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WHEN IS U.S. BANK LENDING TO EMERGING MARKETS VOLATILE?

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ABSTRACT

Using bank-specific data on U.S. bank claims on individual foreign countries since the mid-1980s, this paper: 1) characterizes the size and portfolio diversification patterns of the U.S. banks engaging in foreign lending; and 2) econometrically explores the determinants of fluctuations in U.S. bank claims on a broad set of countries. U.S. bank claims on Latin American and Asian emerging markets, and on industrialized countries, are sensitive to U.S. macroeconomic conditions. When the United States grows rapidly, there is substitution between claims on industrialized countries and claims on the United States. The pattern of response of claims on emerging markets to U.S. conditions differs across banks of different sizes and across emerging market regions. Moreover, unlike U.S. bank claims on industrialized countries, we find that claims on emerging markets are not highly sensitive to local country GDP and interest rates.

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I. Introduction

Little solid evidence exists on the practices of industrialized country banks operating in emerging markets. Critics of the industrialized country banks argue that these agents are unstable lenders who undermine local financial markets. Supporters see the foreign banks as key sources of otherwise scarce capital, with broader positive spillovers on the stability and efficiency of local financial markets. Clearly, there is a need for careful analysis of the lending practices of industrialized country banks to foreign clients. Our goal in this paper is to make progress in this direction by examining the activities of individual U.S. banks with foreign exposures. This micro-data approach facilitates a comparison of the lending behavior of these banks in the complete set of countries in which the banks have positions. By working with bank-level data, we can consider which types of U.S. banks (with size as a defining characteristic) are the more volatile lenders, in which regions the lending by these banks is most volatile, and whether lending to certain regions is volatile mainly because of higher volatility of the economic fundamentals of these regions.

The main data we use are from quarterly foreign exposure data filed by each U.S. bank (or bank holding company) and collected as a component of the bank supervisory process. The Country Exposure Reports provide a by-country distribution of the foreign claims held by individual U.S. banks,[1] revealing the extent of geographic (and to a lesser extent maturity and type of) concentration of the bank's international holdings. We match this data with bank call report information to have corresponding series on the quarterly assets of the same set of banks. Taken together, these data enable us to discuss the international portfolio allocations of individual U.S. banks and consider the evolution of U.S. bank claims abroad.

We pose a number of questions relevant for understanding the scope of U.S. bank activity in international markets. First, what are the characteristics of those U.S. banks that are international players? We describe the number of reporting banks, the average size of these banks, the scope of their international exposures, and the geographical diversification of their portfolios. Second, what drives changes in U.S. bank claims on particular countries or regions? We conduct an econometric analysis of the sensitivity of various international positions to a set of key macroeconomic fundamentals. In the same way that Peek and

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[1] The use of the term "U.S. banks" in this paper generally includes U.S. owned banks and U.S. subsidiaries of foreign banks.

Rosengren (1997, 2000) showed that Japanese banks transmit shocks from Japan to the United States, we consider whether U.S. banks transmit U.S. business cycle fluctuations to their foreign borrowers. We also posit that U.S. bank international exposures may be closely tied to the performance of particular countries or regions. We examine these relationships, throughout considering whether there are observable differences in these sensitivities across U.S. banks differentiated by their size or across the industrialized or emerging market partners of the U.S. banks.

Our main findings are the following:

- Over the past two decades, the U.S. banks engaged in international lending have become more diverse: there are now fewer banks overall, and these banks are more polarized in terms of their size and portfolio allocations.

- An increasing portion of reporting U.S. banks, particularly smaller banks, maintain an exclusive focus on Latin American markets. The lending by smaller banks, especially with respect to Latin American and Asian markets, has been more volatile than the lending by larger banks.

- Compared with smaller U.S. banks, larger banks maintain claims on a larger number of countries. About 60 percent of large bank exposure is in industrialized countries, with most of the remaining exposure evenly split between the emerging markets of Latin America and Asia.

- Looking across U.S. banks, foreign claims are highly correlated with U.S. GDP growth, but not with foreign demand conditions. The negative correlation between U.S. bank claims and U.S. GDP growth for industrialized country partners suggests that net claims on these areas contract when the U.S. economy is expanding. A similar result arises for claims on emerging Asia. By contrast, the positive correlation observed for claims on Latin American countries suggests that lending to Latin America expands as the U.S. economy grows.

- Foreign claims of U.S. banks are correlated with real U.S. interest rates, but generally uncorrelated with foreign real interest rates. Tighter real lending conditions in the United States are associated with lower real claims on industrialized countries and higher claims on Latin American countries.

- Overall, U.S. banks have not been volatile lenders internationally. Even in periods of international financial crises, we do not observe statistically significant or extensive retrenchments of U.S. bank international claims.

These findings have direct relevance for currency crisis prevention in emerging markets. First, while U.S. banks are active participants in international markets, relatively few of these banks have high shares of their assets located abroad. A large portion of U.S. international claims remains within industrialized countries, but certain regions --- most particularly Latin America --- are important lending destinations of U.S. banks. In recent years, some small U.S. banks have heavily concentrated claims on Latin American countries and high ratios of foreign claims to overall bank assets.

The sensitivity of foreign claims to the U.S. business cycle parallels the type of observations that have been made by Peek and Rosengren, wherein Japanese banks were conduits for transmission of Japanese shocks to U.S. markets. In our sample, these spillovers are statistically significant for Latin America, but not consistently so for other emerging market regions.[2] The positive correlation implies that lending to Latin American countries rises when the United States grows faster, even after controlling for the local GDP growth. Some of this expansion may be related to trade credit provision or investments in Latin America's exporting sectors.

