

Banking Globalization and Monetary Transmission

Nicola Cetorelli
Federal Reserve Bank of New York

Linda S. Goldberg
Federal Reserve Bank of New York and NBER

Revised October 6, 2009
(First version June 4, 2008)

Abstract

The globalization of banking in the United States is influencing the monetary transmission mechanism both domestically and with respect to foreign markets. Using quarterly information from all U.S. banks filing call reports between 1980 and 2006, we provide evidence of a specific role of global banks in international transmission of liquidity shocks. Globalized banks activate internal capital markets between the parent banks and their overseas affiliates, using this channel as a way of partially insulating themselves from changes in domestic liquidity conditions. These internal capital markets of global banks directly contribute to the international propagation of domestic liquidity shocks into the lending done by affiliated banks abroad. These results imply a substantially more active lending channel than documented in the seminal work of Kashyap and Stein (2000), but also imply that the lending channel *within* the United States is declining in strength as banking becomes more globalized, while the transmission abroad is likewise increasing in strength.

Keywords: international transmission, monetary policy, bank, global, liquidity, lending channel, internal capital markets

JEL Classification: E44, F36, G32

The views expressed in this paper are those of the individual authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System. We appreciate valuable discussions with Anil Kashyap, Jeremy Stein, Phil Strahan and Adam Ashcraft and seminar and conference participants at the Bundesbank, IMF, ECB, BIS, and University of Alabama. We also thank Sarita Subramanian, Nikki Candelore and Victoria Baranov for research assistance. Address correspondences to Nicola Cetorelli or Linda S. Goldberg, Federal Reserve Bank of NY, Research Department, 33 Liberty St, New York, N.Y. 10045. email: Nicola.Cetorelli@ny.frb.org, or Linda.Goldberg@ny.frb.org.

I. Introduction

How does banking globalization affect monetary policy transmission domestically and internationally? Reflecting a general trend toward increasingly globalized financial markets, the issue resonates since a rising share of total U.S. banking assets is accounted for by banks with significant operations in foreign countries (see Figure 1). In this paper we explore the implications for monetary policy of this first-order transformation of the U.S. banking industry. In particular, we take as a starting point the established evidence that a key channel of monetary policy effectiveness is through the impact on bank lending. We then consider how banking globalization affects the transmission mechanism for policy at home and abroad. While the international macro and finance field has identified financial globalization as having real effects in magnifying international transmission, as discussed for example in Kose, Prasad, Rogoff and Wei (2009), our work focuses on a particular mechanism through which monetary policy becomes less effective at home, and has greater impact abroad through the lending channel, as domestic banks have expanded their foreign operations.

While it is not directly obvious that the process of banking globalization should affect monetary policy transmission, an argument supporting this conjecture is that banks with international operations can respond to a domestic liquidity shock by reallocating funds between the head office and its foreign affiliates. This argument thus presumes that banking organizations actively operate *internal capital markets*, and that global banks can move liquid funds between domestic and foreign operations on the basis of relative needs. If this conjecture holds true, the domestic consequences of monetary policy could become weaker. However, the effects of monetary policy would not disappear. Indeed, if global banks respond to a liquidity shock through an internal reallocation of funds, their foreign lending may be affected. Hence, banks going global may increase the *international* propagation of domestic monetary policy.

One established approach to identifying the consequence of monetary policy for real lending activity is the methodology of Kashyap and Stein (2000). This methodology identifies the consequences of monetary policy on lending by focusing on the tightness of the linkage between a bank's balance sheet and its' lending activity. If policy is effective, this linkage will be weaker in times of more liquidity, stronger in times of monetary

tightness. Kashyap and Stein (1994, 1995, 2000) already have shown that large banks are expected to be insulated from monetary policy because of their potential unencumbered access to external capital markets. Indeed, Kashyap and Stein (2000) showed that the real lending activity of large banks – those U.S. banks in the top 5 percent of the asset distribution -- is virtually unaffected by U.S. monetary policy. One main lesson was that small bank sensitivity is a key component of monetary transmission through the lending channel.

The association between bank globalization and bank size is certainly pronounced: as Figure 2 shows, most global banks are in the top 5 percent of the asset distribution. Hence, one can ask whether it is bank size or globalization (or both) that changes the nature of monetary effectiveness and transmission. If the issue is size, by the time a bank expands operations to include participating in foreign countries, monetary policy has already become inconsequential for its lending in the home market. In this case, banking globalization *per se* is unlikely to have an impact on monetary policy effectiveness and transmission.

We find that bank globalization has an independent effect on monetary policy effectiveness at home and abroad. Using quarterly data for all U.S. banks between 1980 and 2006, we address the size versus global bank argument performing multiple, independent tests. First, expanding on the seminal Kashyap and Stein (2000) approach, we likewise look at banks in the top 5 percent of the asset size distribution, but separate them in two clusters, based on whether they had or did not have global operations. We find that the lending activities of the group of large, global banks is indeed insulated from monetary policy, while the complementary group of large banks with domestic-only operations is instead found to have lending activity that remains sensitive to changes in U.S. monetary policy. This different profile of sensitivity of lending by alternative types of large banks can be interpreted as indicating that insulation derives from the global nature of banks, since otherwise large banks do not seem to be fully insulated via their access to financial markets that are *external* to firm.

Yet, this first set of results is not sufficient to identify a separate effect of bank globalization. A potential counter-argument to the “globalness matters” argument is that it is really just bank size which matters, and global banks are just really big banks. The

U.S. banks' asset distribution is well-known to be highly skewed, so that even within the top 5 percent bracket there is a considerable size difference between banks in the top 1 percent and those between the 95th and the 99th percentile. Therefore, even within the top 5 percent, global banks may disproportionately populate the right tail of the distribution. Hence, to push further the point that globalness per se, not just size matters for policy effects, we repeat our tests focusing on banks between the 95th and the 99th percentile and find results consistent with our prior observations. A skeptic could still argue that even within this finer cluster of large banks, global institutions could still be larger on average, as corroborated by data shown in Figure 3.¹ Consequently, we ran additional testing using weighted least squares estimation techniques, imposing on global banks the size distribution of non-global banks (in essence penalizing the contribution to the estimates of the largest of the global banks) and still found lending by (only) global banks to be fully insulated from U.S. monetary policy.

Limiting our analysis to this type of testing could still be considered as providing insufficient evidence for globalization as an independent factor affecting monetary policy transmission to lending. For example, global banks may have a different type of clientele with loan demand that is less dependent on domestic economic and liquidity conditions. Corroboration of the evidence in favor of the banking globalization and monetary transmission angle requires more direct testing, going beyond the specific types of bank-specific data used in the seminar Kashyap and Stein work on the lending channel.

The argument that banking globalization changes policy transmission presupposes that global banks activate an internal capital market, moving resources between parent and foreign affiliated banks in response to domestic monetary policy changes. We provide direct evidence that this is indeed what is occurring. We draw on data that stems from the requirement that U.S. banks report quarterly the value of the net liabilities (or claims) between the head office and the foreign offices. Outright internal borrowing or lending within the banking organization is a major component of these flows. These data provide an unusual opportunity for a direct test of the existence of an internal capital market: data on borrowing and lending *within* an organization, between its different

¹The chart is drawn with 2005q4 data but it is representative of a similar pattern observable throughout the whole sample period.

components, is – to the best of our knowledge - hardly ever available.² In our case we directly test whether cross-border internal flows of funds within a banking organization are systematically associated with changes in monetary policy. We find significant supportive evidence: In times of tighter monetary policy in the United States, internal funds show a greater tendency to flow *from* foreign operations *to* the U.S. head office of a global bank (or flow by a smaller amount to the foreign operations), and vice versa with U.S. expansionary policy.³

Are these internal flows reflecting funding needs of part of a banking organization, or are they just picking up banks chasing changing rates of returns of the global asset portfolio, both domestically and abroad? For each bank, we construct a time-varying benchmark cost of capital in foreign markets as a control, with construction utilizing bank-specific information on the geographic location of each bank's assets. To hone in on the hypothesis that this internal flows respond to funding needs, we look at a differential response by banks with high or low capital to asset ratios. The idea is that banks with low capitalization ratios would be relatively more impaired in their ability to access external capital markets, hence they would be the ones more in need to mobilize funds internally. The evidence is consistent with this hypothesis, thus strengthening the conjecture that global banks exploit their global nature to respond to changes in monetary policy.

Finally, we show that this internal capital market channel directly influences the lending activity abroad by U.S. owned banks. We demonstrate this direct effect in two ways. First, we perform an analysis of the strength of the relationship between the bank's lending through offices abroad and the parent bank balance sheet. In the spirit of traditional approaches that investigate internal capital market channels, if such capital markets are at work, the reliance of foreign lending activity on the parent balance sheet should be directly affected by domestic monetary policy. Our tests confirm this prior. Second, we test whether this foreign lending changes with internal capital market transfers. We also confirm this latter margin of adjustment. Consequently, while

² For this reason, evidence on the existence of internal capital markets is typically derived indirectly by looking at the *performance* of one side of an organization in response to a shock to the other side.

³ This line of research is closely related to the earlier work by Houston, James and Marcus (1997) and Campello (2002). Important extensions are the contributions by Ashcraft (2006), Ashcraft (2008) and Ashcraft and Campello (2007).

substantiating the main conjecture, we also identify a specific channel of *international* transmission of U.S. monetary policy.

Overall, banking globalization seems to exert an independent effect on monetary policy, above and beyond any impact coming from increasing bank size or differences in demand across bank clientele. Access to alternative sources of external financing is certainly key to monetary policy insulation. However, our results also indicate that banks with global operations make a significant use of internal borrowing and lending between their head offices and their foreign offices.

Our results show that the total consequences of U.S. monetary policy are underestimated by a focus that is solely concentrated on lending in U.S. markets, but also underestimated if U.S. bank globalization is ignored. Monetary policy consequences on lending may not be declining in effectiveness overall but, rather, may be increasingly felt abroad and outside of the traditional purview of observation. In this sense, our work directly complements the Peek and Rosengren (1997, 2000) findings that banks are specifically involved in the international transmission of shocks. In our case, results based on bank-specific data demonstrate a direct mechanism that may generate the type of monetary policy transmission across countries documented in analyses of macroeconomic data, as in Kim (2001), Neumeyer and Perri (2005), and Canova (2005).⁴

Our findings have introduced a new dimension to the debate on globalization effects on monetary policy and real activity in the United States. While contributors to this debate focus on issues like whether the Phillips Curve has flattened (for example, Yellen 2006, Bernanke 2006, Ihrig et al 2007, and Sbordone, 2007), globalization of banking has consequences for the transmission of monetary policy to the real U.S. economy and foreign markets through the lending channel, suggesting the new internal capital markets of global banks playing a key role.

⁴ Kim (2001) provides evidence on international transmission of U.S. monetary policy shocks in the context of a VAR framework. For transmission to emerging markets, Neumeyer and Perri (2005) emphasize the role of world interest rates in emerging market business cycles, and Canova (2005) focuses on transmission of US shocks to Latin American. Other studies highlight the role of exchange rate regime selection in such transmission, as in Di Giovanni and Shambaugh (2008), Frankel, Schmukler and Serven (2004), and Obstfeld, Shambaugh, and Taylor (2005).

