

How Do Global Banks Scramble for Liquidity?

Evidence from the Asset-Backed Commercial Paper Freeze of 2007*

by

Viral V. Acharya (NYU-Stern, CEPR, and NBER)**

Gara Afonso (Federal Reserve Bank of New York)

Anna Kovner (Federal Reserve Bank of New York)

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Abstract

We investigate how banks scrambled for liquidity following the asset-backed commercial paper (ABCP) market freeze of August 2007 and its implications for corporate borrowing. Commercial banks in the United States raised dollar deposits and took advances from Federal Home Loan Banks (FHLBs), while foreign banks had limited access to such alternative dollar funding. Relative to before the ABCP freeze and relative to their non-dollar lending, foreign banks with ABCP exposure charged higher interest rates to corporations for dollar-denominated syndicated loans. The results point to a funding risk manifesting as currency shortages for banks engaged in maturity transformation in foreign countries.

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** Corresponding author: C.V. Starr Professor of Economics, Department of Finance, New York University Stern School of Business, 44 West 4th St., #9-84, New York, NY 10012, USA. Tel: +1 212 998 0354, E-mail: vacharya@stern.nyu.edu.

In August of 2007, a significant amount of maturity transformation undertaken by the global financial sector came to a screeching halt. The market dislocation in the asset-backed commercial paper (ABCP) market put severe funding stress on bank balance sheets when many sponsoring banks took back off-balance sheet ABCP assets to their balance sheets.¹ Acharya and Schnabl (2010) document that while much of the ABCP exposure was US dollar (USD) denominated, a substantial portion of this ABCP exposure was concentrated amongst foreign banks. Many of these foreign banks with large exposure to US ABCP did not have large US-regulated banking operations.²

How did these global banks scramble for US dollar liquidity in response to the ABCP freeze? Did the shortage of USD liquidity affect intermediation by banks to the real sector? Were the responses different between USD and non-USD loans, and between US and foreign banks, given their differential access to the USD funding markets? These are some of the questions we attempt to answer in this paper.

Our first main finding is that in the immediate aftermath of the ABCP freeze, foreign banks were not able to increase US funding in the same ways as their US counterparts. Foreign banks grew their net repo borrowing. However, they were not able to increase deposits or interbank borrowing at their US subsidiaries, nor were many able to access advances from Federal Home Loan Banks (FHLBs). In part, this reflects the fact that deposits at this time increased in proportion to US assets, and foreign banks have less assets in the United States. Foreign banks scrambled for liquidity, ultimately participating actively in the Term Auction

¹ See also Acharya and Richardson (2009), Brunnermeier (2009), Diamond and Rajan (2009), Gorton (2008), Greenlaw et al. (2008), Kacperczyk and Schnabl (2010), and Krishnamurthy (2010) for summaries of how the financial crisis of 2007-08 unfolded, the liquidity and credit problems faced by banks in different markets, and the underlying causes behind banks being exposed in a substantial manner to these problems.

² Acharya and Schnabl (2010) document that ranked by ABCP outstanding to Tier 1 capital, only three of the top ten banks were US headquartered (Citigroup, Bank of America and JP Morgan ranked 1st, 3rd and 5th, respectively). The others (in increasing rank) were all foreign: ABN AMRO, HBOS, HSBC, Deutsche Bank, Societe Generale, Barclays and Rabobank.

Facilities (TAF) set up by the Federal Reserve.³ In contrast, and as documented by Ashcraft, Bech, and Frame (2010) and He, Khang, and Krishnamurthy (2010), banks headquartered in the United States were able to tap into alternative funding sources. Especially, they accessed the deposit market, through time deposits, and in the form of advances from the FHLBs.⁴ This asymmetry highlights an important funding risk in global banking, manifesting as currency shortages for banks engaged in maturity transformation in foreign countries. Importantly, many of these foreign banks play a large role in underwriting syndicated loans in the US.⁵

Do these funding frictions for foreign banks have a direct effect on their lending?⁶ To address this question, we examine banks' underwriting of syndicated loans in US dollars and in European currencies (Euro and pound), recorded at the time of their origination in the Loan Pricing Corporation's DealScan dataset. Our second main finding is as follows: relative to before the ABCP freeze and relative to non-USD loans, foreign banks with ABCP exposure charged higher spreads on syndicated loans denominated in US dollars in the period following the ABCP freeze of August 2007 through mid-December 2007. This finding is particularly striking because this period is one of relative calm for large corporations in the United States, whose syndicated loans we study, as evinced by the remarkably stable behavior of the S&P500 index between August 9 and mid-December 2007 (See Figure 1).

³ The TAF is a temporary program conducted by the Fed between December 17, 2007 and March 8, 2010, which provides term funding to depository institutions on a collateralized basis, at interest rates and amounts set by auction. See Armantier, Krieger, and McAndrews (2008) for an overview of the design and creation of TAF. See also <http://www.federalreserve.gov/monetarypolicy/taffaq.htm> for additional information on the TAF auctions.

⁴ Congress established twelve regional Federal Home Loan Banks (FHLBs) in 1932 owned by the savings and loans (S&L) institutions and some life insurance companies. As a creation of the federal government, the FHLB System can borrow funds in the capital markets at favorable rates, and individual FHLBs can lend these funds to their member-owners, who were the primary originators of mortgages at the time. The FHLB System was thus an early "government-sponsored enterprise" (although that term was introduced decades later).

⁵ More than 63% of facilities in 2007 had at least one foreign bank in the underwriting syndicate and 35% had a foreign bank leading the syndicate.

⁶ There is a long literature on the relationship between bank funding and lending and business cycles. For example, see Kashyap, Rajan, and Stein (2002) and Acharya, Almeida, and Campello (2013). Empirically, see Gatev and Strahan (2006), Gatev, Schuermann, and Strahan (2009), Pennacchi (2006).

Formally, we design a difference-in-differences test to study the terms (spread, maturity and amount) of syndicated loans denominated in USD and in euros or pounds (we will refer to these loans as “euro” loans for simplicity). We exploit several types of differences-in-differences, the first difference being between USD- and euro- loans, the second between foreign banks and US banks, and the third difference being between after and before August of 2007 (in order to exploit within-firm variation). Our difference-in-differences approach helps control for variation in characteristics across banks, differences in banks between before and after the shock, and between USD and non-USD-denominated syndicated loans for a given bank (allowing us to hold constant the bank solvency shock, if any). At the same time, the approach allows us to exploit the variation among banks due to funding shocks (ABCP-exposed versus not exposed banks) and due to differential access to funding in the USD markets (foreign versus US banks).