Small countries often express the concern that the international lender --- conducting lending activities directly through foreign-owned branches or indirectly through cross-border exposures --- will make the emerging market economies more sensitive to external fluctuations through the lending channels. While we concur that there is evidence of international transmission of cycles, some of this correlation would likely be evident even in the absence of a U.S. bank presence. More important is the observation that generally the U.S. lenders are relatively stable providers of credit. Especially important is the lack of correlation between U.S. bank claims on emerging markets and the real demand cycles of those markets. These findings reinforce the conclusions by Dages, Goldberg, and Kinney (2000) that foreign banks operating in emerging markets may play an important role in stabilizing overall

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[2] In some specifications there is a significantly negative correlation between U.S. GDP growth and U.S. bank claims on Asian emerging markets. Goldberg and Klein (1998) reached similar conclusions for foreign direct investment patterns.

lending. Since local banks are highly sensitive to local conditions, stable credit supplies by external lenders may reduce the lending and investment instability in emerging market economies in times of emerging market financial and balance of payments crises. As argued by Palmer (2000), U.S. banks appear to take a long view of their positions in many industrialized and emerging market regions, and local claims are relatively stable as a result.

The remainder of this paper is divided into three sections. Section II discusses the data, the U.S. banks that are lending abroad, and their international exposures. Section III econometrically explores the volatility of the international claims of the U.S. banks. Section IV provides concluding remarks related to currency crisis prevention and presents suggestions for further analysis of this rich data source.

II. Reporting Banks and Their International Exposures

The main data for our analysis are from Country Exposure Reports filed quarterly by individual banks. The Federal Financial Institutions Examinations Council (FFIEC) report 009[3] must be filed by every U.S. chartered insured commercial bank in the 50 States of the United States, the District of Columbia, Puerto Rico, and US territories and possessions, that meets *both* of the following criteria:

a. has at least one of the following: a branch in a foreign country; a majority-owned subsidiary in a foreign country; an Edge for Agreement subsidiary; a branch in Puerto Rico or in any U.S. territory or possession (except that a bank with its head office in Puerto Rico or any U.S. territory or possession need not report if it meets only this criterion); or an International Banking Facility (IBF); and

b. has, on a fully consolidated bank basis, total outstanding claims on residents of foreign countries exceeding $30 million in aggregate.

The reported data provide considerable detail on the U.S. bank claims on foreign countries, with itemization by individual country. Bank claims are fairly broadly defined, encompassing credit extended to foreign country banks, public entities, and other recipients

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[3] The FFIEC is an umbrella organization that collects and warehouses data for the Federal Reserve, Office of the Comptroller of the Currency, and Federal Deposit Insurance Corporation. Much of the information collected via the FFIEC 009 is made public, aggregated over all reporting banks, via the Country Exposure Lending Survey

including individuals and businesses. In addition to direct international flows, bank claims also include revaluation gains on interest rate, foreign exchange, equity, commodity and other off-balance sheet contracts. The reporting institution is asked to break down the cross border claims outstanding by type of borrower (banks, public sector entities, other) and by time remaining to maturity (one year and under, 1 to 5 years, and over one year). In other quarterly reports, banks also provide information on their total assets located both in the United States and abroad.

There are 200 possible foreign "countries" in which a bank can report an exposure each quarter. These include industrialized countries; countries within emerging Europe – encompassing a number of small countries and countries that were formerly part of the Soviet Union; 35 countries under the heading of Latin America; 40 under the heading of Asia/Pacific and Middle East; and 54 countries within Africa. Each bank is required to provide detailed information on exposure to a country only when that exposure exceeds 1 percent of the reporting institutions total assets or 20 percent of its total capital, whichever is less.

For the time period spanned by our data, 1984 through 2000:Q2, the number of U.S. reporting banks with foreign exposures changes dramatically (Table 1). In the second half of the 1980s, there were on average 192 banks that reported foreign exposures.[4] Almost all reporting banks maintained positions in Latin America and in (non-U.S.) Industrialized countries. A smaller proportion of banks are involved in developing Asia, with banks less frequently involved in Africa and developing Europe.

The average number of reporting banks declined sharply over the course of the 1990s, down to 152 in the first half and to 90 in the latter half of the 1990s. Much of this reduction is associated with the general tendency toward banking sector consolidation in the United States over this period. Additionally, in the late 1990s some banks opted to report exposures consolidated at a bank holding company level, further reducing the number of distinct reporting institutions. The data also reveal large changes in the relative popularity of regions

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(FFIEC Statistical Release E.16). Palmer (2000) provides a useful discussion of trends in the aggregated data, with specific emphasis on emerging markets.
[4] Our unbalance panel originally began with 317 banks. 35 banks had only one year or less of nonzero total exposure data and were deleted from our data set. Those observations with zero total exposure at any date were deleted from our sample. There were some foreign banks in our sample whose asset information was not representative of their entire conglomerate. Since this created an inconsistency between the scope of exposure information and the scope of asset information, these banks, classified as Edge Acts Banks and New York State Article 12 corporations, and two other banks with unusual situations were eliminated from the sample.

among the reporting banks: over time a smaller share of reporting banks were present in each region of the world. For example, while 182 banks had positions in (non-U.S.) Industrialized countries in the late 1980s, this number declined to 72 by the late 1990s.[5] The number of U.S. banks active in Latin America declined to 78.