II. Identification strategy

Tests for effects of policy on bank lending. The lending channel of monetary policy, expounded in Bernanke and Blinder (1992), maintains that tight money should reduce the volume of reservable deposits held by depository institutions.⁵ Bank lending changes due to monetary policy arise because a bank faces a significant wedge between the cost of acquiring insured, reservable deposits and the cost of acquiring funds such as large denomination CDs, money market funds, and securities. Hence, a contractionary monetary policy that drains bank reserves from the economy and reduces the amount of reservable deposits, translates into a reduction in bank lending activity when banks are unable to replace each dollar of deposits with other funds.

A research methodology viewed as seminal in testing the consequences of monetary policy is provided in Kashyap and Stein's (2000) and relies on the argument that lending by any bank is sensitive to its balance-sheet health, with healthier banks able to lend a greater fraction of their assets, all else equal. Using the Call Report Data of individual U.S. banks,⁶ Kashyap and Stein showed that, in the United States, lending sensitivity to monetary conditions was statistically important for smaller banks in the United States, but not for the larger banks that presumably have a greater ability to raise alternative sources of funds from capital markets external to the banking organization.

Since our conjecture is that policy effects domestically and internationally are different for global banks, our empirical strategy begins by adapting the Kashyap and Stein work as a reference point. We begin by comparing the degree of sensitivity to monetary policy of lending by global banks with the lending sensitivity of similar banks whose business is however confined within domestic boundaries. We restrict our analysis to banks that in every quarter were in the upper five percent of the asset distribution of all U.S. banks, which is the group of banks that Kashyap and Stein (2000) combined into a single group of banks and found to have lending activities that were insulated from U.S. monetary policy. We follow closely the two-step empirical strategy adopted by Kashyap

⁵ Other basic references on the lending channel see Bernanke and Blinder (1988), Bernanke and Gertler (1995), Kashyap and Stein (1994, 1995, 2000). See Stein (1998) for specific modeling of the informational frictions on banks' liability side.

⁶ Banks file quarterly financial data to the FFIEC (Federal Financial Institution Examination Council), with the reports of Condition and Income commonly referred to as Call Report Data.

and Stein (2000) and refined by Campello (2002), and begin by estimating cross-sectional sensitivities of lending activity of panels of banks to their overall balance sheet liquidity at each date. The first step of this empirical strategy entails running separate cross-sectional regressions for each data quarter for banks indexed by i within each of two bank groups: the large global banks and the large, non-global, banks. The general stage 1 specification is:

$$(1) \quad \Delta \log(Y_{it}) = \sum_{j=1}^4 a_{ij} \Delta \log(Y_{it-j}) + \beta_t X_{it-1} + \text{Controls} + \varepsilon_{it}$$

where Y_{it} is a measure of loans of bank i at time t . Alternative measures of loans are examined in stage 1 regressions, and are discussed in greater detail in Section III. X_{it-1} is a measure of a bank's overall balance sheet liquidity and is defined as the log of the ratio of a bank's liquid assets to its total assets. A bank's capitalization ratio, its asset size, and the value of its nonperforming loans are included as bank-specific controls. These balance sheet measures are lagged one quarter to avoid econometric issues arising due to simultaneity. The vector of controls also includes indicator variables for the state where the bank's headquarters are located and whether or not the bank's headquarters are in a metropolitan statistical area (MSA). The inclusion of the state and MSA indicator variables allows for different macroeconomic conditions in each period for each geographical area and is intended to capture unobserved variability of loan demand.

A key variable of interest is the estimated coefficient on X_{it-1} , denoted by β_t , which reflects the degree of dependence of lending activity on balance sheet liquidity. Each regression is run at each quarter, thus generating a separate time series of estimated β_t coefficients for each class of banks under consideration.

In the second step of this empirical strategy, the β_t series estimated in the first step are used as dependent variables to determine how lending sensitivity varies with monetary policy:

$$(2) \quad \beta_t = \eta + \sum_{j=1}^8 \phi_j MP_{t-j} + \delta \text{Controls} + \mu_t$$

where MP_{t-j} is an indicator of monetary policy. In our analysis we use three alternative indicators of monetary policy, each of which we describe at greater length in

the data section: the Bernanke-Mihov indicator, the nominal Federal Funds rate, and the real Federal Funds rate. As a convention, these indicators of monetary policy are defined in our analysis so that they increase in times of liquidity tightening and decrease in times of looser liquidity conditions. The regression analysis includes as additional controls a time trend, three quarterly indicator variables, and the growth rate in real GDP and its lags. Moreover, for global banks we also add in the second stage a variable intended to control for monetary conditions in the economies in which each of the global banks have local affiliates. This latter variable may be important for internal capital market allocations of the global banks since it provides perspective on the relative movements in policy rates. Presumably, if monetary conditions in countries where U.S. banks have local affiliates move in correspondence with U.S. monetary conditions, the incentive of U.S. parent banks to reallocate funds between parents and foreign affiliates might be mitigated. The second stage of our analysis presumes an all else equal scenario, which is that changes in monetary conditions in the United States influence domestic lending given foreign conditions.

If lending by banks is affected by monetary policy, the testing approach maintains that this makes lending more dependent on balance sheet liquidity in times of policy tightening and less dependent in times of monetary policy loosening. Hence, the sum of the coefficients of the monetary policy indicators β_i in the second-step regression would be positive and significant if policy affects bank lending.

We will consider a number of variants of this basic specification as we consider the strength of policy transmission, as captured by the lending channel, for different definitions of lending in home and foreign markets. Included in a range of robustness checks are specific tests targeted at isolating the role of bank size versus bank globalization in influencing outcomes. As mentioned earlier, large, global banks are on average larger than large, non-global banks. Hence, one type of alternative test of specification (2) drops observations in the top 1 percent of all banks in the full bank sample, so that large banks are redefined to be only those in the 95th to 99th percentile. Another alternative method utilizes weighted least squares regression techniques, weighing the observations in the global bank sample to match the size distribution of banks in the sample of non-global banks.

Another set of tests address a potential critique that large domestic banks and large global banks have different markets in which they operate, and therefore that different demand curves may be behind the result of global bank lending being less sensitive to changes in U.S. liquidity measures. For addressing this critique, we start with an observation made by Campello (2002), that the access to external capital markets by large banks in the United States may give some liquidity advantage to affiliated small banks, compared to stand alone small banks. All of these small banks are domestically oriented, so the differential is confirmed to be due to parent banks. We take this argument a step further by arguing that, if globalness matters and internal capital markets are in place, the small banks affiliated with large domestic banks may be more sensitive to domestic liquidity changes than those affiliated with large global banks.

Tests of internal capital markets in global banks and transmission. Normally data on internal transactions within an organization are unavailable in any systematic format. However, U.S. banks are required to report quarterly the aggregate value of internal transactions between the head office and foreign offices (“Net Due To or From Own Related Offices in Other Countries”).⁷ We construct bank-specific series for $NetDue_{i,t}$ so that a positive value in a quarter implies that the U.S. office of bank i has received a net inflow of funds from their foreign affiliates in period t . It is important to recognize that this entry truly reflects internal funds reallocations and is distinct from other balance sheet activity, such as bank investments in foreign or local assets.

If global banks are insulated from domestic liquidity shifts *just because of their size*, we should not expect to observe any abnormal behavior in the functioning of internal capital markets between parent banks and their foreign affiliates around times of changes in monetary policy. In order to test whether an internal capital market is active in U.S. global banks, we use the following equation time-series panel specification over the full group of global banks:

$$(3) \quad \Delta Net Due_{i,t} = \alpha + \sum_{j=1}^4 \varphi_j \Delta Net Due_{i,t-j} + \sum_{j=0}^4 \phi_j \Delta MP_{t-j} + \sum_{j=0}^4 \gamma_j \Delta GDP_{t-j} + \mu_t$$

⁷ Net Due To or From Own Related Offices in Other Countries is reported in schedule RC-H of Form 030 (Call Report).

where $\Delta Net\ Due_{i,t}$, the quarterly change in real Net Due funds for bank i at time t , is regressed on its own four lags, on the change in the indicator of monetary policy and its four lags, and on the growth rate in real GDP and its four lags. Real Net Due is constructed by deflating nominal net due by the CPI, with 1980 as the CPI base year taking a value of 100. The regression includes the growth rates in real GDP to control for general economic conditions. Bank-specific controls for foreign GDP growth rates and foreign monetary conditions also are included in some specifications, highlighting that the conditions must be relevant for the markets in which specific banks have affiliates.

If the internal capital market is in operation within a global banking organization and is used as at least a partial offset of domestic monetary policy shocks, we should expect to find an increase in the inflow of funds (or a decline in outflows of funds) from foreign operations in times of domestic monetary policy tightening. Evidence of internal capital markets as shock transmitters (or alternatively as buffers) between the parent and foreign affiliates would be reflected in a positive and significant sum of coefficients ϕ_j on the monetary policy indicators.

Two types of robustness checks are run relative to this basic specification. First, we introduce controls for changes in foreign monetary conditions. Again, if monetary conditions in countries where U.S. banks have local affiliates move in correspondence with U.S. monetary conditions, the incentive of U.S. parent banks to reallocate funds between parents and foreign affiliates might be mitigated. Such comovement of the cost of liquidity across markets would be especially strong when the host countries maintain pegged exchange rates vis-à-vis the U.S. dollar. The second set of robustness checks explores whether the sensitivity of net dues to liquidity varies according to the capital ratios of the individual bank. The logic is that banks with weaker capital positions might rely more, compared with their well capitalized counterparts, on internal capital markets in the event of a liquidity shock.

Our final sets of key results investigate the effects of domestic monetary policy on the lending activity of the *foreign offices* of U.S. global banks. If U.S. global banks operate an active internal capital market between their domestic and their foreign operations, then the lending activity of the foreign offices of these banks could be affected by U.S. liquidity shocks. Moreover, if this liquidity support channel through an

active internal capital market is in operation, the lending activity of the foreign offices should depend on the overall level of available liquidity of the domestic head office. In times of U.S. monetary policy contraction, lending by foreign offices would have to rely *less* on the overall balance sheet strength of the domestic head office, and vice versa.

For testing this foreign lending proposition, we again rely on the two-step procedure described in equations (1) and (2). In this case, however, the dependent variable in the first step is a measure of the lending activity of the foreign offices of bank i at time t . The lending measures used are, alternatively, the growth in C&I lending of the foreign offices and the growth in total lending of the foreign offices. The main regressor of interest is the overall liquidity measure of the reporting bank.

We also provide a set of (single stage) regression results whereby the foreign lending of a bank directly relates to internal capital market transfers within the organization

$$(4) \quad \Delta Y_{i,t} = \alpha + \sum_{j=1}^4 \varphi_j \Delta Y_{i,t-j} + \beta \Delta NetDue_{i,t} + \gamma \Delta MP_t + \sum_{j=0}^4 \gamma_j \Delta GDP_{t-j} + \mu_t$$

In this specification, foreign lending by each bank's overseas affiliates is a function of past lending trends, of real GDP growth rates at home and abroad, and of the current pattern of net due flows between parents and overseas affiliates (note: preliminary specification here).

