash requirement on peso deposits in current accounts and other sight and fixed term operations, at 71%.
1993	3.354	The Central Bank homogenized the reserve requirements for current accounts and sight operations in both currencies, implying a substantial reduction in reserve requirements for current accounts in pesos from 71% to 40%. In August, the Central Bank set a 3% increase, to 43%, in cash requirements on current account and saving deposits.
1994	3.300	The Central Bank reduced temporarily required minimums covering dollars deposits from 43% for sight deposits dated 12-15-95, to 35% until 1-15-95. For fixed-term deposits, the minimum cash requirement dropped from 3% to 1% as of 12-16-94 to be reestablished at 3% as of 2-1-95.

1995	3.082	As of November 1995, reserve requirements have been replaced by minimum liquidity requirements (Requisitos Minimos de Liquidez), which may include earning assets. All deposits were subject to a uniform 15% liquidity requirement.
1996	2.100	The Central Bank increased the minimum liquidity requirement by 2%.
1997	2.200	The Central Bank increased the minimum liquidity requirement by 2%.
1998	2.300	The Central Bank increased the minimum liquidity requirement by 1%.
2001	2.188	In April, the Central Bank reduced the minimum liquidity requirement by 2%. In June, the Central Bank established a new liquidity regime based on a minimum cash requirement over sight operations, whereas the rules related to minimum liquidity requirements only involved fixed term deposits.

Source: Annual report of the Argentine economy – economic trends. Consejo Tecnico de Inversiones.

#### BOLIVIA

Year	Code	Reserve requirements
1985	3.500	The Central Bank reduced reserve requirements on demand deposits, saving deposits and time deposits, all in domestic currency. From 60% to 50% in the case of demand deposits.
1986	3.250	The Central Bank reduced reserve requirements on demand deposits, saving deposits and time deposits, all in domestic currency. From 50% to 40% in the case of demand deposits.
1987	2.765	In July, the Central Bank homogenized the reserve requirements to 20% for different types of deposits and currencies.
1994	1.975	In July, the Central Bank eliminated the marginal reserve requirement for deposits in domestic currency. The marginal reserve requirement was 10% for demand and saving deposits, and 6% for time deposits (less than 365 days).
1998	1.757	In May, Central Bank homogenized the reserve requirements to 12% for different types of deposits and currencies.

Source: Annual reports of the Central Bank of Bolivia.

#### BRAZIL

Year	Code	Reserve requirements
1984	3.300	The Central Bank increased reserve requirements from 10% to 22% for time deposits. The average reserve requirement on demand deposits was 43%.
1985	3.170	The rate of reserve requirements on demand deposits in the commercial banks dropped from an average of 43% to 36%.
1988	3.180	Reserve requirements are rationalized, requirements differing according to bank size. As of December, the average implicit reserve requirement represented 37% of deposits.
1993	3.458	The percentage of the reserve requirement moved from 40% to 50% but had little impact on the banking system's capacity to grant credit, since demand deposits represented less than 1% of GDP.
1994	4.337	Under the Real Plan, the Central Bank raised the reserve requirement on demand deposits to 100% in June, which was reduced to 90% in December. The reserve requirement on time deposits was raised from 20% to 30% in August and then reduced to 27% in December. For saving deposits, the reserve requirement was raised from 20% to 30% in August.
1995	4.500	The reserve requirement on demand deposits was reduced from 90% to 83% in July, for time deposits the rate was reduced to 20% in August, and for saving deposits the rate was reduced to 15%.
1996	4.200	The criteria for reserve requirements and obligatory reserves on demand deposits were altered and a schedule was defined according to which the rate would gradually decline from 83% to 78% as of December.
1997	4.150	In January, the reserve requirement on demand deposits was reduced from 78% to 75%.
1999	4.075	In October, the reserve requirement on demand deposits was reduced from 75% to 65%.
2000	3.538	The reserve requirement on demand deposits was reduced twice during the year to 55% in March and to 45% in June.

Source: Annual reports of the Central Bank of Brazil (Banco Central do Brasil).