Our difference-in-differences test reveals that the contractual feature of bank credit that is affected is mainly the spread (rather than maturity or amount).⁷ Besides documenting an important dollar funding risk for foreign banks engaged in maturity transformation in the United States, our results suggest that the transmission channel of the ABCP freeze when studied just for US banks may understate the true underlying strength of the channel. Since most US banks had access to FHLB advances and could employ their deposit franchises to raise USD funding, prevailing government interventions and market structures likely muted their response in terms of transmitting the ABCP freeze to the real sector. In this sense, studying the transmission channel of foreign banks facing USD funding risk on to USD borrowers provides for a cleaner

⁷ This empirical point is consistent with the evidence in Adrian, Colla, and Shin (2012) who argue that for large firms in the crisis of 2007-09, bond financing made up for the quantity of credit not provided through bank loans, albeit at higher yields just like heightened bank loan premiums.

identification of the impact of a liquidity shock.⁸ In addition, our findings suggest that the transmission channel of shocks to USD funding may overstate the underlying strength of the channel, when studied during periods of economic stress (as well as funding stress).

The rest of the paper is organized as follows. Section 1 discusses the related literature. Section 2 documents the information available on foreign banks and their funding in the US. Section 3 examines how banks scrambled for liquidity following the ABCP freeze, via private and government sources of funding. Section 4 investigates the transmission of bank funding risk – and realized funding – to the real sector. Section 5 presents concluding remarks.

1. Related Literature

Perhaps closest to our paper are Ivashina, Scharfstein, and Stein (2012) and Correa, Sapriza and Zlate (2013), who study the effect of the funding shock of money market funds' withdrawal from short-term lending to European banks during the second half of 2010-11. This shock led to substantial violations of the covered interest parity (CIP) between USD and euro exchange and interest rates. Such CIP violations became substantive for the first time after the ABCP freeze of August 2007, the time period we study in this paper (see Figure 2, adapted from Hrung and Sarkar (2012)). However, the magnitude of these violations is naturally smaller in the early phase of financial crisis relative to the highest levels reached in the second half of 2011. Ivashina, Scharfstein, and Stein find that foreign banks contracted dollar lending more than they contracted euro lending. Similarly, Correa, Sapriza and Zlate (2013) find a reduction in lending amounts of US branches of foreign banks at this time. While both time periods are marked by shortages of USD funding for foreign banks, the 2010-11 European crisis occurred at a time when market

⁸ While these results suggest that access to deposits and government funding – stable liabilities – can help stabilize the banking sector and the transmission channel in a crisis, their ex-post efficacy must be weighed against any ex-ante moral hazard they induce.

perceptions of the solvency of US banks differs from that of their European counterparts, and when the macroeconomic prospects of the US and Europe may also have diverged more significantly. This prevents the difference-in-differences analysis from isolating the impact of liquidity shocks as conducted in our paper.

While Ivashina, Scharfstein, and Stein (2012) stress the private – money market based – USD funding differential between the US and European banks, our paper stresses the differential deposit base as well as the access to public funding sources such as through the Federal Home Loan Bank (FHLB) System and the Federal Reserve System. The importance of segmentation in funding different currencies for banks domiciled in different countries, arising from public funding sources, is also validated by Bottazzi et al. (2012), who focus on the role of currencies as collateral in funding contracts (such as in repos, in private markets, or with central banks).

Our paper is also related to Bord and Santos (2014) which analyzes the effect of the ABCP freeze for US-based banks. Bord and Santos (2014) find that US banks that increased their use of funding from the Federal Home Loan Bank System or the Fed's Discount Window following the ABCP freeze charge higher fees to grant new lines of credit to corporations. Their paper, however, does not exploit the differences between US-based and foreign banks, which is the focus of our paper. The economic magnitude of our findings on the impact of ABCP exposure of a bank on the cost of its credit lines appears an order smaller than in these other papers. This is likely because we are looking at the differential response between US-based and foreign banks, as well as between their US-based and foreign borrowers, which controls more conservatively for differences in the macroeconomic environment and the degree of pure (dollar) funding shock.

Our paper also contributes to the broader literature that looks at how bank deposit financing can insulate access to finance even in the face of shocks to their lenders (Ivashina and Scharfstein (2010); Cornett et al. (2011); and Gozzi and Goetz (2010)). However, these papers do not study the effect of the funding source (private versus government) and of the differential access to these sources on foreign bank lending.

Finally, our paper is related to the recent literature on the transmission of funding shocks across borders through operations of global banks. Cetorelli and Goldberg (2011) examine the global transmission of shocks emanating from the financial crisis of 2007-08 and find that regions with higher aggregate exposure to dollar funding shocks lent less following the shock to emerging markets countries. Giannetti and Laeven (2012) show that there is a rebalancing of banks' loan portfolios back to home markets (that is, in countries where banks are domiciled) in the 2008 financial crisis. Paravisini et al. (2011) investigates the liquidity shock of the Russian default, and finds that global banks transmitted the shock to borrowers in Peru. Goulding and Nolle (2012) study the role of foreign banks in the US banking sector over the last two decades.

Our analysis is complementary to both of these sets of papers in that we focus on the effect of *lending in the crisis-affected country* from *foreign banks* whose limited access to funding in the crisis country (relative to domestic banks) helps us isolate the supply effect of bank lending terms on credit lines to the real sector.

2. Foreign Banks

2.1. Institutional Background

In the aftermath of the collapse of the ABCP market in 2007, banks with exposure to conduits financed with ABCP needed short term liquidity to finance their assets (see Acharya, Schnabl

and Suarez (2013) for detailed evidence). In a nutshell, global commercial banks funded long-term assets such as mortgage- and asset-backed securities (MBS and ABS), and credit card receivables, through overnight wholesale funding in the ABCP market. The “conduits” through which the ABCP was issued had little equity capital of their own, other than the guarantees provided by sponsoring banks (which found it attractive to do so due to the favorable treatment of such guarantees in the regulatory capital requirements). When the underlying assets, especially MBS and ABS, experienced a drying up of liquidity following the housing-market collapse in various parts of the world, the ABCP investors “ran” on the conduits, that is, they reduced overnight rollovers and charged higher spreads for doing so. Specifically, the run began on August 9, 2007, following the announcement by BNP Paribas’ hedge funds on August 8, 2007, that their sub-prime MBS investments could no longer be marked to market due to the evaporation of liquidity in the market for these securities.