Our last set of tests is more peripheral to the direct arguments of the other empirical exercises, but underscores a related point that that domestic and international propagation of shocks (or, alternatively, protection or insulation from shocks) extends broadly within bank holding companies, for example between the parent banks and affiliated small domestic banks. The question considered is whether insulation differences observed across large domestic-only banks and globally-oriented U.S. banks extend to the small banks affiliated through common bank holding companies. Methodologically, the empirical steps are analogous to those for equations (1) and (2), with the main exceptions of additional controls applied for the size of the large banks in the BHC.

III. The Data

The sample of banks. We examine data on banks and liquidity conditions for the period from 1980Q1 through 2006Q4. We purposefully exclude data for later quarters since any inference would be confounded by the concomitance with the financial crisis, officially started in 2007Q3.⁸ The core of our analysis utilizes Call Report data available quarterly for every chartered U.S. bank.⁹ Table 1 provides descriptive statistics on the banks used for our analysis. Four categories of banks are covered in the table: large domestic banks, large global banks, and for reference, small banks affiliated with a large global bank via common ownership under the same bank holding company (BHC) organization, and small bank in BHCs that contain large banks but no global banks. We use Call Report data on foreign assets and foreign liabilities of branches and subsidiaries to determine whether a bank is *global* or not. A *large* bank is defined as any bank that is in the 95th percentile or higher of banks sorted by asset size, with this categorization performed in every quarter of the sample period. Following Campello (2002), a small bank is defined as any bank that is in the 90th percentile or lower. Leaving out the intermediate group of banks between the 90th and 95th percentile is justified to impose a cleaner separation between small and large banks.

The main balance sheet data of these types of banks are summarized in Table 1. The information presented covers the number of bank-quarter observations in the sample, median values for bank size, loan to asset ratios, C&I lending to assets, and bank liquidity, capitalization and nonperforming loan shares. For reporting within the Table, three reference dates are considered, 1985, 1995, and 2005, indicative of the respective decades covered by the full dataset.

Our overall sample consists of more than 1.1 million bank-quarters of data for U.S. banking. Over time, the large global and large domestic banks have evolved to become larger on average and to represent more of the total assets of the banking sector. While large global banks are fewer in number, by 2005 they account for almost 70 percent of U.S. banking system assets. Large domestic banks are more numerous but

⁸ These data deserves a separate study (currently underway).

⁹ The specific details on the FFIEC 031 Consolidated Reports of Condition and Income for a Bank with Domestic and Foreign Offices and FFIEC 041 Consolidated Reports of Condition and Income for a Bank with Domestic Offices Only are available at <http://www.ffiec.gov/forms031.htm> and <http://www.ffiec.gov/forms041.htm>.

characterized by a substantially smaller median bank size. Those small banks that are affiliated with large BHCs currently account for less than one percent of banking system assets.

Compared with other large banks, the global banks tend to have less liquid assets, lower capitalization, and higher nonperforming loan shares. While both types of large banks have similar loan to asset ratios, commercial and industrial loans play a larger role in the business base of global banks.¹⁰ These observations about differences in portfolios across the large banks are consistent with lessons from Berger et al. (2005), wherein it is argued that bank size is correlated with the bank business model: larger banks tend to lend at a greater distance, interact more at arms-length with their borrowers, and have shorter and less exclusive relationships with these borrowers.

Alternative measures of bank lending. The basic regression specifications include data on total bank lending as well as commercial and industrial lending. C&I lending, by focusing on business lending, is perhaps a better indicator of the possible impact on the real economy of liquidity conditions affecting the banking industry. At the same time, focusing on just C&I lending may be overly restrictive in terms of the actual impact of liquidity, since different banks may have a different orientations in their asset portfolios and investing strategies.

We also use data on lending specific to the U.S. global banks. The data on loans of foreign offices¹¹ of U.S. global banks captures loans extended directly by offices in countries where they are physically located. These figures do not include possible lending activity of the domestic offices to clients residing abroad which already was captured in the parent bank consolidated lending data.

¹⁰ The patterns are the same when small banks affiliated with global BHCs are compared with small banks affiliated with domestic BHCs.

¹¹ These data are from schedule RC-C of the Call Reports filed by banks: item RCFN 2122 for total loans and RCFN 1763+1764 for C&I loans.

Internal capital markets in the global bank. Another form of data specific to global bank and central to our analysis is Net Due with foreign offices.¹² The net due data reflects *direct* flows between a parent with its branches and subsidiaries abroad. Positive values represent flows from foreign operations to the parent bank located in the United States, and vice versa (see Data Appendix for more details).

Table 2 presents some features of the foreign loan and net due data, focusing on the means, medians and number of observations of these bank-specific series. The first point to note is the consistent large difference between means and medians. The reason for this difference is that the distributions of lending and net due activity are highly skewed, with overall quantities dominated by a few large players. Second, the net due observations are split across “net due to” (flows to the parent) and “net due from” (flows from the parent to foreign affiliates). Since the mid 1990s, the flows from affiliates to U.S. parents have substantially exceeded flows in the opposite direction.¹³ Third, while both total and C&I foreign lending have risen, the median bank is not engaged in this activity. Foreign lending activity is dominated by very large global banks. While total foreign lending had been rising, domestic lending rose at a higher rate, so that foreign loans declined as a share of total bank lending. The direction of flows from foreign affiliates to U.S. parents, reflected in Net Due To statistics, show that affiliated foreign banks have assets abroad that tend to be directed to U.S. markets.

Macroeconomic Liquidity. As in Kashyap and Stein (2000), the proxies for (changes in) market liquidity are measures of monetary policy. Three measures of U.S. liquidity are used in our analysis: a nominal Federal Funds rate, a real Federal Funds rate (the nominal rate adjusted for CPI inflation), and the Bernanke and Mihov (1998) measure.¹⁴ The

¹² We construct these as the difference between schedule RC-H Net due *to* own foreign offices, Edge and Agreement subsidiaries, and IBFs and Net due *from* own foreign offices, Edge and Agreement subsidiaries, and IBFs (RC-H 2941-2163).

¹³ Note, however, that our conjecture and the related identification strategy does not rely on trends in the data, but focuses on quarterly changes in internal flows in response to changes in monetary policy.

¹⁴ Bernanke and Mihov (1998) applied a flexible VAR model which nested specific assumptions about central bank operating procedures, such as whether it is based on federal funds rate or non-borrowed reserves targeting. Ilian Mihov kindly updated and revised this measure in 12/06 using data through the end of 2005. The Kashyap and Stein (2000) study uses a narrative measure of monetary policy, the Boschen-

quarterly effective Federal funds rate is calculated from monthly data from the Federal Reserve Board. The Bernanke-Mihov measure is constructed via a “semi-structural VAR” model of the market for bank reserves. We use an oppositely signed Bernanke-Mihov series compared to the published measure, so that its interpretation is similar to the Federal Funds series: in all cases, our empirical specifications introduce these variables so that an increase in the monetary measure is interpreted as a tightening of U.S. liquidity conditions.

These three measures are depicted in Figure 4. In terms of the values of these series, positive values of our Bernanke-Mihov metric and of the real Federal Funds rates are considered periods of *tight* monetary policy. Upward movements in all three measures generally are considered indicative of *tighter* policy. Of course, the real Federal Funds rate can be tighter either due to an explicit rise in the nominal policy rate, or from a reduction in inflation while the nominal rate remains unchanged. The Bernanke-Mihov measure can reflect tighter liquidity conditions that are generated from policy instruments other than the Funds rate.¹⁵

Some specifications include a control variable for foreign monetary conditions, which enters in the regressions with the same lag structure as the domestic monetary policy variable. The foreign monetary condition variable is a weighted average of short-term money market or policy rates in the countries in which U.S. banks have local claims.¹⁶ Since these variables are intended to proxy for the liquidity conditions in

Mills (1995) index, the Federal Funds rates, and the Bernanke and Mihov measure. Kashyap and Stein (2000) do not use a real Federal Funds rate.

¹⁵ The differences in definition and construction across these measures generate positive but not necessarily tight correlations among them. The tightest correlations are among the nominal and real Federal Funds rate series at 0.71, which have a common policy base but differ in terms of correction for slower moving inflation. The real rate is consistently lower in value and trends downward by less through these decades as average inflation has declined. The trajectory of the Bernanke-Mihov measure is more tightly correlated with the nominal Federal Funds rate (0.41) than the real rate (0.14), perhaps not surprising since the nominal rate enters the VAR used in constructing the Bernanke-Mihov measure. Despite this pattern in correlations reflecting changing liquidity conditions, the B-M and real rates have more comparable direct signals regarding absolute liquidity conditions, namely, whether policy is monetary policy is loose or tight at any point in time.

¹⁶ The short-term monetary rates are generally drawn from International Financial Statistics. Item 60B is typically a money market rate or a call money rate; where unavailable, item 60C Treasury Bill rates are utilized. Weights are based on the quarterly data on local claims by country of all U.S. banks reporting foreign exposures. Adjustments are made to exclude periods when specific countries are in crisis, as summarized in Appendix Table 2, and quarters in which real interest rates exceed 25 percent or are below negative 25 percent. India, one of the twenty countries, is excluded from the weighting due to the volatility

countries in which each bank maintains local claims, the foreign monetary variables are bank specific. The weights on foreign real policy rates are constructed using quarterly data (lagged one period), by bank, on local claims across the twenty largest countries in which banks have positions. These twenty countries typically cover more than ninety-five percent of total bank claims abroad.

Real Macroeconomic Activity. The first-stage regressions on bank lending contain controls such as indicator variables for the state where the banks' headquarters are located and the MSA indicator variable to capture unobserved variability in loan demand. Some of the second stage regressions include real GDP growth of the United States as a control variable. In addition, in the regressions that contain foreign loans as the dependent variable have bank-specific foreign GDP growth as an additional control variable. This variable is intended to capture unobserved variability in the markets in which banks have claims abroad, and is constructed by weighting country real GDP growth by the distribution of a bank's local claims across foreign markets (lagged one period).

Data screens. For our regression analysis we apply a number of screens to the data. These screens follow closely those of Kashyap and Stein (2000) and Campello (2002). We drop bank quarters in which mergers or changes in "high holder" within a BHC occur. We drop bank quarters where asset growth was above 100 percent and total loan growth was above +50 percent or below -50 percent. In regressions where we focus on C&I lending, we remove similar outliers in the C&I lending growth distribution. Finally, for regressions analyzing the lending of foreign offices we dropped outliers at the 1st and 99th percentile of either the series of growth in total and C&I lending of foreign offices.

of data on short-term market rates. Real rates are constructed using quarterly CPI inflation data relative to one year previous levels.