#### CHILE

Year	Code	Reserve requirements
1991	2.300	In June, the Central Bank established a 20% reserve requirement on external credits for less than 1 year.
1992	2.588	In January, the Central Bank established a 20% reserve requirement on demand and term deposits in foreign currency. In March, the reserve requirement was increased to 30% for financial entities not in Chapter XIV of CNCI (Compendium of Regulations Governing Foreign Exchange). In August, the reserve requirement for external credits was increased to 30%.
1996	2.990	In December, credit and financial investment operations between US\$ 10,000 and US\$ 200,000 done under Chapter XIV of CNCI were released of the 30% reserve requirement.
1998	2.300	In April, the Central Bank reduced the reserve requirements on external credits from 30% to 10%. In September, the reserve requirement on external credits was eliminated (unremunerated reserve requirement for short-term capital inflows). In December, there was a reduction of reserve requirements to deposits in foreign currency. From 30% to 19% for demand deposits, and from 30 to 13.6% for term deposits. 10% of the reserve requirement in foreign currency was remunerated.

Source: Annual reports of the Central Bank of Chile.

#### COLOMBIA

Year	Code	Reserve requirements
1984	3.300	The monetary authority reduced the reserve requirement (RR) from 45% to 43% on demand deposits. It also reduced the RR of term deposits of and above six months from 10% to 6%.
1987	3.350	The RR of demand deposits was raised to 44%.
1988	3.250	The RR of demand deposits was reduced from 44% to 40%, and also the RR of demand deposits with entities of the public sector was reduced from 65% to 61%.
1989	3.230	The RR of demand deposits was reduced from 40% to 39%, and also the RR of demand deposits with entities of the public sector was reduced from 61% to 53%.
1990	3.100	The RR of demand deposits was reduced from 39% to 33.5%, and also the RR of demand deposits with entities of the public sector was reduced from 56% to 52.5%.

1991	3.280	In January, marginal reserve requirements of 100% were imposed on all new deposits. These reserves were held as interest-bearing central bank bonds. In September, the marginal reserve requirement was replaced by an increase in reserve requirement on most deposits. RR of demand deposits was raised from 33.5% to 41%, and from 53.5% to 70% (public sector).
1992	3.260	The RR for saving deposits was reduced from 31% to 10%, and from 23% to 10% in the case of term deposits.
1995	3.250	RR of demand deposits was reduced from 41% to 40%, and from 70% to 60% (public sector). A marginal reserve requirement (MRR) of 21% was established for demand deposits, and 10% for saving deposits and term deposits.
1996	2.350	The RR on deposits was homogenized to 21%. The RR on term deposits was reduced to 5% and the MRR was reduced to 7%.
1998	2.292	In November, the monetary authority determined the following changes: The RR on demand deposits was reduced to 16% and the MRR was reduced to 16%.
1999	1.870	The RR on demand deposits was reduced to 13% and the MRR was reduced to 13%.
2000-2001	1.870	No changes.

Source: Annual reports of the Central Bank of Colombia (Banco de la Republica).

#### MEXICO

Year	Code	Reserve requirements
1987	3.550	The Bank of Mexico (BOM) reduced the marginal reserve requirement (MRR) from 77.2% to 51%. The distribution was: 10% in cash, 35% in credits to the Federal Government, and 6% to development banks.
1988	3.500	The BOM determined liquidity coefficients. 30% of liabilities (aceptaciones bancarias) had to be invested in remunerated demand deposits in the BOM and other securities (CETES, BONDES). The distribution of MRR required investment was: 10% in cash, 31% in credits to the Federal Government, and 10% to development banks.
1989	2.990	Liquidity coefficient applied also to liabilities coming from traditional bank instruments. Promissory notes denominated in US dollars required a liquidity coefficient of 30%.
1991	2.903	In August, the BOM eliminated the existing liquidity coefficient on bank liabilities in domestic currency. In June, the BOM established a 50% compulsory liquidity coefficient on foreign currency liabilities to be constituted with liquid foreign assets. In August, the BOM determined an ascendent scale of the liquidity coefficient from 0% to 50% depending on the maturity of deposits.
1992	2.143	In April, the liquidity coefficient, which went from 0% up to 50% according to the maturity of the deposits, was replaced by a 15% requirement.
1995	1.415	In March, the BOM adopted a zero average legal reserve requirement.
1996-2000	1.300	No changes.

Source: Annual reports of the Central Bank of Mexico (Banco de Mexico).