Sponsoring banks with guarantees had to either take over the conduit assets “on balance-sheet,” resulting in greater capital requirements, or to generate overnight funding against the ABCP assets through alternative sources. Acharya, Schnabl and Suarez (2013) document that this ABCP run was very large, with the market collapsing from its peak of over \$1,200 billion in beginning of August 2007 to just over \$600 billion by the end of 2008. Throughout the paper, we label this the “freeze” in ABCP or the ABCP “shock”. We are particularly interested in understanding differences in access to liquidity between US and foreign banks exposed to this shock, and thus we first outline sources of short-term liquidity available to US and foreign banks.

Foreign banks can access USD liquidity in the short run in many ways. In terms of private sources of immediate funding, they may have US cash on hand in the form of reserves or interest bearing balances with other banks. They can borrow from other banks on an unsecured

basis in the fed funds or Eurodollar market or on a secured basis in the repo market. They can also borrow from US depositors and money market funds or issue dollar denominated commercial paper. In addition, foreign banks can borrow from home country depositors or issue local currency commercial paper and swap foreign currency liquidity into USD in foreign exchange markets. Finally, they can sell liquid assets.

US branches and agencies of foreign banks that hold reserves can also access liquidity from US government sources, including the Discount Window. An alternative source of government funding is advances from FHLBs, but these funds are available only to foreign banks with US commercial bank subsidiaries. Subsequent to the time period we study in this paper, many additional government programs were designed to alleviate liquidity shortages (e.g., the Term Auction Facility (TAF) auction and the Term Asset-Backed Securities Loan Facility (TALF)) and US dollar shortages (e.g., swap lines with many foreign central banks⁹). To better isolate the liquidity shock, we focus the analysis in our paper on the period before December 12, 2007, when the first of these programs was instituted.

Access to liquidity is a function of foreign banks' legal structure in the US. Foreign firms can engage in US banking through six principal types of organizations: representative offices, branches, agencies, banks, Edge Act and Agreement international banking corporations, and international banking facilities (IBFs). Reporting requirements vary depending on organizational structure. *Representative offices* are subject to minimal regulation and file no reports with the Federal Financial Institutions Examination Council (FFIEC), Office of the Comptroller of the Currency (OCC), or Federal Reserve. These offices engage in representational and administrative functions but do not conduct bank activities. *Branches and agencies of foreign*

⁹ See http://www.federalreserve.gov/monetarypolicy/bst_liquidityswaps.htm for information on the dollar liquidity swap lines.

banks (FBOs) file FFIEC 002 (Report of Assets and Liabilities of US Branches and Agencies of Foreign Banks). The activities of a branch of an FBO are similar to those conducted by a branch of a US bank, including wholesale and foreign deposit acceptance as well as other credit fiduciary activities. However, the FDIC does not insure the deposits of foreign bank branches, and branches of FBOs are not required to join the Federal Reserve System. Foreign banks can establish *subsidiary US banks or bank holding companies*, which file the Call Report (FFIEC 031) or Y-9C.¹⁰ These subsidiary banks have the same legal and regulatory restrictions and reporting requirements as domestic banks. Foreign banks can also create separate *Edge Act subsidiaries* to engage in international banking activities. No regulatory data on these exist in either the Call Report, Y9-C or 002 filings except for a breakdown of interest income accruing from Edge and Agreement subsidiaries. Finally, foreign banks may create an *international banking facility (IBF)* as an extension of the previous five structures. These facilities are used to book deposits unrestricted by US reserve requirements or other deposit insurance premiums. The activities of the IBF are consolidated in the 002 filing for branches and agencies of foreign banks. In addition, FBOs can own other structures including savings associations, industrial LLCs, and other securities LLC companies for which no Federal Reserve regulatory filings are available. Finally, no regulatory information is available for foreign banks' holding of dollar-denominated assets or dollar funding at non-US subsidiaries.

We review the availability of these data for foreign banks, and aggregate the various filings into a picture of foreign banks' change in USD funding at this time. Unfortunately, comprehensive data are not available for all possible liquidity sources on a daily bank-by-bank basis, and we are forced to examine funding mostly by looking at changes in quarterly figures. In

¹⁰ After the enactment of the Foreign Bank Supervision Enhancement Act of 1991, foreign banks accepting insured deposits must establish a US subsidiary bank. The difference between branches and agencies is that the agency primarily makes commercial and corporate loans, but does not have deposit-taking authority.

order to get some estimates at a higher frequency, we also take advantage of information from the Federal Reserve's weekly survey of banks (approximately 950 domestic and 96 foreign-related institutions in 2007). Data items are a subset of call report items that are aggregated and released publicly. However, participation in this panel is voluntary and not all banks file in all weeks.

3. Bank Funding of ABCP-Exposed Banks in 2007

3.1. Data

We use Moody's data to identify 56 banks that sponsored conduits funded by US dollar-denominated ABCP and thus were exposed to a liquidity shock in August 2007 (see Acharya, Schnabl and Suarez (2013) for a detailed discussion of these data). We build a comparison set of similar banks without ABCP exposure by gathering information on large US BHCs and foreign banks that file US regulatory reports. We add an additional 552 firms that filed FR Y-9C, Call Report (FFIEC 031), or FFIEC 002 regulatory reports in both the second and third quarters of 2007. We limit the total sample of US banks to the 425 BHCs with more than \$1 billion in assets in the fourth quarter of 2006, since banks with ABCP tend to be larger,¹¹ and we include all 127 foreign entities with any US regulatory filings, since they are likely to be similar to foreign banks with a US presence. Since we are examining balance sheet changes between 2007q2 and 2007q3, we exclude five firms with M&A activity in those quarters, which includes two banks exposed to USD ABCP. The resulting dataset includes 603 banks, of which 28% are foreign, and 9% have exposure to ABCP. Of banks with ABCP exposure, 74% are foreign. For foreign banks, when total firm assets exceed US regulatory data assets, indicating that the parent company is larger