IV. Empirical Findings

Comparing the lending channel across large banks. The first empirical exercise tests how lending sensitivity to balance sheet liquidity varies with monetary policy for different categories of banks. We compare large banks with international operations - the U.S. global banks - with those large banks that instead operate exclusively within domestic boundaries. The results highlight differences in policy transmission into U.S. bank lending across these groups of banks.

Table 3 presents results from regressions where the dependent variable is the time series of estimated coefficients on the liquidity to asset ratio in quarterly cross-sectional regressions where the dependent variable was either growth in total bank loans or total C&I loans. The numbers shown in this table are the results from the second stage regressions run on these two subsets of banks, with each of the 15 cells within the table presenting the summed coefficient on alternative U.S. monetary policy or liquidity variables and generated from distinct regressions. The table is divided into two panels, with the upper panel reporting estimated summed coefficients where the first stage regressions used growth in total loans as the dependent variable, and the lower panel reporting estimated coefficients using growth in C&I loans.¹⁷

In addition, some of the specifications exclude controls for GDP growth in the second stage regression, while other specifications include these controls. For the group of global banks we also provide results from second stage regressions where we added controls for foreign liquidity conditions. Results highlighted in bold are statistically significant at least at the 10 percent level and indicate an active lending channel for monetary policy.

The lending channel of U.S. monetary policy is not statistically significant in any specifications for the group of global banks. The sums of coefficients for the regressions based on this category of banks are never significant at standard significance levels. Even controlling for foreign conditions does not change the results. The results for global banks are robust to whether or not specifications introduce controls for domestic GDP growth (column 4), and foreign GDP growth and foreign interest rates (column 5). The

¹⁷ For reference, in Appendix Table x.x. we present sample first stage and second stage regressions for the benchmark specification of domestic and global bank samples.

results are consistent across all three metrics of U.S. monetary policy, as indicated by the non-bold coefficients in each column of the table.

The pattern of statistical significance of the lending channel is different for the large but domestic banks. These domestic-only banks seem less insulated than expected. In seven out of twelve regressions, the sums of coefficients are statistically significant and positive, and marginally significant in one additional specification. The size of the coefficients suggests that the economic magnitude of the effect of monetary policy on lending of the large, non-global banks may not be very large. However, this is expected: these are still institutions that, because of their size, to a substantial degree are indeed able to access external financial markets.

One goal of these bank-sample distinctions was to provide support to the conjecture that globalness is an additional, independent factor that further reduces the sensitivity of bank lending to U.S. policy. The results are consistent with this conjecture. In section [x.x](#) we address the economic magnitude in order to provide a quantitative appreciation of the contribution of globalness to the lending channel response to monetary policy.

This pattern of differences across bank types also is robust to tests aimed at separating the bank size and globalness factors. For instance, since global banks heavily populate the top 1 percent of the size distribution, it is possible to argue that Table 3 findings might be driven by size not the global nature of the banks. Accordingly, an additional set of regressions curtail the dataset to banks within the 95th and the 99th percentile. This refinement, with results in Table 4, continues to show that large global banks (excluding the very largest), have lending patterns that are insulated from monetary policy, while large, non-global banks within the same sub cluster continue to display a certain degree of lending sensitivity.¹⁸

Another econometric approach is through weighted least squares. We also ran regressions for the global banks using weighted least squares in the first stage, using as weights the size distribution of the large, non-global banks. This approach in essence statistically penalizes the largest of the global banks and over-emphasizes the

¹⁸ Only non-global banks in the top 1 percent are found to be wholly insulated (results not reported). The lack of statistical significance may be due to the relatively small sample size for this category of banks in the top 1 percent group.

contribution to the results of the smallest ones. The results, in the last column of Table 4, still confirm that the lending channel for policy effects is still insignificant in global banks, and that size per se may not be the leading factor explaining such finding.

Another possible criticism of our results is that perhaps it is not globalness per se driving the differences across domestic and global banks, but rather is a difference in the customer base of these banks. This is not the case. One check on this issue is that the comparison is robust for total loans and for C&I loans by these groups of banks.

Another interesting approach isolates spillovers from globalness on similar populations of borrowers in the United States. To achieve this, we capitalize on the Campello (2002) findings that insulation achieved in external capital markets by large institutions also benefits their small bank affiliates within the United States. These small banks operate in similar lending markets, with a more homogenous population of borrowers. We revisit this conclusion with the expectation that the degree of insulation may be different for small banks that are associated with large and global banks, compared with insulation afforded those associated with large but domestic-oriented banks.

The identification is achieved with the same two-step procedure described above through equations (1) and (2). However, following very closely Campello, in this case in the first stage we estimate the sensitivity of lending activity of the small banks to their own internally-generated income and then in the second stage measure how such sensitivity varies with monetary policy. The intuition is that small banks associated with banks that are insulated by liquidity shocks should not be in need, or should be less in need, of their own internally generated income to fund lending activity. If these small banks cannot rely on funds reallocation provided by the larger, better insulated affiliates, their lending activity will be more dependent on their own income and such dependence will be even higher in times of tighter monetary policy. As before, the first stage regressions include as bank-specific lagged controls a bank capitalization ratio, its size, and the value of its non-performing loans, together with state and MSA indicator variables. In addition, we include controls for the overall size of the large banks in the BHCs to which each bank i belongs. These controls are the lagged values of the log of the sum of total assets of all large banks in the BHC, and its squared term.

Table 5 reports the results of second stage regressions for these two groups of small banks affiliated through a BHC with a large bank. The first set of columns refer to estimated coefficients from the regressions run on the subset of small banks affiliated with large, domestic banks, while the second set of columns refer to regressions run on the subset of small banks affiliated with large, global banks. The second set of columns shows that small banks affiliated with large, global banks appear to be insulated from liquidity shocks. In all cases, with any indicator of monetary policy, looking at total lending or just C&I lending, and including or excluding GDP controls, the estimated sums of coefficients are never positive and significant. In fact, they are actually negative and significant in three of the regressions with total loans as dependent variable. By contrast, the results for small banks affiliated with large, domestic banks are markedly different. In eleven of the twelve alternative specifications the sums of coefficients from the second stage regressions are positive and significant, indicating that these small banks need to rely more on their own internal funds in times of liquidity shortage. The implication is that the small banks affiliated with domestic-only BHCs appear to remain exposed to changes in U.S. liquidity conditions, an indication that the large banks in their organizations may not be sufficiently shielded to be able to activate a meaningful reallocation of resources to their small affiliates through the organization's internal capital market.

Internal capital markets of global banks. While the results in the previous section suggest that monetary policy transmission into the lending of global banks may be insignificant due to their global nature, confirming this conjecture requires more direct testing. Global banks can operate an internal capital market that potentially allows them to reshuffle resources between domestic and foreign operations depending on the relative liquidity needs within the banking organization. The next set of tests examines whether this channel is active and used to respond to changes in U.S. monetary policy. We test equation specification (3), on the “net due” from foreign operations to the parent. In all regressions the dependent variable is the change in net due flows between a bank domestic headquarter and its foreign offices, with the net due flows deflated to be expressed in constant 1980 dollars. Specifications differ in the monetary variable used

and in the controls included in regressions. Recall that, by construction, an *increase* in net due means that the domestic offices are receiving more funds from their foreign offices or sending fewer resources abroad.

The results summarized in the first column of Table 5 show a pattern of funds flow internal to the banking organization which is both statistically significant and consistent with the expected direction of results. Column 1 shows that net due flows from foreign affiliates to the head office in the United States increase significantly (or outflows decline significantly) when liquidity conditions tighten in the United States. This finding is robust across all three indicators of U.S. liquidity and monetary policy. For robustness, we add to the basic specification the composite foreign interest rate with the same lag structure as the monetary policy variables and observe in column 2 that the inclusion of this control does not alter the basic result.

Columns 3 and 4 present tests for asymmetry in the internal capital market response to U.S. liquidity when conditions tighten or loosen. The transmission of U.S. liquidity conditions onto net-due flows is bi-directional. Funds flow into the parent bank at a faster pace when domestic monetary policy is tighter (column 3), and funds flow out to the affiliates, or into the parent from the affiliate at a slower pace, when domestic monetary policy is more expansionary (column 4). Tests performed for equality across the asymmetric coefficients show that none of the specifications yield a statistically significant difference between estimated size of net due response to tightening versus loosening of credit conditions. The empirics reject the notion that the response of internal capital markets between U.S. banks and their foreign affiliates is active only in one direction of U.S. monetary policy change.

It is possible that the movement of funds picked up by the regressions on net due flows between affiliated banks may not reflect internal funding needs, but may instead be the result of chasing higher relative return opportunities. So, for instance, a higher fed funds rate may just signify higher return opportunities in the United States, with the foreign operations reallocating their resources accordingly. However, if this were the case, foreign offices would simply increase their own positions in domestic assets on their balance sheet (e.g., through purchases of U.S. government securities or other). In

other words, international portfolio reallocations could be done directly without the affiliate engaging in internal transactions with the head office.

Nonetheless, we test the validity of this objection by running an alternative model specification. We test for a differential response in net due flows between banks based on whether they displayed high or low capitalization ratios: if the net due flows are just the result of portfolio considerations and not due to internal funding needs, we would expect to see no difference in response between banks with higher and lower capital to asset ratio. On the contrary, under the presumption that banks with lower capitalization may be the ones with more difficulties to access traditional external markets, we would expect to see a higher response exactly from this subgroup of banks. Each quarter, we construct a dummy variable equal to one if a global bank has a lower than median capital-to-asset ratio relative to other global banks. Interacting this dummy in the regression specifications leads to the results shown in columns 5 and 6. The significant results on the lower-capitalization dummy show that global banks with lower capitalization ratios tend to use the net dues channel more aggressively. This finding adds to the evidence already provided that global banks use their global nature and rely on internal capital market transfers to offset some liquidity changes arising from domestic monetary policy.

International transmission through global banks. Our observation that foreign affiliates help insulate U.S. global banks against home liquidity shocks does not mean that the total consequences of U.S. monetary policy are smaller than in the absence of globalization. While some reduced sensitivity is evident in lending by U.S. banks, transmission of U.S. monetary shocks can be magnified on foreign markets. Indeed, the *economic* impact of the same amount of inflows and outflows can be markedly different from the domestic lending and foreign perspectives. Since the total foreign lending portfolios are typically much smaller than the total domestic loan portfolios (Table 2), the impact of a given outflow on the lending of foreign offices could be proportionately much larger than the impact of an equally sized inflow on domestic lending.

We explore the potential impact of changes in U.S. monetary policy for lending activity abroad by the affiliates of U.S. banks using the bank-specific data on lending done by U.S. affiliated banks in foreign markets (i.e. foreign loans). If global banks

appear insulated from domestic monetary policy shocks because of their ability to redirect liquid funds across national borders, we expect the balance sheets of the foreign offices of such banks to be directly affected by U.S. shocks. As internal capital is reallocated in the global bank, the availability of funds for lending abroad likewise adjusts as does outstanding foreign loans. Evidence supporting this conjecture would provide a direct channel through which domestic monetary policy is transmitted internationally, supporting the type of spillovers of policy established in VAR studies that exclusively rely on macroeconomic data.