Table 1	Average Number of Reporting Banks, Over time and By Region		
	1984-1989	**1990-1995**	**1996-2000**
Total # Reporting Banks	192	152	90
# Banks Reporting positions in Specific Regions			
Industrialized Countries	182	137	72
Developing Europe	77	37	30
Latin America	183	133	78
Asia	122	85	50
Africa	71	40	27
Middle East	97	78	44

Alongside the sharp decline in the number of banks over the past two decades, we observe important changes over time in the size distribution of the reporting banks (Table 2). Although the mean and median bank size basically doubled over the 1984 through mid 2000 period, the actual change in the size distribution of these banks was much greater. Sorting banks by quartiles based on their total assets, the average bank in the lowest quartile became considerably smaller, down from $15 million to $7.5 million in assets. In the next quartile of banks, the average size doubled since the mid-1980s, with the representative bank growing from $46 million to $102 million. The size variation within these quartiles of banks also grew considerably. The banks classified in the third and especially the fourth quartile more clearly reflect the phenomenon of banking sector consolidation. The average fourth quartile reporting

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[5] Throughout the paper, when we refer to Industrialized Countries this means Industrialized countries other than the United States. The list of countries is provided in Appendix Table 3.

bank tripled in asset size, to more than $1 billion in assets by the late 1990s, with numerous banks considerably larger. From both Tables 1 and 2 we conclude that while the number of reporting banks has declined, the remaining banks have become considerably more diverse.

Table 2	Size of Reporting Banks: Total Assets, in $US millions. Means, with Standard Deviations in Parentheses		
	1984-1989	**1990-1995**	**1996-2000**
Total Reporting Banks	178.8 (261.1)	235.1 (309.1)	446.2 (677.7)
Banks sorted into Quartiles by Asset Size			
Quartile 1	15.3 (9.3)	12.2 (11.3)	7.5 (7.3)
Quartile 2	46.5 (10.0)	67.2 (20.1)	101.9 (48.9)
Quartile 3	112.4 (40.5)	182.0 (49.0)	321.1 (79.6)
Quartile 4	541.0 (301.7)	680.1 (317.9)	1353.2 (823.4)

Beyond differences in size, there are also huge differences across individual banks in their foreign exposure, measured as the sum of cross-border exposure and local country claims, reported relative to total bank assets (Tables 3A and 3B).[6] The first five rows of Table 3A provide the unweighted averages of foreign exposure shares across all bank observations and within every period. For all banks taken together (and unweighted by bank size) there has been a tendency toward increasing shares of foreign exposure in average U.S. bank portfolios. However, this result is driven by tendencies among the smaller banks actively participating in international markets. These banks have increased their average foreign portfolio share from 2.8 to 5.4 percent of bank assets. By contrast, the larger banks maintain smaller foreign portfolio shares (at approximately 1 percent of bank assets) with the overall shares slightly declining over time. Even when portfolio shares of all banks are weighted by their respective asset positions of banks at each date, the overall foreign portfolio share of U.S. banks has declined over time, to under 1 percent of U.S. bank assets.

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[6] Observations are included for every period in which a bank reports non-zero foreign exposure.

Table 3A	Foreign Portfolio Shares of Reporting Banks: Means, and Standard Deviations Foreign exposures as a percent of total bank assets.		
	1984-1989	**1990-1995**	**1996-2000**
Unweighted Average Across Banks	1.6 (4.8)	1.7 (5.8)	1.9 (6.9)
Banks divided into quartiles based on parent assets			
Quartile 1	2.8 (6.8)	4.1 (9.5)	5.4 (12.1)
Quartile 2	1.3 (3.8)	0.8 (2.3)	0.7 (2.3)
Quartile 3	1.0 (3.4)	0.9 (3.5)	0.7 (2.7)
Quartile 4	1.1 (4.4)	1.1 (4.4)	0.8 (3.7)
Weighted Average Across Banks (Using total asset weights)	1.2	1.1	0.8

The low foreign exposure shares in Table 3A make it tempting to conclude that international exposures pose very low degrees of foreign risk to the reporting banks. This conclusion is inappropriate. Risk analysis is more often conducted in relation to parent bank capital or equity, and generally not relative to the bank's overall asset position.[7] If a bank's capital is 10 percent of assets, a foreign portfolio share of 5 percent would suggest that the ratio of foreign exposure to capital is 50 percent for that bank – suggesting that bank equity can be substantially threatened by adverse external conditions, even if such threats are not obvious from the portfolio share data. Additionally, the low numbers of Table 3A are the result of having many banks with low exposures – less than 1 percent of assets -- reported together with a lesser (but still substantial) number of banks with much higher foreign exposures.

Table 3B provides average exposures for only those banks that have foreign exposures greater than 1 percent of assets, reducing our sample to only 15 percent of those observations reported in Table 3A. Observe that these banks can have quite large exposures, rising to 8.2 (5.7) as an unweighted (weighted) averages for the late 1990s. The tendency toward

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[7] See Palmer (2000) and Bomfim and Nelson (1998) for related discussions of the appropriate measurement of risk.

increasing exposure over time for the average bank is especially due to the large increases in foreign exposure shares by the smaller and medium sized banks in the sample. This sample of larger banks has maintained foreign portfolio shares on the order of 5 to 6 percent of assets for the full period covered by our data.

Table 3B	Foreign Portfolio Shares of Reporting Banks with Exposure >1%: Means, and Standard Deviations Foreign exposures as a percent of total bank assets.		
	1984-1989	**1990-1995**	**1996-2000**
Unweighted Average Across Banks	5.7 (8.6)	6.8 (10.6)	8.2 (13.0)
By Quartile			
Quartile 1	7.6 (11.5)	10.3 (14.5)	13.1 (17.8)
Quartile 2	4.7 (6.5)	6.7 (10.0)	8.7 (14.0)
Quartile 3	4.7 (5.7)	4.1 (5.5)	5.3 (7.4)
Quartile 4	5.8 (9.1)	6.1 (9.4)	5.6 (8.3)
Weighted Average Across Banks (Using total asset weights)	5.9	6.0	5.7

The form of these exposures has changed over time in terms of regional concentration and in terms of clientele (banks, public sector borrowers, or other private borrowers). The diversification structure across location and clientele is important for ultimately interpreting our analysis of lending volatility later in the paper. One hypothesis is that when U.S. bank positions are highly dispersed regionally, their lending may be more insulated from region-specific disturbances and less volatile, even to regions experiencing shocks.[8]

Table 4 considers the share of all reporting banks, regardless of size, maintaining claims exclusively in one foreign region.[9] Only 4 percent of all bank-observations correspond to an exclusive position in industrialized countries. In stark contrast, by the second half of the

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[8] Dages, Goldberg, and Kinney (2000) show that within Argentina and Mexico, loans by domestic privately-owned banks are more volatile with respect to local conditions than are loans by foreign owned banks.
[9] The regions used by the IMF are: Industrialized Countries; Developing Europe, Developing Western Hemisphere (mainly Latin America), Developing Asia, Africa, and the Middle East.