#### PARAGUAY

Year	Code	Reserve requirements
1991	3.330	Reserve requirement (RR) on demand deposits in local currency was at 42%.
1992	2.990	The Central Bank reduced the RR for domestic currency deposits to 30%. In June, the Central Bank started to remunerate legal RR on local currency deposits.
1993	2.600	The CB reduced the RR on local currency deposits from 30% to 25%. RR on foreign currency deposits was 30%.
1994	2.500	In September, the CB reduced the RR on local currency deposits from 25% to 18%. In October, the CB started to remunerate legal RR on local currency deposits in excess of 10%.
1995-2000	2.100	No changes.

Source: Annual reports of the Central Bank of Paraguay.

#### PERU

Year	Code	Reserve requirements
1985	3.850	As of December, the reserve requirement was 65%. In August, the marginal reserve requirement (MRR) was raised from 50% to 75% for liabilities in domestic currency.
1986	3.760	As of December, the reserve requirement was 61%. The Central Bank reduced the MRR twice. As of May, the MRR was 70% for liabilities in domestic currency, and as of October, the MRR was 64%.
1987	3.580	As of December, the reserve requirement was 53.1%. In March, the Central bank reduced the MRR from 64% to 50% for liabilities in domestic currency. The reduction only applied to bank branches located outside the Lima to support credit decentralization.
1990	3.350	As of December, the reserve requirement was 45%. In June, the Central Bank homogenized and raised the MRR to 80%, but in August it came back to the initial scheme of 64% and 50%. In September, the Central Bank homogenized and reduced the MRR to 40% and then it was reduced to 30% at the end of the year.
1991	2.600	The reserve requirement was reduced from 45% to 25.4% at the end of the year. In October, the MRR was reduced to 15% and then reduced to 5% at the end of the year. The Central Bank raised the MRR from 30% to 50% for liabilities in foreign currency.
1992	1.625	As of December, the reserve requirement was at the level of 9.3%. There was a unification of the legal and exigible reserve requirement. In March, the MRR was reduced to 0% for domestic currency deposits.
1993	1.620	The Central Bank established a reserve requirement of 9% for domestic currency, and reduced the MRR from 50% to 45% for foreign currency.
1997	1.470	The Central Bank reduced the reserve requirement to 7%.
1998	1.470	The Central Bank reduced the average reserve requirement by 4.5% between October and December for liabilities in foreign currency. In December, the MRR in foreign currency was reduced from 35% to 20%.
2000	1.400	In September, the reserve requirement was reduced from 7% to 6%, and a 1% minimum reserve requirement in the form of demand deposits kept at the Central Bank was introduced.

Source: Annual reports of the Central Reserve Bank of Peru.