Two types of evidence are provided. The first exercise uses Kashyap and Stein type methods, and relies on the expectation that, with operable internal capital markets, foreign lending is likely to depend on the strength of the balance sheet of the home office. Consequently, we test whether such degree of dependence varies with the conditions of U.S. monetary policy. The regression specifications in Table 7 cover growth in C&I lending of foreign offices, shown in the first set of columns, and Total Foreign Lending, shown in the second set of columns. As in Table 3, the reported results are the summed effects across quarters of a change in U.S. monetary variables, with the cells of the table drawn from regression specifications that are inclusive or exclusive of controls for real GDP growth. The pattern of results reported in Table 7 is highly consistent across specifications and across the coverage of the foreign lending variable. The estimated sums of coefficients are always negative and are significant in nine out of the twelve regressions. The implication is that foreign lending activity of U.S. bank affiliates abroad can rely *less* on the overall strength of the home office in times of tighter monetary conditions in the United States, and rely more on the U.S. parent in times of looser U.S. liquidity.

The second type of evidence is a direct correlation between changes in lending abroad by the foreign affiliates and changes in net due flows. While it may be possible to design more fully specified models of this relationship, the evidence in Table 8 clearly shows that increased net flows to the affiliate (or decreased flows from the affiliate) support lending in the foreign markets. (results to be inserted)

V. Economic effects of banking globalization.

We use the empirical results provided in section IV to gauge the magnitude of the economic significance of the effects of bank globalization, with the specific focus on transmission of monetary policy into domestic and foreign lending by these banks. To quantify the effect of monetary policy on lending by large, non-global banks we follow the procedure of Kashyap and Stein (2000): we compute the impact on growth in lending occurring over a period of 8 quarters arising from a 100 basis point change in the nominal federal funds rate. Because the identification strategy relies on banks being liquidity constrained, we assume (again, as in Kashyap and Stein, 2000) that banks are liquidity constrained if they are below the 90th percentile in the liquidity-to-asset ratio distribution for each separate group of banks that we analyzed. From each subset of banks below this threshold, we take the median value in the liquidity-to-asset ratio and evaluate the economic impact of the monetary policy change at this point in the distribution.¹⁹ For the quantitative exercises, we use the estimated coefficients from the regressions with the added GDP growth controls and using the nominal Federal Funds rate.

[Note: need to double check numbers in this section!] Consider C&I lending by large banks first. The estimated sum of coefficients on monetary policy from this specification is 0.0012, as reported in Table 3.²⁰ From examining the Call Report data, across large domestic banks the value of the liquidity-to-asset ratio at the 90th percentile is 0.40 and the median value for banks below the 90th percentile threshold is 0.19 (in logs equal to -1.64). Hence, a 100 basis point tightening of the nominal federal funds rate would result in a decline in C&I lending growth by 0.2 percentage points for the median bank (0.0012×-1.64). Since the median quarterly C&I loan growth for this bank group over our sample period was 1.7 percent, the Federal Funds tightening would reduce the median loan growth rate to 1.5 percent, or by about 12 percent of the median value. The same exercise applied to total lending would instead find a 0.13 percentage points decline in the total lending growth rate (0.008×1.64). Since the median total loan growth rate

¹⁹ Our exercise is a narrower but still informative variant on Kashyap and Stein (2000), who calculated the integral over the entire distribution of banks at the given point in time.

²⁰ These coefficients indicate the change in the sensitivity of lending growth to liquidity, the estimated β 's from the first-stage regressions. The sizes of the coefficients in the various specifications are comparable to the means of the β 's for each corresponding group of banks. For instance, a change in sensitivity by 0.0012 is large compared to the mean of the estimated β 's for large domestic banks, which was equal to 0.0032. Similar magnitude comparisons apply for the other bank groups.

was 1.9 percent, the monetary tightening would reduce median total loan growth to 1.77 percent, or about 7 percent of the median value.

As anticipated earlier, this effect is relatively small in economic magnitude, but this is not surprising: these are still relatively very large banks with better than average access to financial markets external to the banking organization. The testing shows that despite access to such external markets, insulation of large bank lending to U.S. monetary policy is not complete when these banks do not have international affiliates.

Global banks presumably can complement this basic strategy of using *external* funding with the activation of the global *internal* funding channel. One way to gauge the quantitative importance of such an internal funding market is to consider the change in net due flows in response to a 100 basis point increase in the nominal Federal Funds rate. From Table 5, the estimated sum of the coefficients on the nominal Federal Funds rate was equal to 189.07. Since the net due variable was expressed in real 1980 dollars, we convert back into nominal terms using the CPI deflator. For instance, consider the effect at the fourth quarter of 2005, where the multiplication factor for the CPI deflator was 250.7. Then the total effect of a 100 basis point tightening on the quarterly change in net due flows is equal to \$47.4 million (189.07×250.7), with net due variables in the empirical exercise expressed in thousands of dollars. This figure is within the range of typical fluctuations in net due flows across the global banks and their subsidiaries. In the fourth quarter of 2005 the median size of a change in net dues, whether inflows or outflows, was \$15 million, while the absolute size of net due for the median bank was \$74 million. Hence, the evidence suggests that global banks mobilize substantial funds in their internal capital markets.

To establish that these funds were sufficiently large to help the liquidity needs of U.S. global banks we consider a benchmark for what the monetary tightening would have done to these banks in the absence of the foreign-sourced funds. As a hypothetical exercise, we apply to the group of large global banks the quantified impact of monetary tightening that had been calculated for large, non-global banks. To obtain a direct comparison with the calculated response in net due flows, we look at the potential impact on total lending of the median, liquidity constrained, large and global bank in the fourth quarter of 2005. In this quarter, the median bank reported about \$21 billion in total loans.

Using the coefficient estimated for the group of large, domestic banks, the median, constrained global banks would experience a potential loss in total lending growth of about \$63 million.²¹ Hence, the estimated magnitude of the response of net due flows for the median global bank from our monetary policy experiment (\$47.4 million) would deliver a substantial fraction of the funds needed to insulate the liability side of the bank balance sheet and mitigate the transmission to the asset side.

For the transmission of U.S. monetary policy to foreign loans through global banks we use Table 7 estimates and conclude that the economic significance of U.S. monetary policy on foreign lending is potentially large. The increase in the Federal Funds rate would reduce C&I lending of foreign offices by about 3 percentage points and reduce total lending of foreign offices by 2.2 percentage points. Over the entire sample period, the median values in both C&I and total lending growth for foreign offices were actually negative (-1.2 and -0.3 percent, respectively). Monetary tightening in the United States would thus slow lending abroad to an even greater extent. The effect would still be considerable even for a foreign office at the 75th percentile of either loan growth distribution (+ 5.9 and + 6.1 percent, respectively).

In sum, our study confirms that the ongoing process of globalization of the banking industry impacts the transmission mechanism of monetary policy both in the United States and in markets in which global banks have affiliated organizations. The aggregate impact is not trivial: total lending in the fourth quarter of 2005 was approximately \$4.8 trillion. Of this total amount, \$3.1 trillion were issued by large, global banks. Hence, about 65 percent of total lending is largely insulated, at least in terms of direct effects, from changes in U.S. monetary policy. On the other hand, we find that there is evidence of sensitivity to monetary policy among the remaining large domestic institutions. In 2005Q4 the overall lending of this bank category amounted to about \$1 trillion.²² The effects of U.S. monetary policy also are transmitted abroad to foreign

²¹ Computed as follows: The 90th pct in log(liquid asset ratio) for large global in 2005q4 = -2.00. Median of those banks below this threshold = - 4.01. Impact on total lending = 4.01 * 0.0008 = 0.003. Total lending for median, constrained, large global bank = 21Bn. Loss = 21Bn * 0.003 = 63Mn.

²² The effect is even larger if we also consider the impact on the small banks affiliated with the large, non-global banks. Hence, our results contrast with the key result of Kashyap and Stein that lending by large banks is unresponsive to monetary policy. In essence, the “reclaiming” about 25 percent of large bank loans to the potential lending channel effects seems economically significant, even if the coefficient on the magnitude of this effect for these banks only changes loan growth by a modest amount

lending through the internal capital markets of affiliated banks, with the effects occurring both in contractionary and expansionary periods of policy.

V. Conclusions

We have provided evidence that the globalization of banking has a deep and pervasive impact on the domestic and international transmission of U.S. monetary policy. Using bank-specific data over the period between 1980 and 2005 we have found evidence of differences in the lending channel across large banks. While large banks are typically considered to have lending activity that is insulated from U.S. monetary policy, once global banks are separated from this group of large banks, the remaining domestic-oriented banks show significant lending sensitivity to monetary policy. Our evidence supports the conjecture that insulation of large global banks is aided by a functioning internal capital market between globalized parents in the United States and their foreign affiliates.

The consequences of these results are statistically and economically significant. On the one hand, documenting that large but non-global banks are less insulated than previously evaluated suggests a stronger impact of monetary policy via the lending channel. On the other hand, the mechanisms we identify imply that, under increasing globalization, the impact of monetary policy on domestic bank lending and on the U.S. economy as a whole will be attenuated, while at the same time the domestic shock is transmitted more broadly to foreign markets through affiliated banks. A continuing process of increasing globalization suggests that the lending channel within the United States will be declining in strength, with international transmission of U.S. shocks rising.²³

Our results also indicate that access to external capital markets may not be frictionless if large, domestic-oriented banks display a significant degree of sensitivity to their own balance sheet liquidity, and if large, global banks make use of their international, internal channel in response to monetary policy. Understanding the dynamics of international, intra-bank funding adds important insights to our

²³ This work is closely related to others that have also suggested a reduced potency for monetary policy as a result of evolution of the banking industry, e.g., Morgan, Rime and Strahan (2004), Ashcraft (2006) and Loutskina and Strahan, (2009).

understanding of banks' response to liquidity shocks and it should therefore assist in the undertaking of effective policy making. As a case in point, the response of U.S. global banks in the aftermath of the liquidity crisis during the summer of 2007 and through 2009 indicates a significant use of internal funds even during such an event. Hence a banking system that grows increasingly global may have enhanced resilience and self-adjustment in times of liquidity crisis. However, also as observed in the financial crisis, it may not rule out broader international propagations of shocks and perhaps a more limited scope for isolated intervention by national policy authorities.

As a concluding remark, in principle the importance of the internal capital markets across globalized parents and their foreign affiliates may be predicated on the regulatory and macroeconomic regimes at home and abroad. For the channels we identify the role of the foreign policy regimes warrants further careful study. The potential for viewing foreign markets as a liquidity buffer against U.S.-generated liquidity shocks may rely on the presumption that the cost of capital in foreign markets does not move in step with the U.S. federal funds rate. In this case, it may be that those branches and subsidiaries in countries in where currencies are not pegged to the dollar are the ones that play the dominant liquidity buffer role. Indeed, existing studies using macroeconomic data already identify differences in monetary regimes on monetary policy transmission across markets that are associated with exchange rate regime. The implication is that globalization consequences for the lending channel could differ depending on whether the constellation of partners in banking contains countries that directly tie their monetary policies to those of the United States.