1990s more than 12 percent of banks had foreign exposures exclusively concentrated in developing countries of the Western Hemisphere (i.e. Latin America). These Latin American markets are the main foreign focus of some small, specialized banks operating out of the United States.

Table 4: **Share of all reporting banks maintaining a position exclusively in one region**
(as percent of all reporting banks)

| | Exclusive Position in *Any* Region | Exclusive Position in a Single Region | | | | | |
| | | Industrialized Countries | Developing Country Regions | | | | |
			Europe	Latin America	Asia	Africa	Middle East
1984-1989	9.1	3.0	0.0	5.8	0.1	0.0	0.1
1990-1995	13.6	4.9	0.0	6.7	0.8	0.4	0.5
1996-2000	21.5	4.0	0.0	12.7	2.8	0.5	1.7

Given that a bank maintains an exposure to a particular region, we also examined the likelihood that the same bank is diversified to other regions. Claims on Latin American countries are always likely to be part of a bank's portfolio, regardless of other regions in which a bank maintains positions (Appendix Table 1). Moreover, if a bank has a position in Latin America, with the rise in Latin America specialization we observe a parallel decline over time in the likelihood of that bank also having positions in Industrialized economies, Asia, and Africa. If any bank has a position in Industrialized countries, there is a greater than 80 percent probability that the bank will also have positions in Latin America and 60 percent in Asia.

The recipients of U.S. bank's foreign exposure also have evolved over time and across regions (Table 5). The last 16 years are characterized by a declining (but still substantial) role of bank-to-bank lending, by a general decline in lending to public entities, and by the rise in lending to a broader group of non-bank private clientele.

Table 5   Recipient Shares in U.S. Bank Exposure, over time and by region

(as percent of Total Exposure by Bank)

Period		Banks	Public	Other Private
1984-1989		47.6	29.1	19.3
1990-1995		46.6	21.4	26.6
1996-2000		44.2	15.0	34.7
	By Region			
1984-1989	Industrialized Countries	62.4	12.8	18.7
	Developing Europe	36.1	52.1	10.2
	Latin America	36.3	40.6	20.8
	Asia	47.5	24.4	21.2
	Africa	21.2	52.1	23.9
	Middle East	45.6	29.3	22.9
1990-1995	Industrialized Countries	57.9	9.9	24.1
	Developing Europe	30.7	41.3	25.9
	Latin America	37.5	24.1	35.3
	Asia	54.2	11.8	23.3
	Africa	22.6	45.3	27.3
	Middle East	39.5	40.4	18.1
1996-2000	Industrialized Countries	49.0	10.8	32.6
	Developing Europe	37.0	28.7	30.6
	Latin America	42.4	10.1	43.9
	Asia	53.0	4.6	27.7
	Africa	29.7	32.0	29.8
	Middle East	43.3	35.1	18.9

Distinguishing across regions, we further observe that:

- In Industrialized countries, the substantial shift away from bank-to-bank lending matches the rise in the non-bank private lending. Public sector borrowers have played relatively small roles, hovering at about 10 percent of the U.S. bank claims on these regions.

- The importance of public sector borrowers declined substantially as a fraction of activity in Latin American exposures. The decline was from about 40 percent of individual bank claims in the mid/late 1980s to just above ten percent by the late 1990s. In absolute terms, there has been a huge increase in U.S. bank private lending to Latin American companies, with a smaller decline in public borrowing.

- For Developing Asia, while the role of public borrowers decreased since the late 1980s, the shift toward direct lending to non-bank private clients has not been as pronounced as observed in other regions.

Also of interest is the source of these claims, whether generated by cross-border operations, or by lending by U.S. branch or subsidiary operations already located in foreign markets (Table 6). The ratio of cross-border claims to total bank claims is near 100 percent for almost all regions and almost all banks in the lower three quartiles of banks. Local lending activities are prevalent mainly among the larger banks. Averaging over banks in the 4th quartile (again, without weighting by bank size), the share of U.S. bank claims that are generated by local lending is 16 percent for Industrialized countries, 24 percent for Developing Asia, and 10 percent for Latin American countries.

As a final descriptive exercise before turning to the volatility of claims of Section III, in Table 7 we show the average importance of particular regions to the foreign exposures of the reporting banks. First, U.S. banks hold very small portions of their foreign portfolios in the regions of Developing Europe, Africa and the Middle East. On average, each of these regions is on the order of one to two percent of the foreign portfolio, regardless of the size of the banks. Among the largest banks Developing Europe gained popularity (to 2.2 percent of portfolios) in the second half of the 1990s. Among the smallest banks, the Middle East is in some cases a higher portion of bank portfolio (at 3 to 4 percent).