URUGUAY		
Year	Code	Reserve requirements
1991	1.870	The remunerated reserve requirement (RR) on sight deposits in local currency was 13%.
1992	1.670	The RR on sight deposits in local currency was reduced to 10%.
1993-2000	1.670	No changes.
<i>Source: IMF Staff Country Reports.</i>		
VENEZUELA		
Year	Code	Reserve requirements
1990	1.927	In January, the Central Bank (CB) unified the RR on demand, time and saving deposits to 12%. In May, the CB raised the RR to 15%.
1991	2.244	In May, the CB established a special RR of 80% on public sector deposits in commercial banks. In August, the CB raised the RR on demand, savings and time deposits to 25% gradually.
1992	2.397	In September, the CB established that the RR on liabilities held until August 30 was 25%, and for liabilities after this date the RR was 15%. Also, the CB reduced the RR on public sector deposits in commercial banks from 80% to 25% gradually. In December, it was adjusted to 15%.
1993	1.990	In November, the CB unified the RR scheme. For commercial banks the RR was 15%.
1998	2.100	The RR was raised to 17%.
<i>Source: Annual reports of the Central Bank of Venezuela.</i>		
INDIA		
Year	Code	Reserve requirements
1987	1.644	In February, the cash reserve requirement (CRR) was raised from 9% to 9.5%. In May, the CRR on foreign currency non-resident (FCNR) deposit liabilities was raised from 3% to 9.5%. In October, the CRR was raised from 9.5% to 10% of net demand and time liabilities.
1988	1.705	In July, the CRR was raised from 10% to 11% of net demand and time liabilities. In July, the CRR on FCNR was raised from 9.5% to 10% .
1989	1.866	In July, the CRR was homogenized at 15% for all net demand and time liabilities.
1990	1.992	In September, statutory liquidity ratio (SLR) was raised from 38% to 38.5% of net demand and time liabilities.
1992	1.980	In April, SLR was reduced from 38.5% to 37.75% of net demand and time liabilities. In April, banks were exempted from the maintenance of the 10% incremental CRR on net demand and time liabilities.
1993	1.973	In September, CRR was reduced from 15% to 14%.
1994	1.990	CRR was raised from 14% to 15% in three phases. In October, a CRR of 7.5% on FCNR deposit liabilities was established.
1995	1.982	In January, CRR of deposit liabilities under Foreign Currency (NR) was raised to 15%. In November and December, the CRR was reduced from 15% to 14%.
1996	1.848	In May, the CRR was reduced from 14% to 13%. In July, the CRR was reduced from 13% to 12%. In November, the CRR was reduced from 12% to 11%.
1997	1.665	In January, the CRR was reduced from 11% to 10%. In October, the CRR was reduced from 10% to 9.75%.
1998	1.683	In March, the CRR was raised from 9.75% to 10.25%.
1999	1.675	In November, the CRR was reduced from 10.25% to 9%.
<i>Source: Annual reports of the Central Bank of India.</i>		
INDONESIA		
Year	Code	Reserve requirements
1988	1.100	Reserve requirements were reduced from 15% to 2%.
1995	1.100	In December, the Bank of Indonesia (BOI) amended the regulation on the reserve requirement to statutory reserve requirement. With this new regulation, the reserve components changed from demand deposits with BOI and cash originally, to only demand deposit with BOI.
1996	1.192	In February, the new regulation required commercial banks to maintain 3% of their funds in the form of demand deposit with the BOI.
1997	1.192	The statutory reserve requirement for foreign currencies deposits was reduced from 5% to 3%.
<i>Source: Annual reports of the Bank of Indonesia</i>		
KOREA		
Year	Code	Reserve requirements
1985	1.300	The reserve requirement (RR) for demand, time and saving deposits was 4.5% in domestic currency and 1% in foreign currency (in July, the marginal reserve ratio for resident account in foreign currency was introduced at 20%).
1987	1.328	In November, RR for demand, time and saving deposits was raised to 7.0% in domestic currency. In February, the marginal reserve ratio for resident account in foreign currency was reduced to 4.5%.
1988	1.486	In December, RR for demand, time and saving deposits was raised to 10.0% in domestic currency.
1989	1.680	In May, a 30% marginal reserve requirement (MRR) was introduced for deposits in domestic currency.
1990	1.762	In February, RR for demand, time and saving deposits was raised to 11.5% in domestic currency. In March, the marginal reserve ratio for resident account in foreign currency was raised to 11.5% .
1996	1.621	In April, RR for demand, time and saving deposits was reduced to 9% in domestic currency. In April, the marginal reserve ratio for resident account in foreign currency was reduced to 9%. In November, RR for demand, time and saving deposits was reduced to 7% in domestic currency. In November, the marginal reserve ratio for resident accounts in foreign currency was reduced to 7%.

1997	1.351	In February, RR for demand deposits was reduced to 5% in domestic currency. The RR for time and saving deposits in domestic currency was reduced to 2%. The Bank of Korea imposed a 2% RR on negotiable certificates of deposits.
2000	1.340	In April, the MRR for resident account in foreign currency (demand deposits) was reduced to 5%. The MRR for resident account in foreign currency (time and saving deposits) was reduced to 2%.

Source: Annual reports of the Bank of Korea.

#### **MALAYSIA**

Year	Code	Reserve requirements
1985	1.288	In April, the statutory reserve requirement (SRR) of commercial banks (CB) was reduced from 5% to 4% of total eligible liabilities. For merchant banks (MB), the ratio was raised from 1.5% to 2.5%. The SRR for finance companies (FC) remained unchanged at 2.5%.
1986	1.263	In February, the SRR of FC and MB was increased from 2.5% to 3%. In October, the SRR for CB was reduced from 4% to 3.5%. In February, the liquidity requirement (LR) of CB was reduced from 20% to 18.5%. The LR for MB and FC remained unchanged at 10%. In October, the LR for CB was reduced from 18.5% to 17%.
1987	1.238	The Central Bank reduced the liquidity ratio of CB from 10% to 8%, with the LR remaining unchanged at 17% for MB and FC.
1988	1.233	The Central Bank reduced the liquidity ratio of CB from 8% to 5%, and abolished the liquidity ratio for FC.
1989	1.298	In May, the Central Bank raised the SRR of CB, MB and FC to a uniform 4.5%. In October, the Central Bank raised the SRR of CB, MB and FC to 5.5%.
1990	1.440	In January, the Central Bank raised the SRR of CB, MB and FC to 6.5%.
1991	1.465	In August, the Central Bank raised the SRR of CB, MB and FC to 7.5%.
1992	1.547	In May, the Central Bank raised the SRR of CB, MB and FC to 8.5%.
1994	1.715	In January, the Central Bank raised the SRR of CB, MB and FC to 9.5%. In May, the Central Bank raised the SRR of CB, MB and FC to 10.5%. In July, the Central Bank raised the SRR of CB, MB and FC to 11.5%.
1996	1.873	In February, the Central Bank raised the SRR of CB, MB and FC to 12.5%. In June, the Central Bank raised the SRR of CB, MB and FC to 13.5%.
1998	1.521	In February, the Central Bank reduced the SRR of CB, MB and FC from 13.5% to 10%. In July, the Central Bank reduced the SRR of CB, MB and FC from 10% to 8%. In September, the Central Bank reduced the SRR of CB, MB and FC from 8% to 4%.
1999-2000	1.250	No changes.