¹¹ The smallest US ABCP-exposed domestic bank holding company (BHC) has \$100 billion in assets while the mean of all non ABCP-exposed domestic BHCs is only \$9 billion.

than its US holdings, we supplement data with information from Bankscope, and Capital IQ if Bankscope data are not available. We further restrict our analysis to entities with US regulatory filings. The final sample includes 585 banks (26% are foreign, and 6% with ABCP exposure.) On average, exposed banks in the panel sponsored \$15 billion of assets with US dollar-denominated ABCP. ABCP-exposed foreign banks are much larger than non-ABCP-exposed foreign banks, with mean total assets of \$940 billion and \$136 billion, respectively. Summary statistics for these banks are presented in Table 1.

For information on foreign banks' funding, we aggregate several different US regulatory reports (Call Report (FFIEC 031), FFIEC 002, FR Y-9C) filed by foreign banks' offices (FBOs) and other subsidiaries supervised by the Federal Reserve.¹² Of the foreign exposed banks, approximately 65% file a US regulatory report of some kind. The remaining fourteen exposed banks file no US regulatory reports. We assume that these banks have no US deposits.¹³ Since most regulatory report data are available on a quarterly basis, we compare funding as of the quarter immediately before (June 30, 2007) and after (September 30, 2007) the ABCP market shock on August 9, 2007. In addition, we examine the subset that file the H.8 form and look at changes from the week before (August 1, 2007) to the week after the shock (August 15, 2007). In Figure 3, we outline the availability of US regulatory filings for foreign banks in the sample.

¹² FBOs report some consolidated regulatory capital information quarterly on the FR Y-7Q; however, balance sheet line items are not available in this reporting form. We effectively assume that all funding and loans reported in US regulatory filings are dollar denominated. However, domestic BHCs may have foreign deposits and loans included in these numbers. Similarly, foreign banks may hold dollar denominated assets or liabilities at non US entities which will not be included in their US regulatory filings.

¹³ The banks in the sample that file no regulatory reports are as follow: Bayerische Hypo-und Vereinsbank AG, Bayerische Landesbank, Crédit Agricole S.A., Danske Bank A/S, Dresdner Bank AG, Eurohypo AG, Hypo Real Estate Holding AG, ING Groep NV, KBC Group-KBC Groep NV/ KBC Groupe SA, LBB Holding AG-Landesbank Berlin Holding AG, Nationwide Building Society, Natixis, Norddeutsche Landesbank Girozentrale NORD/LB, and WestLB AG.

Figure 3: Availability of US Regulatory Reports for Foreign Banks

NUMBER OF FOREIGN BANKS		
US Regulatory filings	ABCP Exposure	
	No ABCP	ABCP
Y9-C Filer		
Y9-C Only	3	1
Y9-C and 002 Filers	7	10
No Y9-C Filer		
CALL Filer(s) Only	5	0
CALL and 002 Filers	6	2
002 Filers Only	106	13
Total Regulatory Report Filers	127	26
Total No Regulatory Report Filers		
No Y9-C, CALL or 002	0	14
TOTAL	127	40
H8 (FR 2644)	32	24
Total in reporting panel	282	30

3.2. Private Funding

We begin by looking at funding by calculating changes in bank balance sheets between the second and third quarter of 2007. Banks increase liquidity when short-term liabilities increase or short-term assets decrease. While we cannot exactly match all changes to the ABCP shock, banks that decrease working capital (short-term assets less short-term liabilities) are generating additional liquidity. Table 2, Panel A, tabulates changes in the following short-term assets: Cash and Balances, and Available-for-sale (AFS) Securities; and short-term liabilities items: Fed Funds Net, Repo Net, Total US Deposits, and Other Borrowed Money. Exact variable definitions are in Appendix A.

We aggregate the panel across nationalities and ABCP exposure in the first column. Overall, banks in the sample are generating liquidity (reducing working capital) in the third

quarter of 2007, led by increases in deposits and other borrowed money, as well as decreases in cash, offset by increases in AFS, and decreases in net fed funds and repo.

However, there are large differences between all banks (Column 1) and banks with ABCP exposure (Column 2). The average bank in the panel increased US deposits (by \$427 million) and Other Borrowed Money (\$149 million) from 2007q2 to 2007q3, but ABCP-exposed banks increased deposits by almost \$4 billion, and Other Borrowed Money by almost \$3 billion. Fed Funds and Repo appear to be mostly a net use of funds at this time (the net amounts decrease for all banks by \$38 million and \$58 million, respectively, and by \$425 million and \$1 billion for exposed banks, meaning that firms are funding themselves though these short term liabilities less, in net at this time).

Within types of US deposits, we examine changes in the following subcategories of deposits: Demand Deposits, Core Deposits, Time Deposits (<\$100K), Time Deposits (>\$100K), and Other Deposits. On average, as banks search for liquidity at the end of 2007, they grow time deposits and other deposits, but not demand deposits nor core deposits.

We aggregate funding variables into *Total Private Funding* – the net of the increases in liabilities (Fed Funds Net, Repo Net, Total US Deposits, and Other Borrowed Money) less the increases in assets (Cash and Balances, and AFS Securities). This number represents the net total of how much the banks grew their short-term liabilities and shed liquid assets. ABCP-exposed banks increase private funding by more than eleven times as much as the average bank at this time, although on average all banks are increasing total assets.

We also seek to understand if banks' nationality affected their access to funding. Moving to the right in Panel A of Table 2, we separate the sample between exposed domestic and foreign banks (Columns 3 and 4) and find dramatic differences between foreign and US banks' access to

liquidity. For example, on average, banks exposed to ABCP grow deposits almost 19 times more than do non-ABCP-exposed banks; however, US banks drive the difference. In fact, US banks with ABCP exposure grow deposits by almost three times more than foreign banks with ABCP exposure, although the average amount of ABCP outstanding for US banks was much less than three times the exposure of foreign banks (US exposure was only twice foreign exposure) (see Table 1). This suggests that foreign exposed banks were not able to switch to more stable sources of funding as did US banks. Within types of deposits, exposed US banks grow both small and large time deposits, while foreign banks grow flightier large time deposits only. US exposed banks also raise other debt financing, increasing other borrowed money, while foreign exposed banks actually reduce other borrowed money.