Table 6   The Relative Importance of Cross-Border versus Local Lending, by Region and by Quartile

(percentage of exposure that is cross-border)

	Industrialized Countries	Developing Country Regions				
		Europe	Latin America	Asia	Africa	Middle East
1984-1989						
All Reporting Banks	94.1	99.2	98.5	93.5	97.5	98.1
Quartile 1	99.9	99.9	100.0	99.7	100.0	100.0
Quartile 2	99.0	100.0	100.0	99.1	99.9	100.0
Quartile 3	95.9	100.0	99.0	97.5	99.5	100.0
Quartile 4	78.3	98.1	94.1	83.5	95.7	95.5
1990-1995						
All Reporting Banks	91.9	98.0	97.0	89.3	95.2	98.0
Quartile 1	99.7	100.0	99.9	99.1	100.0	100.0
Quartile 2	98.1	100.0	99.8	97.8	99.7	100.0
Quartile 3	92.5	99.9	96.4	95.1	100.0	100.0
Quartile 4	74.8	96.3	90.1	74.6	92.2	95.2
1996-2000						
All Reporting Banks	92.2	96.3	96.4	85.3	91.5	97.4
Quartile 1	100.0	100.0	99.8	96.7	100.0	100.0
Quartile 2	96.3	99.9	97.8	89.8	100.0	100.0
Quartile 3	91.6	98.8	96.6	91.5	100.0	100.0
Quartile 4	84.2	96.3	90.5	76.0	92.2	96.0

Table 7   **Regional Total Exposure Shares, by Bank Type and Over Time**
(unweighted by bank size: share of region in a bank's total foreign exposure)

1984-1989	Industrialized Countries	Developing Country Regions				
		Europe	Latin America	Asia	Africa	Middle East
All Banks	55.5	1.0	26.0	13.3	2.4	1.8
Quartile 1	51.5	0.9	37.5	5.5	1.7	3.1
Quartile 2	52.6	1.2	34.0	10.2	1.1	0.9
Quartile 3	53.5	0.9	29.4	12.7	1.9	1.6
Quartile 4	56.3	1.0	24.2	14.0	2.7	1.9
1990-1995						
All Banks	58.4	0.9	21.7	16.5	1.3	1.3
Quartile 1	57.1	1.1	34.7	3.0	1.8	2.4
Quartile 2	53.5	0.3	29.0	16.0	0.4	0.8
Quartile 3	56.4	0.7	30.1	11.1	0.7	1.0
Quartile 4	59.2	1.0	19.1	18.0	1.4	1.4
1996-2000						
All Banks	57.5	1.9	22.6	15.6	1.2	1.2
Quartile 1	20.9	1.6	70.9	2.1	1.0	3.6
Quartile 2	48.4	0.3	32.1	17.8	0.4	1.0
Quartile 3	50.1	1.1	33.9	12.7	0.9	1.4
Quartile 4	60.3	2.2	18.7	16.4	1.4	1.0

Reinforcing our earlier observations, Table 7 shows the importance of claims on the Latin American countries to the portfolios of both large and small banks. While small banks have had disproportionately large emphasis on Latin American claims (in 1984 to 1989 at 37 percent, compared with 24 percent for the banks in the largest quartile), the role of Latin American investments soared for the smaller banks over the second half of the 1990s. For quartile 1 banks, Latin American claims reached over 70 percent of overall foreign exposures

by the end of the 1990s. Claims on Industrialized countries have generally been 50 to 60 percent of the foreign exposures of U.S. banks, and remain at these levels for those banks without a more exclusive Latin American focus.

III. The Volatility of International Exposures of U.S. Banks

While the previous section has demonstrated that significant differences exist across banks and over time in the size and composition of U.S. bank foreign claims, it did not address the reasons for and timing of changes in these claims. We now turn to this more dynamic issue, asking whether fluctuations in claims are econometrically explained by changes in the fundamentals of the countries in which these banks have claims, and by changes in the fundamentals of the United States.

To examine the fluctuations of bank claims on specific groups of countries, we divide banks by asset size categories and into the three time intervals (1984-1989, 1990-1995, 1996-2000). We consider three arbitrary size divisions. First, we define as smaller banks those with less than $50 million in overall assets (all in real terms). Medium banks have assets of $50 million to $250 million, and larger banks have assets in excess of $250 million. Banks are assigned to these categories for each period in which they are in operation. Thus, if a bank grows from $100 million in assets in 1987 to $500 million in 1997, that bank will first be considered a medium-sized entity, and later, after crossing the arbitrary size threshold, will be a larger bank for the purpose of our specification.

The econometric unraveling of this volatility is easily motivated by basic portfolio theory. In that spirit, we model a bank's exposure to a country as dependent on the real rate of returns on investments in that country c, which are assumed to be functions of local interest rates, i_t^c and on real GDP growth rates, $GGDP_t^c$. These foreign country fundamentals are assessed relative to home market conditions, captured by U.S. real interest rates and U.S. real GDP growth. Thus, we express the (log) claims of bank i into country c at time t, Exp_t^{ic}, as:[10]

$$Exp_t^{ic} = a_0^i + a_1^i t + a_2^r + a_2^r t + b \cdot i_t^c + c \cdot i_t^{us} + d \cdot GGDP_t^c + e \cdot GGDP_t^{us} \qquad (1)$$

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[10] We performed a parallel analysis using the share of country c claims in the bank's portfolio (i.e. claims relative to bank assets), instead of just examining the changes in the actual bank claims on country c. The few substantive differences in results are noted later in this section.

The terms $a^i + a_1^i t$ allow for the possibility that some banks have higher average and trend-changes in the foreign exposure of their claims, independent of the time-series variables in our specification. The terms $a^r + a_2^r t$ allow for the possibility that, regardless of observable fundamentals, some regions are more popular destinations for investment across banks. This popularity is modeled as having mean and trend components.

In order to avoid estimation problems potentially arising from the unit root properties of GDP growth, real interest rate, and claim series, we first difference equation (1). With this differencing, the bank and region constant terms drop out, and the bank and regional trend terms enter the resulting first-difference specification in levels.

$$\Delta Exp_t^{ic} = a_1^i + a_2^r + b \cdot \Delta i_t^c + c \cdot \Delta i_t^{us} + d \cdot \Delta GGDP_t^c + e \cdot \Delta GGDP_t^{us} \qquad (2)$$

Equation (2) is our basic testing specification, stating that the *change* in a U.S. bank claims on any country: has a bank specific component common across all regions (which can represent a trend toward or against further internationalization of a bank's overall exposure level); a region-specific component (which can represent trend change in the popularity of claims of particular regions); components correlated with changes in foreign country and in U.S. real interest rates; and components correlated with changes in GDP growth rates for the foreign country and for the United States.