References:

Ashcraft, Adam, "Are Bank Holding Companies a Source of Strength to Their Banking Subsidiaries?" *Journal of Money, Credit, and Banking*, Volume 40, Issue 2-3, pp. 273-294, March/April 2008.

Ashcraft, Adam. "New Evidence on the Lending Channel," *Journal of Money, Credit, and Banking*, Volume 38, Issue 3, pp. 751-776, April 2006.

Ashcraft, Adam and Murillo Campello, "Firm Balance Sheets and Monetary Policy Transmission" *Journal of Monetary Economics*, Volume 54, Issue 6, pp. 1515-1528, September 2007.

Berger, Allen, Nathan H. Miller, Mitchell A. Petersen, Raghuram G. Rajan "Does Function Follow Organizational Form? Evidence from the Lending Practices of Large and Small Banks", *Journal of Financial Economics*, vol. 76 (May 2005), pp. 237-69.

Bernanke, Ben. 2006. "Remarks on Global Economic Integration: What's New and What's Not?" At the Federal Reserve Bank of Kansas City's Thirtieth Annual Economic Symposium, Jackson Hole, Wyoming August 25, 2006.

<http://www.federalreserve.gov/boarddocs/speeches/2006/20060825/default.htm>

Bernanke, Ben and Alan Blinder. 1988. "Credit, Money, and Aggregate Demand", *American Economic Review, Papers and Proceedings*, May 1988, vol. 78, no. 2, pp. 435-439.

Bernanke, Ben and Alan Blinder. 1992. "The Federal Funds Rate and the Channels of Monetary Transmission", in *American Economic Review*, September, vol. 82, no. 4, pp. 901-21.

Bernanke, Ben and Mark Gertler. 1995. "Inside the Black Box: The Credit Channel of Monetary Transmission", *Journal of Economic Perspectives*, Fall 1995, vol. 9, no. 4, pp. 27-48.

Bernanke, Ben and Ilian Mihov. 1998. "Measuring Monetary Policy" *Quarterly Journal of Economics*, August, 113 (3), pp. 869-902.

Boschen, John and Leonard Mills. 1995. "The Relation between Narrative and Money Market Indicators of Monetary Policy" *Economic Inquiry* (33), pp.24-44.

Campello, Murillo. 2002. "Internal Capital Markets in Financial Conglomerates: Evidence from Small Bank Responses to Monetary Policy". *Journal of Finance*, December 2002, v. 57, iss. 6, pp. 2773-2805.

Canova, Fabio. 2005. "The Transmission of U.S. Shocks to Latin data." *Journal of Applied Econometrics*. vol. 20 pp. 229-251.

Di Giovanni, Julian and Jay Shambaugh. "The Impact of Foreign Interest Rates on the Economy: The Role of the Exchange Rate Regime" *Journal of International Economics*, Volume 74, Issue 2, pp. 341-361, March 2008.

Frankel, Jeffrey, Sergio Schmukler, and Luis Servén. 2004. "Global Transmission of Interest Rates: Monetary Independence and the Currency Regime." *Journal of International Money and Finance* vol. 23 no. 5 (Sept.) pp.701-734.

Houston, Joel, David Marcus, and Christopher James. 1997, "Capital market frictions and the role of internal capital markets in banking?", *Journal of Financial Economics* 46(2), 135-164.

Ihrig, Jane, Steve Kamin, Deb Lindner, and Jaime Marquez. 2007. "Some simple tests of the globalization and inflation hypothesis", International Finance Discussion Papers 891. Washington: Board of Governors of the Federal Reserve System.

Kashyap, Anil and Jeremy Stein. 2000. "What Do A Million Observations on Banks Say About the Transmission of Monetary Policy?," *American Economic Review*, 90(3), pp. 407-28.

Kashyap, Anil and Jeremy Stein. 1994. "Monetary policy and bank lending", in: N. G. Mankiw, ed , *Monetary Policy* (University of Chicago Press, Chicago) pp 221-256.

Kashyap, Anil and Jeremy Stein. 1995."The Impact of Monetary Policy on Bank Balance Sheets,"*Carnegie-Rochester Conference Series on Public Policy*, 1995, vol.42,pp.151-95.

Kim, Soyoung. 2001. "International Transmission of U.S. Monetary Policy Shocks: Evidence from VAR's" *Journal of Monetary Economics* vol. 48 pp. 339-72.

Loutskina, Elena and Philip E. Strahan. 2009. "Securitization and the Declining Impact of Bank Finance on Loan Supply: Evidence from Mortgage" *Journal of Finance*,.

Morgan, Donald P., Bertrand Rime, and Philip E. Strahan, 2004, "Bank integration and state business cycles," *Quarterly Journal of Economics* 119, 1555-1584.

Neumeyer, Paolo and Fabrizio Perri. 2005. "Business cycles in emerging economies: the role of interest rates" *Journal of Monetary Economics* vol. 52 pp.345-380.

Obstfeld, Maurice, Jay Shambaugh, and Alan Taylor. 2005. "The Trilema in History: Tradeoffs among Exchange Rates, Monetary Policies, and Capital Mobility" *Review of Economics and Statistics*. Vol. 3 (December) pp. 423-438.

Peek, Joe and Eric Rosengren. 1997. "The International Transmission of Financial Shocks: The Case of Japan" *American Economic Review* (September) 87 (4), pp.495-505.

Peek, Joe and Eric Rosengren. 2000. "Collateral Damage: Effects of the Japanese Bank Crisis on Real Activity in the United States" *The American Economic Review*, Vol. 90, No. 1. (March), pp. 30-45.

Sbordone, Argia. 2007. "Globalization and Inflation Dynamics: The Impact of Increased Competition" NBER Working Paper 13556

Stein, Jeremy. 1998. "An Adverse Selection Model of Bank Asset and Liability Management with Implications for the Transmission of Monetary Policy", *Rand Journal of Economics* 29 (Autumn) pp. 466-486.

Yellen, Janet. 2006. "Monetary Policy in a Global Environment" Speech at The Euro and the Dollar in a Globalized Economy Conference, U.C. Santa Cruz, Santa Cruz, CA May 27, 2006. <http://www.frbsf.org/news/speeches/2006/060527.pdf>

Data Appendix.

Net due to and Net due from items are **located on schedule RC-H--Selected Balance Sheet Items for Domestic Offices of the CALL report (FFIEC 031, page 24)**

Item Number 2941: *NET DUE TO OWN FOREIGN OFFICES, EDGE AND AGREEMENT SUBSIDIARIES, AND IBFS*

Data Description: The position of the domestic offices of the bank relative to all of the bank's Edge and Agreement subsidiaries, foreign branches, consolidated foreign subsidiaries, and branches in Puerto Rico and U.S. territories and possessions. All intra-bank transactions of the domestic offices with these other offices of the bank, including investments (both equity and debt) in consolidated subsidiaries (foreign and domestic), are reflected here, since all other items are reported on a fully consolidated basis and excludes all intra-bank transactions. A single net amount for all the intra-bank due to and due from positions of the domestic office is calculated and entered either in "Net Due from Own Foreign Offices, Edge and Agreement Subsidiaries, and IBFs (2163)" or this item, depending on whether the single net amount is a net due from or a net due to balance.

Item Number 2163: *NET DUE FROM OWN FOREIGN OFFICES, EDGE AND AGREEMENT SUBSIDIARIES, AND IBFS*

Data Description:

The position of the domestic offices of the bank relative to all of the bank's Edge and Agreement subsidiaries, foreign branches, consolidated foreign subsidiaries, and branches in Puerto Rico and U.S. territories and possessions. All intra-bank transactions of the domestic offices with these other offices of the bank, including investment (both equity and debt) in consolidated subsidiaries (foreign and domestic), are reflected here, since all other items are reported on a fully consolidated basis and exclude all intra-bank transactions. A single net amount for all the intra-bank due to and due from positions of the domestic offices is calculated and entered either in "Net Due to Own Foreign Offices, Edge and Agreement Subsidiaries, and IBFs (2941)" or this item, depending on whether the single net amount is a net due from or a net due to amount.