Finally, we compare the changes in the balance sheets of ABCP exposed foreign banks (Column 6) to their non-exposed peers (Column 7).¹⁴ This comparison allows us to understand if banks with US dollar shocks (the exposed banks) access more liquidity than do their non-exposed peers. Foreign banks with ABCP grow deposits by four times as much as their non-exposed peers. They also increase repo and cash, but shrink other borrowed money.

Of course, this analysis is univariate in nature, and changes are heterogeneous. In Table 3, we present the results of a number of specifications in which the change in funding (the difference between balances as of 2007Q3 and 2007Q2) normalized by lagged total assets (2006Q4) is the dependent variable. As explanatory variables, we include an indicator variable for whether the bank is foreign (*For_DUM*); bank's exposure to USD ABCP, again normalized by 2006Q4 total assets (*ABCP (%)*); the interaction of the foreign dummy and the exposure to ABCP (*ABCP (%) * For_DUM*); the logarithm of total US assets (*Log US Assets*) and total

¹⁴ Column 6 repeats Column 3 (summarizing changes in balance sheets of foreign banks with ABCP) for presentational ease.

assets (*Log Assets*). We normalize exposure to ABCP by assets to control for size differences, and because we cannot normalize by the amount of the US ABCP shock experienced by the bank nor by total US assets, since we would be dividing by 0 for some banks.

In the fall of 2007, we do not see ABCP-exposed foreign banks disproportionately increasing US deposits in response to their liquidity shock. In fact, the sign on the interaction of ABCP exposure and foreign bank is negative, although not statistically significant, in specifications for total deposits (Column 6), core deposits (Column 7) and non-core deposits (Column 8). This effect suggests a funding risk in that the depositors of ABCP-exposed foreign banks likely withdrew their deposits, moving them to unexposed foreign banks, domestic banks, or to money market funds. Looking across the other eight regression specifications, each with a dependent variable measuring a source of short term funding, we do not find any statistically significant relationship for this interaction. In short, we show in this section that foreign banks exposed to the ABCP funding shock were unable to grow total US deposits to meet their increased funding needs after the ABCP market shock on August 9, 2007.

3.3. Weekly Funding

Since this quarter-end analysis may miss dislocations in shorter term funding conditions, we confirm our results with intra-quarter changes in balances (between August 1 and August 15, 2007). We present summary statistics for the subset of 306 banks (30 ABCP-exposed banks, and 54 foreign banks) in our sample that file weekly reports over this two-week period in Panel B of Table 2. We also include summary statistics for the 298 banks that file between June 27 and September 26, 2007. These filings have additional detail that allows us to look at transfers between foreign bank subsidiaries, which would approximate liquidity raised outside of the US

and swapped into dollars.¹⁵ We examine both the change in *Net Due From (To) Related Institutions* and the change in *Borrowing from US Commercial Banks* at this interval. The former is a measure of intrabank liquidity flowing to US-regulated entities from their non-US corporate parents and affiliates, while the latter measures interbank lending within the US.

Looking only at the two-week window, exposed foreign banks are raising almost \$660 million from US commercial banks in the two weeks around the shock. That money appears to be going to affiliates, on average, with a net increase of almost \$900 million due from affiliates (see Cetorelli and Goldberg (2012)). These numbers are dwarfed by the amount that US exposed banks are borrowing from their peers -- an average \$1.25 billion increase over the same two weeks. As time elapses, and liquidity continues to be difficult to obtain, this pattern reverses, and exposed foreign banks' borrowing from US commercial banks actually falls by \$220 million, while US exposed banks borrow an additional \$3.5 billion. This is consistent with evidence in section 3.2, that foreign banks cannot make up this liquidity shock.

3.4. Government Funding

We next compare funding from government sources, specifically the Discount Window and advances from FHLBs. We calculate the change in funding from the Discount Window primary credit program by summing the borrowing amount of primary credit at the Discount Window for the months September, October, November, and December, and subtracting the amount for the months April, May, June, and July. These data come from the proprietary Federal Reserve database and exclude borrowing done through secondary credit and seasonal credit lending programs. While not all banks access the Discount Window, we have complete information for all banks that borrow. Although the aggregate borrowing level was low, US exposed borrowers

¹⁵ While this information includes transfers among foreign commercial banks and their US offices, it represents a lower bound on access to dollars, since it measures only funds sent to US-regulated subsidiaries.

increase Discount Window borrowing by almost six times as much as their exposed foreign peers (Table 4, Panel A).

We also measure the quarterly change in Federal Home Loan Bank advances over all maturities reported on the Call Report. As shown in Panel A of Table 4, in aggregate, US ABCP-exposed banks borrow 50 times as much from the FHLB as do their exposed foreign peers. In fact, only 19 of the 167 foreign banks in the sample even had access to FHLB advances. Adding up both sources of government funding, we obtain *Total pre-TAF Gov. Funding*, and again find that the US exposed banks expand funding much more than do foreign exposed banks (by 30 times). Examining borrowing from the discount window and the FHLBs, and adding linear controls for bank size, we see consistent results in Panel B of Table 4 – although not statistically significantly, funding is positively associated with US regulated assets, and foreign banks access less government liquidity than do their US peers before the implementation of TAF.

Total pre-TAF Funding in Panel A of Table 4 sums up the total amount of funding that banks add in the third quarter of 2007, before the TAF is instituted. It is the sum of private and government funding in our previous analysis. By this measure, we see the funding gap clearly illuminated. Before TAF was implemented, foreign banks with ABCP exposure grow their funding dramatically less than US banks with ABCP exposure do (approximately 1/30th as much).

3.5. Residual Funding Demand

As a measure of the unmet demand for USD liquidity, we next examine borrowing from the Term Auction Facility (TAF), which was instituted in December 2007, and calculate the sum of the amount borrowed in the TAF auctions held on December 17th and 20th of 2007.¹⁶ On average,

¹⁶ On December 17, 2007, the Federal Reserve conducted a 28-day TAF auction of \$20 billion at a stop-out rate of 4.65 percent. The awarded loans settled on December 20, 2007, and matured on January 17, 2008. On December 20,

foreign ABCP-exposed banks borrow more from the TAF than do any other category of bank, although not all exposed foreign banks bid at the TAF auctions.