Using this specification, we pose the following questions to the bank data on country exposures:

- Do banks adjust exposure to different regions in similar ways in response to fluctuations in the macroeconomic fundamentals of those regions? Empirically, this translates into tests for common b and d across regions.

- Is U.S. bank exposure to some regions relatively more sensitive to changes in U.S. interest rates and U.S. output performance? Empirically, this translates into tests for common c and e across countries.

- Are smaller banks generally more volatile lenders? Empirically, this would translate into systematic differences in estimated coefficients b, c, d and e across banks, divided by size.

To estimate the elasticities of country claims with respect to fundamentals, we gather country-specific data on real GDP and on real interest rates. Although our country sample initially contains 200 countries in which U.S. banks may have claims, we trim the sample in a number of reasonable dimensions. First, most banks have held positions in a much smaller set of countries. Looking across all banks together, on average banks maintain exposures with respect to 20 to 25 countries. Again, the aggregates mask big differences across larger and smaller banks (Appendix Table 2). The larger banks in our sample (in Quartile 4) tend to be invested in many more countries, with the average across these banks at 86 countries in the late 1980s, declining to 66 countries in the late 1990s. Overall, compared with smaller and mid-sized banks, larger banks have a greater number of countries in which they maintain relatively smaller foreign exposures.

Moreover, there are some countries in which U.S. banks have little or no exposure. By deleting these countries we eliminate 51 of the 180 countries for which banks individually could provide foreign exposure data.[11] Additional countries are dropped from our sample due to the absence of adequate data on interest rates or GDP.[12] Since there generally is more data available on GDP than on interest rates by country, we run the regression specification in a number of ways to generate appropriate insights on GDP and interest rate elasticities, while maximizing the number of countries and interval of observations explored. We find that the regression results are robust to the slightly narrower data sample that includes country real interest rates as well as real GDP growth. Consequently we report only the fully-specified regressions.

We also want to limit the downward bias on significance that could potentially arise from keeping in the sample the large number of banks with very small foreign portfolio shares. The large number of bank-observations with foreign exposure shares well below 1 percent of bank assets indicate that a relatively small number of U.S. banks account for a large share of the overall bank foreign exposure. We trim the data sample to that used in Table 3A

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[11] Among the 200 initial "country" choices for reporting are about 20 international organizations and regional aggregates. We delete these "country" observations immediately. For our econometrics, we reduce the sample of countries examined by eliminating countries where U.S. banks, *in aggregate*, have less than $10 million of total exposure. With other data-related exclusions we are left with 105 countries for the regression analysis.

[12] We generally use lending rates (IFS 60p), "the lending rate to meet the short and medium term financing needs of the private sector, differentiated by credit worthiness of borrowers and objectives of financing". If this rate is unavailable for a country, we use deposit rates (IFS 60L) or treasury bill rates (IFS 60C). Appendix Table 3

by eliminating from the reported regressions all observations for which bank total foreign exposure is less than one percent of total bank assets.

Results. Regressions based on equation (2) demonstrate significant differences in the effects of fundamentals on bank claims on countries in different regions. In Table 8, we include all bank observations. In Table 9 we report the results of regressions that differentiate across banks on the basis of size. In the reported specifications, the results are unweighted. The interpretation is that the results describe what -- on average -- influences the claims of individual banks, irrespective of differences across banks in the relative size of their claims on countries. The results should not, therefore, be viewed as describing the evolution of total credit to specific countries or regions.

The first row of Table 8 shows that, across all U.S. banks reporting foreign exposures, the claims on specific countries are on average relatively insensitive to fluctuations in the real interest rates of those countries. Moreover, the GDP growth rates of both industrialized and emerging market economies do not generally influence the claims on these countries by the average reporting bank.[13] The lack of significance of own-country GDP growth and own-country interest rates for U.S. banks claims on emerging markets is a consistent pattern observed across regression specifications.

More important determinants of U.S. bank claims abroad are the patterns in U.S. macroeconomic variables. Industrialized and Latin American country regions are the two regions in which these U.S. variables often have statistically significant effects. All else equal, when interest rates rise in the United States, U.S. banks consistently reduce their claims on other industrialized countries, suggesting the possibility of some substitution across markets. Likewise, higher U.S. GDP growth is consistently associated with reduced claims on other industrialized countries.

Higher U.S. GDP growth and interest rates have mixed effects on emerging markets, with some sensitivity to the regression specifications. For example, higher U.S. interest rates are associated with higher claims on Latin American countries in the unweighted regressions

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details which countries ultimately are included in our empirical specifications, along with a categorization of which countries fall under the heading of Europe, Latin America, Asia, Africa, and Other regions.
[13] This result also appears in regressions using portfolio shares of country claims (exposure to a country relative to U.S. bank total assets) as the dependent variable.

of Table 8. Similar results arise in a claims-weighted version of this regression. For Asia, the sign of this relationship is negative for the average bank reported in Table 8, but becomes positive in claims-weighted specifications. The direction of U.S. GDP growth on emerging market claims is consistent across the unweighted and weighted regression specifications, but differs across Latin America and Asia. Claims on Latin America expanded for a reporting U.S. bank when the United States grew faster, but on average claims on Asian countries contracted.