Figure 1
Share of total U.S. bank assets in globally-oriented U.S. banks

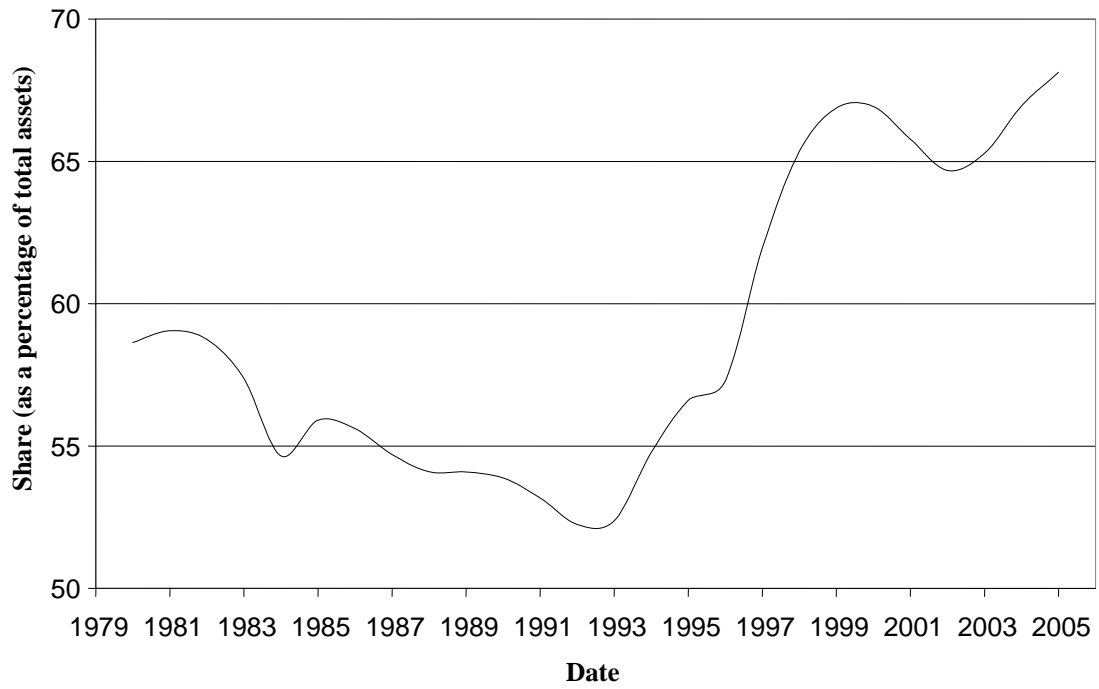


Figure 2
Most global banks are large banks

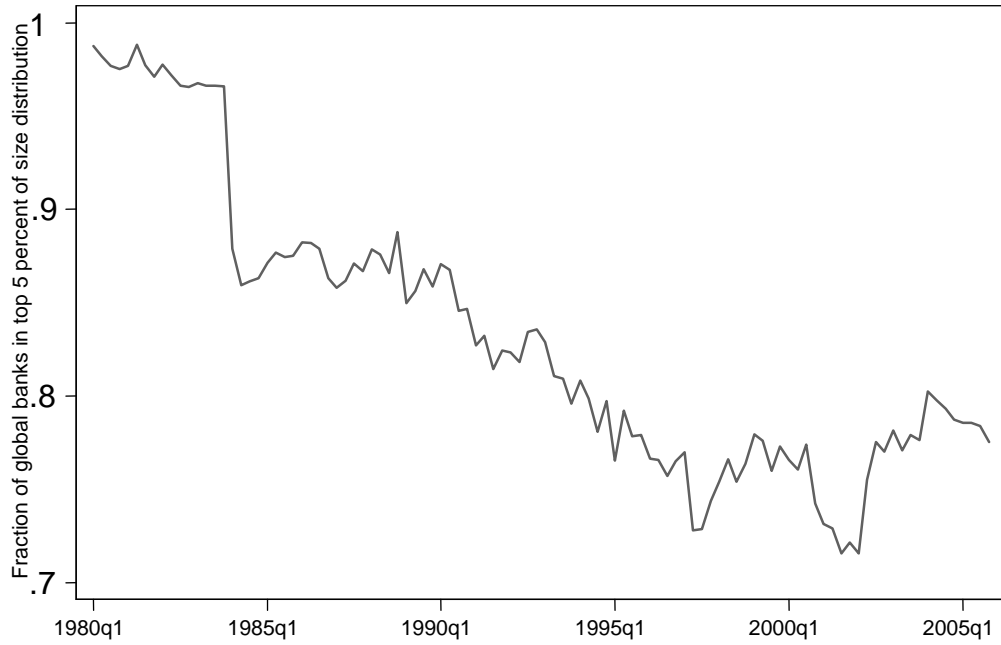


Figure 3
Asset distribution, 95th-99th percentile, 2005q4. Global vs. non-global banks

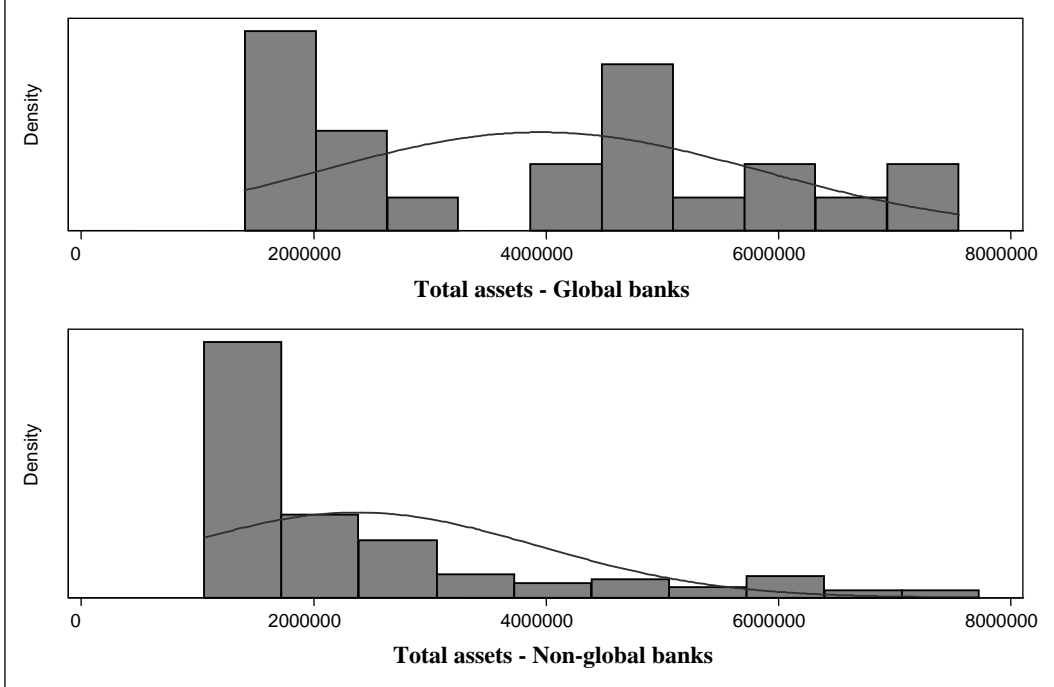
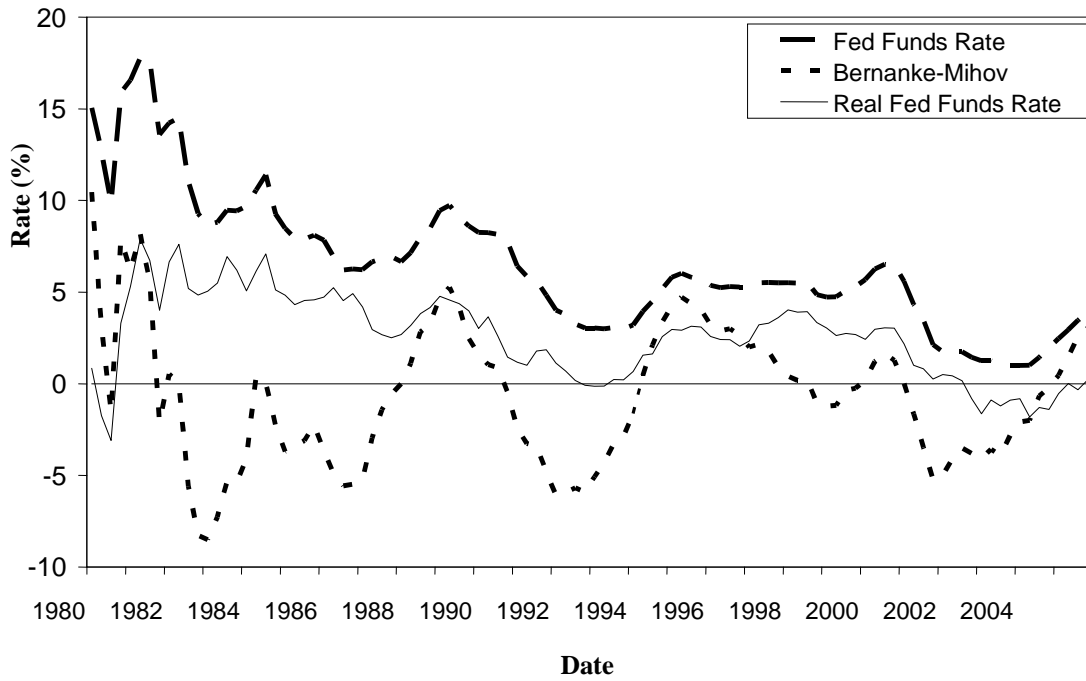


Figure 4
Monetary Policy Variables



The Bernanke-Mihov index has been modified from the original so that all three monetary policy indicators signal tightening when they increase.

Table 1: Basic Balance Sheet Information for U.S. Banks

	All banks	Large domestic banks	Large global banks	Small banks in domestic BHCs	Small banks in global BHCs
Total number of bank observations (1980Q1-2005Q4)	1,162,969	43,921	14,252	41,339	47,640
Median values for bank asset size (thousands 2005USD)					
1985	62,269	996,951	5,123,663	93,897	102,967
1995	73,906	1,775,889	10,358,585	142,711	134,766
2005	105,223	2,236,512	22,300,000	213,294	213,157
Share of each bank group in total assets (%)					
1985	100.0	16.6	56.0	1.4	2.2
1995	100.0	22.6	56.1	1.0	0.9
2005	100.0	17.9	67.9	0.4	0.3
Median total loans / assets (%)	55.6	61.1	60.4	57.1	55.5
Median C&I loans / assets (%)	17.3	22.8	35.4	18.4	21.0
Median bank liquid assets / total assets (%)	28.0	26.5	20.1	16.6	27.1
Median capitalization ratio (%)	8.7	7.2	6.4	8.0	7.6
Value of nonperforming loans/ total loans (%)	1.0	1.0	1.1	1.6	0.8

Data is from quarterly Call Report forms for all banks from 1980Q1 to 2006Q4. A bank is defined as global in a quarter if it reports positive foreign assets. A bank is defined as domestic if all its activity comes from offices located domestically. Large banks are those with total assets above the 95th percentile of the total asset distribution in each quarter. Small banks are those with total assets below the 90th percentile of the total asset distribution in each quarter. Small banks in domestic BHCs are small banks affiliated in BHCs with at least one large, domestic bank and no global banks. Small banks in global BHCs are small banks affiliated in BHCs with at least one large global bank.

Table 2 Net due flows and Foreign Loans
(Thousands 2005 USD)

		1985q4	1995q4	2005q4
Net due flows				
Net due to	Median	\$62,279	\$299,162	\$657,339
	Mean	\$304,304	\$955,710	\$3,856,075
	Number of observations	60	103	62
Net due from	Median	\$43,264	\$3,934	\$852
	Mean	\$458,316	\$332,548	\$983,989
	Number of observations	187	67	45
(Net due to – Net due from)				
	Median absolute value	\$47,285	\$141,930	\$74,356
	Mean absolute value	\$420,904	\$710,111	\$2,648,189
	Number of observations	247	170	107
Loans of Foreign Offices				
Total loans	Median value across banks	\$19,270	\$27	\$0
	Mean value across banks	\$1,599,723	\$1,977,955	\$3,129,760
	Number of observations	247	170	107
	Share of total bank lending	0.15	0.11	0.07
C&I loans	Median value across banks	\$4,839	\$0	\$0
	Mean value across banks	\$866,359	\$942,215	\$1,236,887
	Number of observations	247	170	107
	Share of total C&I lending	0.08	0.05	0.03
Abs(Net due)/ total foreign loans				
	Median value across banks	0.70	1.01	0.98
	Aggregate ratio	0.26	0.35	0.84

Net due to/from indicate the position of the domestic offices of a bank relative to all of the bank's Edge and Agreement subsidiaries, foreign branches, consolidated foreign subsidiaries, and branches in Puerto Rico and U.S. territories and possessions (schedule RC-H from form FFIEC 031 – Call Report). A positive net due *to* indicates that the head office owes funds to its foreign offices. A positive net due *from* indicates that the head office is owed funds from its foreign offices. Foreign loans are the total loans booked by the foreign offices of U.S. global banks.