In Panel B of Table 4, we run simple OLS regressions to understand if our results are driven by bank scale. We control for the size of banks' total assets, as well as banks' US assets held through Federal Reserve regulated subsidiaries, because US assets may determine access to deposits. All foreign banks appear to demand more from the TAF, although there is no statistically significant difference between exposed and non-exposed banks (Column 3). The general lack of statistical significance may reflect the fact that we are unable to capture the amount of USD liquidity accessed by foreign firms through swap lines instituted at the same time as the TAF. Adding together the TAF and FHLB funding (Column 4), we see that foreign exposed banks access no more government funding than do their unexposed peers (not statistically significant).

Our analysis has some limitations. We have no comprehensive information on USD or dollar-denominated assets of non-US entities, and we lack information on USD commercial paper issuance of foreign banks.¹⁷ This lack of information itself is symptomatic of a mismatch between bank exposure to US assets and incomplete information on banks that are headquartered outside of the US. It is worth noting that while exposed US banks accessed dramatically more funding, in terms of amounts relative to Tier 1 Capital, foreign banks actually had almost twice as much US ABCP exposure as US banks did, on average (Table 1).

2007, the Federal Reserve held another TAF auction of \$20 billion in 35-day credit at 4.67 percent stop-out rate. Loans settled on December 27, 2007, and matured on January 31, 2008. TAF transaction data is publicly available through http://www.federalreserve.gov/newsevents/reform_taf.htm

¹⁷ Comprehensive data on CP issuance have been made available only since August 2008. While some of this information is on Bloomberg, the fields are not well populated. We do not believe that there was a significant increase in USD denominated CP issuance by foreign banks, but it is more difficult to prove the absence of such issuance.

4. Impact of Funding on Real Economy

4.1. Syndicated Loans

Having documented differential access of domestic and foreign banks to USD funding sources, we turn to the syndicated loan market to understand if the ABCP funding shock had real effects on corporate credit; and if this effect differs between US and foreign banks, and for USD versus foreign currency denominated loans. In perfect markets with no frictions in access to US dollars, we would not find differences between lending in dollars and in other currencies within banks. However, if funding frictions exist (consistent with observed CIP violations), we hypothesize that lending in USD by ABCP-exposed foreign banks would be negatively affected.

We use the Loan Pricing Company's (LPC) DealScan database to analyze the terms of syndicated loans arranged in 2007. LPC data have been extensively described in previous literature (see, for example, Ivashina (2009)). We link (by hand) banks from our sample to LPC using bank names and RSSD information from the National Information Center hierarchy to assign a match when the LPC lender name matches to any of the bank's subsidiaries. These banks comprise 51% of unique LPC lender names, and matched banks participate in 98% of the loans made in 2007.¹⁸ We are able to find matches for 307 of the 603 sample banks (148 of the matched banks are foreign). We limit the analysis to observations with borrower sales data from LPC to better control for borrower quality. Of the 307 banks, only 217 underwrote syndicated loan facilities with available data in our sample period of January 1, 2007 to December 12, 2007 (208 underwrote USD-denominated loans, 112 underwrote euro-denominated loans, 103 underwrote both USD- and euro- denominated loans, and 208 underwrote revolving credit lines).

¹⁸ LPC lender names and IDs are not unique by bank. Large banks such as JP Morgan may have as many as 38 lender IDs in LPC. In 2007, there were 8,461 syndicated loan facilities made excluding Bond and Note loan types. The banks in our sample were lenders in the syndicate for 98% of the loans (99.6% of the total facility amount outstanding) and lead arrangers in 95% of the loans (99% of the total facility amount outstanding).

The remaining banks did not underwrite syndicated loans reported to LPC in this period. In addition to information on the lending syndicate, we use this database for information on each loan facility, including all-in-drawn spread, maturity, amount, purpose, and the sales and industry of the borrower.

It is notable that just as we see a mismatch between foreign banks' US ABCP exposure and their US-regulated assets, we see a mismatch between foreign banks that underwrite USD denominated syndicated loans and their US regulated assets. Table 5 presents summary statistics on the underwriting of USD syndicated loans by foreign and US banks. Adding up all loans likely to be outstanding as of August 9, 2007, defined as facilities with a start date before and maturity after August 9, 2007 (146,492 facilities), and assuming that each member of the underwriting syndicate underwrites an equal amount of each facility, the numbers are striking – exposed US and foreign banks underwrite roughly the same amount of syndicated loans. These underwriting commitments are approximately 40% of US banks' total assets, but about 200% of foreign banks' US regulated assets.

Of course, many of these loans are underwritten but sold off. To be more conservative, we assume that banks keep only their portion of the revolver, and retain no exposure to the term loans. Even under this assumption, we find that foreign exposed banks' revolving credit line commitments are about 100% of their total regulated US assets. To be even more conservative, if we assume that banks keep only 25% of their underwritten share of the revolver and 5% of the term loans, ABCP-exposed foreign banks still have an exposure to USD-denominated loans that is greater than 25% of their regulated US assets (the comparable number for US banks is 6.5%). In part, this reflects the fact that large syndicated loan underwriters such as Deutsche Bank and Credit Suisse have relatively small amounts of regulated assets in the US relative to the scale of

their operations in the US. While this small asset base relative to total assets would not be relevant if US dollars could be raised at will and in a frictionless manner, aggregate dollar shortages as well as frictions in raising market funding (due to moral hazard and adverse selection concerns) render such a small asset base as a significant exposure to future dollar funding risk.

Do USD funding frictions affect foreign banks' US lending? We use information on 11,617 syndicated loan facilities in the pre-ABCP crisis period and 4,604 in the post period (August 9, 2007 to December 12, 2007), a total of 16,221 lender-facility observations. In the pre-period, 10,982 are denominated in US dollars, and 635 are denominated in euros or pounds; of the facilities in the post-period, 4,323 are denominated in USD, and 281 are denominated in euros or pounds.¹⁹ We also use information about loans ratings from the DealScan database, using the Moody's rating if available. If the Moody's loan rating is not available, we use the first available of the following ratings: S&P Loan Rating equivalent, Moody's Senior Debt, S&P Senior Debt, Fitch Senior Debt, Fitch Long-term Borrower Rating, and S&P Long-Term Borrower Rating.