Table 8   **Regression analysis using full panel of banks and branches, unweighted**

	Industrialized Countries	**Developing Countries**				
		Europe	Latin America	Asia	Africa	Middle East
Δi_t^c	0.026 (0.044)	0.000 (0.001)	0.000 (0.000)	0.043 (0.031)	-.019 (0.045)	-0.001 (0.003)
Δi_t^{us}	-0.074*** (0.015)	-0.020 (0.623)	0.042* (0.021)	-0.098** (0.041)	0.017 (0.155)	-0.102 (0.116)
$\Delta GGDP_t^c$	-0.001 (0.003)	0.000 (0.000)	-0.001 (0.005)	-0.001** (0.001)	0.001 (0.050)	0.005 (0.024)
$\Delta GGDP_t^{us}$	-0.106*** (0.021)	-0.134 (0.312)	0.063** (0.029)	-0.142** (0.056)	0.011 (0.215)	-0.135 (0.158)
Adjusted R-square: 0.485		Number of Observations: 21700				

Standard errors in parentheses. ***,**,* indicate statistical significance at the 1, 5, 10 percent levels. All regressions include regional fixed effects and bank fixed effects. Includes only bank observations with foreign exposure exceeding 1 percent of bank assets.

Next, we consider whether the broad description arising from Table 8 is also pertinent when we divide banks according to their size, but again compute regressions for the "average bank", i.e. unweighted by bank size or total claims.[14] We find that there are in fact observable differences across smaller and larger banks in the determinants of their claims on foreign countries. These differences are apparent through comparisons of Panels A, B, and C of Table 9.

First for the banks in the smallest asset class category (Panel A), we observe differences in the role of fundamentals for claims on the (non-U.S.) industrialized countries

versus those on emerging markets. While increases in industrialized country real interest rates are associated with larger claims on industrialized countries, claims on emerging markets are uncorrelated with real local lending rates. Claims on the (non-U.S.) industrialized countries fall when U.S. interest rates rise, consistent with some substitution between claims on the United States and other industrialized country borrowers. For the average small bank, none of the emerging market macroeconomic fundamentals included in the regressions were statistically significant and qualitatively important determinants of changes in their claims on specific emerging markets. These patterns of results were robust to the inclusion of crisis period dummy variables in the regression specifications.[15]

For the larger banks shown in Panel C, we again see the pattern of local country macroeconomic fundamentals being important mainly in the context of U.S. bank claims on industrialized countries. Within the emerging market groupings, U.S. bank claims on Latin American countries expand with the United States grows faster and when U.S. interest rates rise.[16] For the other emerging markets regions, claims on specific countries are not as tightly correlated with the macroeconomic fundamentals.

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[14] Bank size has been shown to be a relevant consideration in the U.S. lending markets: for example, as Hancock and Wilcox (1998) show, in response to declines in their own capital small banks shrank their loan portfolios considerably more than did large banks.

[15] We considered 5 distinct crisis dates: Latin American debt crisis: 1984:Q1-1985:Q1; ERM crisis: 1992: Q3-1993:Q1; Tequila crisis: 1994:Q4-1995:Q1; Asia crisis: 1997:Q3-1997:Q4; Russian default: 1998:Q3-1998:Q4.We entered these 5 period dummies into the regression specification of equation (2), permitting the effects to differ across the countries of the six regions in which U.S. banks have positions.

[16] For claims on Latin America, there are qualitative differences between these results and those generated using U.S. bank portfolio allocations. The alternative approach shows that claims on Latin American countries, when measured relative to the overall assets of the specific banks, fall --- not rise --- significantly as U.S. GDP growth and real interest rates increase.

Table 9   **Regression Results, by region and by bank size (unweighted specification)**

Panel A: Banks with Assets below $50 million

	Industrialized Countries	Developing Countries				
		Europe	Latin America	Asia	Africa	Middle East
Δi_t^c	0.157** (0.078)	0.000 (0.001)	0.000 (0.000)	0.021 (0.035)	-0.010 (0.046)	-0.001 (0.003)
Δi_t^{us}	-0.086*** (0.023)	-0.052 (0.624)	0.025 (0.027)	0.011 (0.092)	0.263 (0.183)	-0.089 (0.117)
$\Delta GGDP_t^c$	0.000 (0.003)	0.000 (0.000)	-0.001 (0.007)	-0.001 (0.001)	0.010 (0.050)	0.003 (0.024)
$\Delta GGDP_t^{us}$	-0.126*** (0.032)	-0.293 (0.333)	0.041 (0.037)	0.029 (0.127)	0.313 (0.251)	-0.114 (0.160)

Adjusted R-square: 0.2585   Number of Observations: 10912

Table 10 Panel B: Banks with Assets between $50 million and $250 million

	Industrialized Countries	Developing Countries				
		Europe	Latin America	Asia	Africa	Middle East
Δi_t^c	0.043 (0.054)		-0.003 (0.003)	0.153* (0.085)	-0.843* (0.465)	
Δi_t^{us}	-0.025 (0.026)		-0.055 (0.046)	-0.197*** (0.062)	-0.757** (0.355)	0.096 (1.205)
$\Delta GGDP_t^c$	-0.027*** (0.011)		-0.017 (0.049)	-0.056 (0.070)		
$\Delta GGDP_t^{us}$	-0.041 (0.036)		-0.077 (0.064)	-0.278*** (0.086)	-1.051** (0.497)	-0.015 (0.941)

Adjusted R-square: 0.3649   Number of Observations: 4250

Table 10 Panel C: Banks with Assets greater than $250 million

	Industrialized Countries	Developing Countries				
		Europe	Latin America	Asia	Africa	Middle East
Δi_t^c	-0.178* (0.101)	0.270 (0.244)	0.000 (0.000)	0.175 (0.109)	-0.255 (0.232)	10.212 (7.215)
Δi_t^{us}	-0.109*** (0.027)	5.571 (8.520)	0.121** (0.052)	-0.069 (0.063)	-0.904 (0.981)	
$\Delta GGDP_t^c$	0.006 (0.014)	-0.030 (0.042)	-0.002 (0.009)	-0.082 (0.059)	1.035* (0.534)	
$\Delta GGDP_t^{us}$	-0.148*** (0.038)	0.643 (1.003)	0.169** (0.072)	-0.112 (0.087)	0.423 (0.985)	

Adjusted R-square: 0.2028   Number of Observations: 6538

Standard errors in parentheses. ***,**,* indicate statistical significance at the 1, 5, 10 percent levels. All regressions include regional fixed effects and bank fixed effects. Includes only bank observations with foreign exposure exceeding 1 percent of bank assets.