Source: Annual reports of the Central Bank of Malaysia.

#### **PHILIPPINES**

Year	Code	Reserve requirements
1985	2.540	In September, the reserve requirement (RR) against short-term deposit liabilities of commercial banks (CB) and thrift banks (TB) was reduced from 24% to 23%.
1986	2.438	The RR on long-term deposit instruments of banks was reduced by a total of 2 percentage points from 23% to 21% in May and August.
1987	2.350	No changes.
1988	2.350	No changes.
1989	2.333	In September, the RR on deposits and deposit substitutes was homogenized to 20%.
1990	2.600	A series of upward adjustments in the RR on bank deposits were made during the year with a cumulative increase of 5 percentage points from 20% in 1989 to 25% at the end of 1990 as a contractionary measure.
1991	2.600	No changes.
1992	2.600	No changes.
1993	2.300	A series of downward adjustments in the RR on bank deposits were made during the year with a cumulative reduction of 5 percentage points from 25% in 1992 to 22% at the end of 1993.
1994	2.100	The RR was reduced to 19%.
1995	2.027	In May, the RR was reduced to 17%.
1997	2.100	At the end of the year, the RR was 17%. During the year there were seven changes in the liquidity reserve component of the RR.
1998	2.054	In May, the RR was reduced to 15%. In October, the RR was increased to 17%.
1999	1.950	The RR was reduced during the year by a total of 5 percentage points from 17% in January to reach 12% by July.
2000	1.850	In October, the RR was increased to 16%.

Source: Annual reports of the Central Bank of Philippines

#### **SINGAPORE**

Year	Code	Reserve requirements
1987	1.400	In May, the Monetary Authority of Singapore (MAS) reduced the minimum liquid asset ratio from 20% to 18%.
1998	1.300	In July, the MAS reduced the minimum cash balance (MCB) from 6% to 3%. The MCB had been maintained at 6% since 1975. The minimum liquid assets (MLA) requirement of finance companies was raised from 10% to 13%.
1999-2000	1.200	No changes.

Source: Annual reports of the Monetary Authority of Singapore.

#### **TAIWAN**

Year	Code	Reserve requirements
1978	2.990	The required reserve ratio (RRR) for checking accounts (CA) was 30%.

1979	2.730	In May, the RRR for CA was reduced to 25%.
1982	2.542	In June, the RRR for CA was reduced to 23%.
1988	2.508	In December, the RRR for CA was raised to 25%.
1989	2.863	In April, the RRR for CA was raised to 29%.
1990	2.929	In August, the RRR for CA was reduced to 28.5%.
1991	2.867	In September, the RRR for CA was reduced to 27.75%.
1993	2.773	In September, the RRR for CA was reduced to 26.25%.
1995	2.692	In November, the RRR for CA was reduced to 23.75%.
1996	2.508	In August, the RRR for CA was reduced to 22%.
1997	2.408	In October, the RRR for CA was reduced to 19.75%.
1998	2.247	In September, the RRR for CA was reduced to 18.75%.
1999	2.006	In February, the RRR for CA was reduced to 15%.
2000	1.975	In October, the RRR for CA was reduced to 13.5%.
2001	1.855	In October, the RRR for CA was reduced to 10.75%.