We begin by comparing loans arranged before (Pre-Paribas) and after (Post-Paribas) August 9, 2007 in USD (USD Loans) and in Euro or British pounds (Euro Loans). We tabulate the average terms of loans made before and after the shock in Panel A of Table 6. On average, after the ABCP shock, spreads fall by almost 1.5 times as much in US dollar denominated loans as they do in the Euro/GBP market. However, these results do not control for systematic differences in the types of banks, borrowers, and loans granted.

In Panel B of Table 6, we further split the sample between US and foreign banks. In the beginning of 2007 (Pre-Paribas), on average, foreign and US banks seem to be making USD-

¹⁹ See Carey and Nini (2007) for a discussion of the US versus European syndicated loan data.

denominated loans of similar risk, with mean loan spreads around 165 basis points. In Europe, relative to USD loans, both exposed US and foreign banks seem to be making riskier loans before August 9, 2007, with mean spreads around 190 basis points. After the ABCP market shock, US and foreign banks still seem to be making riskier (higher spread) loans in the European market, US banks appear to participate in significantly larger loan facilities in Europe, and on average euro/pound-denominated loans seem to be of longer maturity than USD loans. These univariate differences point out the importance of controlling for bank and currency fixed effects.

4.2. Empirical Methodology

In order to control for important differences in the type of loans that banks make, and for differences in loan markets, we employ a differences-in-differences strategy, where we estimate the terms of loan facilities extended before and after the ABCP shock, in USD and other currencies, by foreign and domestic banks, and by ABCP- and non-ABCP-exposed banks. We begin by looking at the effect of the share of loans that is financed by ABCP-exposed or foreign banks, and then expand the dataset to one observation per loan facility-bank.

We can thus estimate how loan terms changed in the following segments: i) after the ABCP shock, ii) in USD loans vs. non- USD loans, iii) for foreign banks after the ABCP shock, and iv) for foreign banks with ABCP exposure after the ABCP shock, while controlling for bank fixed effects, borrower characteristics and loan characteristics. Specifically, we estimate the following equation:

$$LPC Term_{b,l,f} = \Omega\Psi + \Theta\Psi * USD + \Lambda\Psi * Post + \Gamma\Psi * Post * USD + \tau X_b + \varphi Y_l + \zeta Z_f$$

where b indexes banks, l indexes loan facilities and f indexes borrower firms; the dependent variable $LPC Term_{b,l,f}$ is a term from the loan package, either spread, amount, or maturity; $\Omega = [\omega_i]$, $\Theta = [\theta_i]$, $\Lambda = [\lambda_i]$, and $\Gamma = [\gamma_i]$, for $i=1,\dots,4$, are row vectors of coefficients; and Ψ is a column vector of variables of interest defined as:

$$\Psi = [1, ABCP_DUM, For_DUM, ABCP_DUM * For_DUM]^T.$$

Our variables of interest are the following: *USD*, a dummy variable equal to 1 if the currency of the loan is USD; *Post*, an indicator variable equal to 1 on or after August 9, 2007; *ABCP_DUM*, an indicator variable equal to 1 if a bank has USD ABCP exposure, and *For_DUM*, a dummy variable equal to 1 if the bank's ultimate parent is headquartered outside of the US. In the analysis at the loan facility level (Table 7), we substitute *ABCP_DUM* by *S_ABCP*, the percentage of banks in the syndicate with USD ABCP exposure; and *For_DUM* by *S_Foreign*, the percentage of syndicate banks with an ultimate parent headquartered outside of the US. Lacking detailed information on the share taken by each bank, we do not weight these percentages by loan share. Results are similar, but with reduced statistical significance if we include only lead banks.

In many specifications, we include fixed effect controls for each bank, X_b . In these specifications, the *For_DUM* and *ABCP_DUM* variables will drop and we examine only the interaction of these variables with the post time period, exploiting differences in within bank variation in the pre vs post shock time period for foreign or ABCP exposed banks.

In addition, we add Y_l a vector of controls for loan characteristics associated with terms of syndicated loans, including loan security, and fixed effects controls for the loan purpose. We also include controls for lender specialization and lender experience. *Lender specialization* is the sum of all facilities amounts for a given lender in a given 2-digit SIC code in the previous calendar

year, and normalized by the sum of the facility amounts in a given 2-digit SIC code (converted to USD). *Lender experience* is the logarithm of one plus the amount lent in the previous year in a specific currency (calculated including only the amount lent in USD for loans in USD, and the non-USD amounts (converted in to USD) for non-USD loans.)

Additionally, we include Z_f controls for borrower characteristics including sales divided by package amount and fixed effects for the borrower industry, as well as the loan's credit rating when available. In our sample, approximately 46% of loans are rated. In some of the spread specifications, we include controls for other co-determined loan characteristics such as maturity and amount. Results are similar if those controls are omitted. Standard errors are clustered at the loan package level. Detailed variable definitions are available in Appendix A.

In summary, we estimate differences in loan terms after controlling for observable loan and lender characteristics, borrower characteristics, and for any fixed differences among currencies and banks. Results emerge from differences in the differences in bank terms between currencies before and after the ABCP shock. Of course, there are limitations to any analysis of syndicated loan data. First, loans are priced in a syndicate, and therefore terms are determined by the syndicate. This would bias us against finding any results, since a withdrawal of credit by foreign banks might be mitigated by additional credit provision by other syndicate members. Second, syndicated loans are underwritten by the syndicate banks, but they may originate the loan to sell off some of or the entire loan package. Third, we can only analyze the prices of the loans that are actually made after the liquidity shock (the intensive margin). In Section 4.4, we attempt to understand the extent to which the extensive margin changes, although we are limited by the lack of data on loan demand.