Finally, we generally observe larger point estimates on the coefficients in the regression specifications using observations for the larger U.S. banks. The differences in these point estimates are statistically significant in the context of claims on Latin American countries. Especially with respect to positions in emerging market economies, the regressions suggest that trends in claims may be very significant for the smaller banks, as opposed to emerging market macroeconomic fundamentals. By contrast, larger bank positions have less important regional trends and appear to be more responsive to fundamentals. These patterns of results are robust to inclusion of crisis period dummy variables.

IV. Concluding Remarks

Foreign credit to emerging markets is viewed as one means for deepening emerging capital markets and potentially reducing the severity of crises, when they occur. One relevant issue is the stability of foreign bank claims on these markets and the source of volatility in these claims. U.S. banks generally seem to have been steady providers of credit to these markets in the face of fluctuations in emerging market growth rates and interest rates. Since lending by banks within emerging markets is likely to be more sensitive to conditions in their home markets, these results suggest that the U.S. banks may contribute to more stable overall credit supplies in emerging markets.

On the other hand, the bank claims on emerging markets by large U.S. banks are sensitive to U.S. cyclical conditions. The countries end up with a more diversified supply of credit, but claims on emerging markets could fluctuate with conditions in foreign markets. The patterns of exposure of small U.S. banks may be driven more by trends, while the exposures of larger U.S. banks may be driven more by changes in market fundamentals. There is little evidence of systematic differences in the behavior of U.S. bank claims across periods associated with international financial crises.

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Appendix Table 1   U.S. Bank Conditional Exposures, by Region

(Conditional on activity in a left-handside region, the row entries provide the probability of also having a position in the other regions.)

		Industrialized Countries	Developing Europe	Latin America	Asia	Africa	Middle East
84-89	Industrialized Countries	1.00	0.40	0.94	0.64	0.38	0.38
	Developing Europe	0.98	1.00	0.99	0.86	0.74	0.78
	Latin America	0.92	0.39	1.00	0.61	0.37	0.49
	Asia	0.99	0.54	0.98	1.00	0.54	0.61
	Africa	1.00	0.78	0.99	0.91	1.00	0.73
	Middle East	0.97	0.62	0.98	0.78	0.55	1.00
90-95	Industrialized Countries	1.00	0.25	0.85	0.57	0.27	0.27
	Developing Europe	0.98	1.00	0.98	0.80	0.68	0.83
	Latin America	0.86	0.25	1.00	0.53	0.27	0.51
	Asia	0.96	0.34	0.89	1.00	0.36	0.58
	Africa	0.97	0.61	0.96	0.77	1.00	0.79
	Middle East	0.90	0.38	0.91	0.62	0.40	1.00
96-00	Industrialized Countries	1.00	0.36	0.89	0.62	0.34	0.34
	Developing Europe	0.96	1.00	0.96	0.81	0.63	0.82
	Latin America	0.78	0.32	1.00	0.53	0.31	0.52
	Asia	0.92	0.45	0.89	1.00	0.46	0.60
	Africa	0.95	0.66	0.98	0.86	1.00	0.86
	Middle East	0.87	0.50	0.94	0.66	0.49	1.00

Appendix Table 2	Average Number of Countries in Which Banks Have Foreign Exposures		
	1984-1989	**1990-1995**	**1996-2000**
All Reporting Banks	27	20	21
Banks Sorted By Quartile*			
Quartile 1	14	12	13
Quartile 2	24	14	15
Quartile 3	35	33	35
Quartile 4	86	76	66

Note: Banks are divided into Quartiles according to their asset size.

Appendix Table 3   Countries Included in Regression Analysis, Using IFS Classification

Industrialized Countries	Developing Countries				
	Developing Europe	*Western Hemisphere (L. America)*	*Asia and Pacific*	*Africa*	*Middle East*
Australia	Bulgaria	Argentina	Bangladesh	Chad	Bahrain
Austria	Croatia	Bahamas	China	Congo	Egypt
Belgium	Cyprus	Barbados	Fiji	Cote d'Ivoire	Israel
Canada	Czech Repub.	Belize	Hong Kong	Equatorial	Jordan
Denmark	Estonia	Bolivia	India	Guinea	Kuwait
Finland	Hungary	Brazil	Indonesia	Gabon	Oman
France	Kazakhstan	Chile	Malaysia	Ghana	Saudi Arabia
Germany	Latvia	Colombia	Mongolia	Guinea-Bissau	
Greece	Lithuania	Costa Rica	Pakistan	Kenya	
Iceland	Macedonia	Dominican	Papua New	Mauritius	
Ireland	Poland	Republic	Guinea	Morocco	
Italy	Romania	Ecuador	Philippines	Niger	
Japan	Russia	El Salvador	Singapore	Nigeria	
Luxembourg	Slovakia	Guatemala	South Korea	Senegal	
Netherlands	Slovenia	Guyana	Sri Lanka	South Africa	
New Zealand	Turkey	Haiti	Thailand	Tunisia	
Norway	Ukraine	Honduras	Vanuatu	Zambia	
Portugal		Jamaica			
Spain		Mexico			
Sweden		Nicaragua			
Switzerland		Panama			
United		Paraguay			
Kingdom		Peru			
		Suriname			
		Trinidad and			
		Tobago			
		Uruguay			
		Venezuela			