Source: Annual reports of the Central Bank of the Republic of China

#### THAILAND

Year	Code	Reserve requirements
1990	1.470	To stabilize the money markets and reduce fluctuations of short-term interest rates, the BOT modified the computational procedure of commercial bank's reserve requirements.
1995	1.480	In August, non-resident bank deposits with maturity of less than one year are subject to a 7% minimum reserve requirement in the form of deposits (with no interest) with the BOT. While reserve requirements on domestic deposits were also 7%, they could be held in the form of interest-bearing public bonds.
1997	1.447	In September, the BOT reduced the liquidity requirement ratio on total deposits from 7% to 6%. For finance companies, the liquidity requirement on total domestic and foreign borrowing was reduced from 7% to 6%. This was also applied to non-resident deposits, or foreign borrowing with maturity of less than one year.
1999	1.440	The BOT announced new rules on liquidity reserve requirement composition and procedure, but not changes in rates.
2000	1.440	No changes.

Source: Annual reports of the Bank of Thailand.

## Appendix E. Algorithm to track the evolution of bank ownership

This Appendix describes the algorithm used to reconstruct the evolution of bank ownership. Ideally, the objective is to identify foreign institutions involved in retail banking and with access to upstream financing from their mother banks<sup>1</sup>. This is the case of branches of foreign banks, which can obtain resources from their mother institutions when needed. This may also be the case of subsidiaries of foreign banks, although the availability of upstream resources in this case is not guaranteed. In this paper, a bank is considered "foreign" if it is a branch of a bank incorporated in a foreign country, or if it has shareholders settled in a foreign country, holding together at least 51 percent of the bank capital.

The above operational definition was applied in four steps. First, the Bankscope search engine was used to identify subsidiaries of banks from OECD countries. Those with more than 51 percent of ownership in the hands of foreign banks were selected. This search identified 304 banks at least partially owned by banks from OECD countries. Of those, 189 had more than 51 percent in the hands of banks headquartered in OECD countries. Second, to verify the above list, the search engine of Bankscope was used to identify the shareholders of the sampled banks. Specifically, banks with shareholders settled in OECD countries, holding together at least 51 percent of the bank capital, were filtered. In cases with no available information on percentage ownership, banks with one or more shareholders from OECD countries, and with local shareholders holding together less than 50 percent of the bank's capital, were also selected. These filtering criteria produced 313 cases. Of those, 171 were common to the 189 mentioned above, and taken as foreign banks without further check. The remaining 18 were checked individually by looking at their web pages. All of them were included in the final list of foreign banks.

Third, as the information on ownership is not available for all the banks included in the Bankscope database, a list of banks with unknown dependence was produced. The search matched 801 banks. This information was crossed out with a list of transnational banks headquartered in OECD countries or the Cayman Islands, gathered from the web site [www.transnationale.org](http://www.transnationale.org). In addition, the list of banks in the sample was intersected with the lists of foreign banks available from the Central Banks' web pages of Hong Kong, Brazil, Singapore, and Thailand. On a case-by-case basis, 168 additional branches of foreign banks were also identified.

The list produced by the above criteria provides information on ownership as of end-2000 (in some cases end-2001). In the fourth step, to obtain chronological information on changes in ownership throughout the period, the sample of banks was intersected with a comprehensive list of mergers and acquisitions targeting financial institutions in the sampled countries taken from the SDC Platinum database. Specifically, the list includes all transactions announced

<sup>1</sup> In practice, both the nature of the services provided by foreign banks, and their access to upstream resources, depend on the institutional modality of entry. The most commonly used are representative offices, branches, subsidiaries, and joint ventures.

between January 1, 1985 and December 31, 2000, targeting institutions classified under industrial (SIC) codes 6000, 6081, 6029, 6021, and 6712 (to be on the safe side, these codes include a broad category of target financial institutions). The search produced 1,227 transactions involving 804 target institutions. Of those, 404 were matched with the sample of banks. In order to track acquisitions by financial institutions exclusively, the list ignored operations where the acquirers and their nationalities were unknown. Using the description of each operation, nine categories were created, indicating the nationality of the buyer (foreign OECD, foreign non-OECD, government, domestic resident), and the resulting ownership position after the transaction (public, domestic, foreign OECD, and foreign non-OECD)<sup>1</sup>. With the help of this code, it was possible to replicate the evolution of bank ownership throughout the period. In total, the algorithm identified 58 institutions changing ownership.

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<sup>1</sup> In cases where the acquirer is a public company (there are several cases involving government-owned companies based in China), we classify the acquirer as government.