Table 3 Lending Channel for Large Domestic and Large Globally-Oriented Banks
Summed monetary variable effect on first-stage regression betas
[Prob > chi2 that summed coefficients=0]

Total Bank Lending					
	Domestic Banks		Global Banks		
	no gdp controls (1)	with gdp controls (2)	no gdp controls (3)	with gdp controls (4)	gdp and foreign rate controls (5)
Federal Funds Rate (nominal)	0.0007 [0.006]	0.0008 [0.001]	-0.0013 [0.161]	-0.0015 [0.154]	-0.0006 [0.591]
Federal Funds Rate (real)	0.0006 [0.113]	0.0012 [0.006]	0.0003 [0.766]	-0.0004 [0.974]	0.0002 [0.893]
Bernanke-Mihov index (negative*100)	0.0003 [0.044]	0.0003 [0.123]	0.0001 [0.898]	0.0003 [0.970]	0.0005 [0.424]

Total C&I Lending					
	Domestic Banks		Global Banks		
	no gdp controls (1)	with gdp controls (2)	no gdp controls (3)	with gdp controls (4)	gdp and foreign rate controls (5)
Federal Funds Rate (nominal)	0.0012 [0.017]	0.0012 [0.032]	-0.0009 [0.4586]	-0.0012 [0.278]	-0.0025 [0.174]
Federal Funds Rate (real)	0.0008 [0.104]	0.0012 [0.039]	-0.0002 [0.9036]	0.0001 [0.945]	-0.0012 [0.459]
Bernanke-Mihov index (negative*100)	0.0000 [0.944]	-0.0001 [0.763]	-0.0004 [0.7377]	-0.0007 [0.473]	-0.0009 [0.304]

This table presents results from regressions where the dependent variable is the time series of estimated coefficients on the liquidity to asset ratio in quarterly cross-sectional regressions where the dependent variable was either growth in total bank loans or total C&I loans. The reported figures in the columns are from the sum of the estimated coefficients on the eight lags of each respective monetary policy variables. The Bernanke-Mihov index has been modified from the original so that all three monetary policy indicators signal tightening when they increase. Reported in brackets is the probability that the sum of the coefficients is significantly different from zero. The upper panel reports results from estimations where the dependent variable in the first-stage regressions was total lending growth. The lower panel reports results from estimations where the dependent variable in the first-stage regressions was total C&I lending growth. The first two columns reports results for the group of large domestic banks. The last three columns report results for the group of large, global banks. Columns 1 and 3 refer to second-stage specifications without GDP controls, while columns 2, 4 and 5 to specifications including GDP controls. Column 5 also includes foreign rate controls. Bold indicates statistical significance at least at the 10 percent level. Sample period: 1980:Q1-2006:Q4. Standard errors are computed with an 8-lags Newey-West correction for autocorrelation and heteroskedasticity.

Table 4 Robustness checks on the Role of Large Bank Size in Monetary Effects on Lending

Summed monetary variable effect on first-stage regression betas

[Prob > chi2 that summed coefficients=0]

Total Bank Lending

	Domestic Banks		Global Banks		
	Excludes top 1 percentile		Excludes top 1 percentile	WLS 95-99 percentile	
	no gdp controls (1)	with gdp controls (2)	no gdp controls (3)	with gdp controls (4)	with gdp controls (5)
Federal Funds Rate (nominal)	0.0011 [0.002]	0.0012 [0.0002]	-0.0027 [0.475]	-0.0035 [0.378]	-0.0029 [0.424]
Federal Funds Rate (real)	0.00075 [0.086]	0.0013 [0.004]	0.0010 [0.778]	-0.0008 [0.856]	0.0012 [0.768]
Bernanke-Mihov index (negative*100)	0.0003 [0.048]	0.0003 [0.144]	-0.0016 [0.436]	-0.0016 [0.455]	-0.0013 [0.540]

Total C&I Lending

	Domestic Banks		Global Banks		
	Excludes top 1 percentile		Excludes top 1 percentile	WLS 95-99 percentile	
	no gdp controls (1)	with gdp controls (2)	no gdp controls (3)	with gdp controls (4)	with gdp controls (5)
Federal Funds Rate (nominal)	0.0009 [0.048]	0.0009 [0.085]	0.0079 [0.216]	0.0055 [0.383]	0.0068 [0.274]
Federal Funds Rate (real)	0.0007 [0.111]	0.0008 [0.122]	0.0107 [0.117]	0.0069 [0.318]	0.0098 [0.163]
Bernanke-Mihov index (negative*100)	0.0000 [0.6586]	-0.0000 [0.981]	0.0002 [0.944]	-0.0015 [0.528]	-0.0010 [0.631]

This table presents results from robustness tests to the model specifications in Table 3. The dependent variable is the time series of estimated coefficients on the liquidity to asset ratio in quarterly cross-sectional regressions where the dependent variable was either growth in total bank loans or total C&I loans. The reported figures in the columns are from the sum of the estimated coefficients on the eight lags of each respective monetary policy variables. The Bernanke-Mihov index has been modified from the original so that all three monetary policy indicators signal tightening when they increase. Reported in brackets is the probability that the sum of the coefficients is significantly different from zero. The upper panel reports results from estimations where the dependent variable in the first-stage regressions was total lending growth. The lower panel reports results from estimations where the dependent variable in the first-stage regressions was total C&I lending growth. The first two columns reports results for the group of large domestic banks. The last three columns report results for the group of large, global banks. In the first four columns, the sample was curtailed at the 99th percentile of the asset size distribution. In the fifth column, the first stage regressions were run with weighted least squares, where the weights were represented by the asset distribution for large, non-global banks in the 95th-99th percentile cluster. Bold indicates statistical significance at least at the 10 percent level. Sample period: 1980:Q1-2006:Q4. Standard errors are computed with an 8-lags Newey-West correction for autocorrelation and heteroskedasticity.

Table 5 Results for Small Affiliated with Domestic or Globally-Oriented Banks
Summed monetary variable effect on first-stage regression betas
[Prob > chi2 that summed coefficients=0]

	Total Bank Lending			
	Small in Domestic Banks		Small in Global Banks	
	no gdp controls (1)	with gdp controls (2)	no gdp controls (3)	with gdp controls (4)
Federal Funds Rate (nominal)	0.2909 [0.047]	0.5203 [0.026]	-0.1390 [0.764]	-0.0207 [0.970]
Fed Funds Rate (real)	0.8440 [0.000]	0.9411 [0.001]	-1.0854 [0.233]	-1.0579 [0.282]
Bernanke-Mihov index (negative*100)	0.1278 [0.122]	0.2495 [0.016]	-0.1084 [0.604]	-0.0145 [0.953]

	Total C&I Lending			
	Small in Domestic Banks		Small in Global Banks	
	no gdp controls	with gdp controls	no gdp controls	with gdp controls
Federal Funds Rate (nominal)	1.4342 [0.029]	1.0752 [0.087]	-1.1977 [0.131]	-0.3404 [0.471]
Fed Funds Rate (real)	2.5028 [0.050]	2.6469 [0.027]	-1.5803 [0.057]	-1.8704 [0.142]
Bernanke-Mihov index (negative*100)	0.7712 [0.035]	0.6619 [0.057]	-0.6966 [0.075]	-0.4937 [0.042]

This table presents results from regressions where the dependent variable is the time series of estimated coefficients on the net income to loan ratio in quarterly cross-sectional regressions where the dependent variable was either growth in total bank loans or total C&I loans. The reported figures in the columns are from the sum of the estimated coefficients on the eight lags of each respective monetary policy variables. The Bernanke-Mihov index has been modified from the original so that all three monetary policy indicators signal tightening when they increase. Reported in brackets are the probabilities that the sum of the coefficients is significantly different from zero. The upper panel reports results from estimations where the dependent variable in the first-stage regressions was total lending growth. The lower panel reports results from estimations where the dependent variable in the first-stage regressions was total C&I lending growth. The first two columns reports results for the group of small banks members of BHCs where there is at least one large domestic bank and no global banks. The last two columns report results for the group of small banks members of BHCs where there is at least one large global bank. Odd columns refer to second-stage specifications without GDP controls, while even columns to specifications including GDP controls. Bold indicates statistical significance at least at the 10 percent level. Sample period: 1980:Q1-2006:Q4. Standard errors are computed with an 8-lags Newey-West correction for autocorrelation and heteroskedasticity.

Table 6 Monetary Effects on Real Net Due To Parent Banks from Foreign Affiliates

Monetary variable	Baseline	Baseline with foreign rate controls	Baseline with Potential asymmetry of effects when		Average vs. lower capitalization banks	
			Tighter money	Looser money	Baseline effect	Dummy for Lower capital banks
	(1)	(2)	(3)	(4)	(5)	(6)
Federal Funds Rate (nominal)	189.1 [0.024]	198.6 [0.020]	383.9 [0.039]	206.5 [0.013]	195.2 [0.011]	229.3 [0.038]
Fed Funds Rate (real)	229.9 [0.022]	325.5 [0.004]	262.9 [0.010]	325.6 [0.073]	105.0 [0.233]	295.5 [0.006]
Bernanke-Mihov index (negative*100)	63.3 [0.045]	69.0 [0.053]	118.7 [0.064]	56.4 [0.225]	91.14 [0.004]	27.8 [0.600]

This table presents results from regressions where the dependent variable is the quarterly real change in net due flows from foreign affiliates to the head office. The reported figures in the columns are from the sum of the estimated coefficients on the eight lags of each respective monetary policy variables. The Bernanke-Mihov index has been modified from the original so that all three monetary policy indicators signal tightening when they increase. Column 2 reports results of the basic specification where foreign rate controls were also included. Columns 5 and 6 report results of the specification where the effect of monetary policy is identified separately for banks with average and lower capitalization ratios. The total effect on lower capitalization banks is the sum of the baseline and dummy coefficients. Reported in brackets are the probabilities that the sum of the coefficients is significantly different from zero. Bold indicates statistical significance at least at the 10 percent level. Sample period: 1980:Q1-2006:Q4.

Table 7 Monetary Policy and Foreign Lending
Summed monetary variable effect on first stage betas
[Prob > chi2 that summed coefficients=0]

Monetary variable	Total Foreign C&I Lending		Total Foreign Lending	
	Without gdp controls (1)	With gdp controls (2)	Without gdp controls (3)	With gdp controls (4)
Federal Funds Rate (nominal)	-0.0192 [0.001]	-0.0176 [0.004]	-0.0115 [0.002]	-0.0124 [0.001]
Fed Funds Rate (real)	-0.0146 [0.012]	-0.0137 [0.031]	-0.0115 [0.042]	-0.1366 [0.010]
Bernanke-Mihov index (negative*100)	-0.0057 [0.061]	-0.0043 [0.179]	-0.0033 [0.302]	-0.0034 [0.248]

This table presents results from regressions where the dependent variable is the time series of estimated coefficients on the liquidity to asset ratio in quarterly cross-sectional regressions where the dependent variable was either growth in total bank loans or total C&I loans of the foreign offices of global banks. The reported figures in the columns are from the sum of the estimated coefficients on the eight lags of each respective monetary policy variables. The Bernanke-Mihov index has been modified from the original so that all three monetary policy indicators signal tightening when they increase. Reported in brackets are the probabilities that the sum of the coefficients is significantly different from zero. The first two columns report results from estimations where the dependent variable in the first-stage regressions was total lending growth of foreign offices. The last two columns report results from estimations where the dependent variable in the first-stage regressions was total C&I lending growth of foreign offices. Odd columns refer to second-stage specifications without GDP controls, while even columns to specifications including GDP controls. Bold indicates statistical significance at least at the 10 percent level. Sample period: 1980:Q1-2006:Q4. Standard errors are computed with an 8-lags Newey-West correction for autocorrelation and heteroskedasticity.

INSERT NEW TABLE 8 that relates CHANGE IN FOREIGN LOANS TO NET DUE