4.3. Loan Pricing after the ABCP Funding Shock

We hypothesize that banks exposed to the ABCP shock suffered more of a liquidity shock than banks without ABCP exposure. This liquidity shock is denominated in USD, and since we find evidence that US banks have differential access to USD liquidity in Section 3 (by raising deposits and accessing FHLB financing), we expect there to be differential impacts in the US lending market relative to other currencies, assuming that there are frictions in liquidity across currencies for foreign banks. Thus in order to estimate the impact of a negative liquidity shock to US lending, we look to see if foreign exposed banks offer different terms than do US exposed banks, or than foreign or domestic non-exposed banks.

We begin in Table 7 by looking at the pricing of loans before and after the ABCP shock, and at the characteristics of the bank syndicate in each loan facility. In each specification in the table, we include controls for observable characteristics of the borrower, lender and loan that are associated with loan pricing. For each loan term (spread, amount and maturity), we estimate two specifications. First, we estimate the effect on USD and non-USD loans of the percentage of the loan syndicate that is exposed to the ABCP shock, but without distinguishing between US and foreign banks (columns (1), (3) and (5)). Then we allow the estimated coefficient to differ for the share of the syndicate that is foreign and exposed to the ABCP shock. The size of the coefficient on the interaction of *Post*, *S_Foreign*, *S_ABCP*, and *USD* captures the marginal effect of the share of exposed foreign banks in the syndicate in the post-shock period on the terms of loans denominated in USD, relative to non-USD loans.

Before looking at the nationality of the lenders, we do not find differential effects in the share of ABCP-exposed banks on loan terms – if anything, it appears that non-USD loans are disproportionately affected (column (1)). However, once we allow coefficients to vary with the share of foreign exposed banks, we see that it is the share of foreign exposed banks that is

associated with higher prices for USD loans. For a 10-percentage point increase in the syndicate share of foreign exposed banks, spreads increase by 127 basis points, amounts decrease by under \$1 million, and maturities increase by 25 months, all else equal. All estimated coefficients are statistically significant, although amounts are significant only at the 10% level. Estimated coefficients are larger when calculated using all banks in the syndicate, rather than just leads.

There may be unobservable differences in the types of borrowers that have foreign banks in their lending syndicate. Since many of the banks in our sample lend in both USD and non-USD, we can use bank fixed effects to control for unobservable differences in the types of borrowers that match with the foreign exposed lenders. In addition, while a given bank may change lending in response to solvency concerns after the ABCP shock, there is no a priori reason to think that the solvency effect on lending in USD should be different from the change in lending terms in other currencies. In this way, we can estimate cleanly the effects of USD liquidity shortages, while controlling for variation among banks' liquidity and solvency at this time through bank fixed effects. An advantage of this analysis, relative to studying a later time period, is that we believe the shock to US and non-US banks' solvency to be quite similar (driven by ABCP exposure) and that demand should be relatively unaffected. In order to add controls for bank fixed effects, we expand the sample out to one observation per bank-facility and cluster standard errors at the loan package level to account for the correlation among loans to the same borrower. To the extent that loan terms are jointly determined across banks in the syndicate, this empirical approach will bias us against finding any relationship between loan terms and bank characteristics.

In Table 8, we begin by repeating the first two specifications of Table 7, where the lender variables are now binary variables (instead of percentages) indicating if the bank is foreign

(*For_DUM*) or exposed to US ABCP (*ABCP_DUM*). We start with specifications that include loan level, rating, amount, maturity, and lender specialization and experience controls, but not lender fixed effects. Prices on loans made by exposed banks increase in the post shock period, as do prices for USD loans (although not statistically significant). In the fourth specification, when we look only at the variation within banks, the statistical significance of the results actually strengthens.

As in Table 7, significant differences emerge when we allow the effect of ABCP exposure to vary by loan currency. Foreign banks with exposure to ABCP raise interest rates on US dollar loans after the ABCP funding shock, particularly when compared to US exposed banks or to non-exposed foreign banks. The effect is statistically and economically significant, with a marginal difference in interest rate for foreign exposed banks lending in US dollars of 71 basis points, even after controlling for loan maturity, size, level, and loan rating (specification 4). Adding up the coefficients, exposed foreign banks are raising prices after the ABCP shock. The sum of the marginal effects is an additional five basis points on USD loans – at a time when they are dropping interest rates on their non-USD loans.

Since relationship banks may play a more important role in the syndicate, we identify banks that participated in a borrower's previous syndicated loan (*Relationship*) and repeat the analysis in specification (4) but splitting the sample between borrowers for which the lender has previously participated in the lending syndicate in the last five years (column (5)) and those with no previous relationship (column (6)). We find similarly large effects for both sets of borrowers. We would also expect to see stronger effects for bank-dependent borrowers. We split the sample between banks with and without public equity (specifications (7) and (8)), and find similar results in that we estimate a larger coefficient for banks without public equity.

A liquidity shock might be expected to have the strongest effects on the terms of the liquidity that banks provide to their customers through revolving lines of credit. Looking at only US banks lending to US borrowers in the same period, Bord and Santos (2014) find that banks that accessed the liquidity facilities of the Federal Reserve raised prices on the undrawn fees for revolving credit lines to their customers. Surprisingly, in our analysis, the effect is relatively limited when we restrict the sample to revolvers (not shown). However, we are estimating our results on all-in-drawn spread, rather than on undrawn spread, because we have very few observations with information on undrawn spreads for non-USD revolvers. Since loan facilities are typically part of a larger loan package, we want to make sure that the pricing differences we find are present in aggregate loan packages. Therefore, we aggregate facilities of a single borrower into a loan package and calculate a weighted average spread on all facilities. The results are of similar magnitude and economic significance.

We also look to see if borrowers with previous relationships with foreign banks are disproportionately affected. Ideally, we would have banks exogenously assigned to borrowers. In practice, since borrowers are likely to refinance with their existing bank syndicate, we examine the subset of borrowers with previous syndicated loans that selected foreign banks prior to the ABCP funding shock. These pairings are thus unlikely to be correlated with the shock.²⁰ We are limited in the power of this analysis by the fact that the penetration of non-exposed US banks in non-USD loans and non-exposed foreign banks in USD loans is relatively lower in the sample of pre-2007 loans. We re-run the analysis on the subset of borrowers with pre-2007 loans that have been refinanced in the post-time period. The terms of the loans for this subset that we analyze are those of the post-2007 loans, but the bank syndicate is set to be the original syndicate, regardless

²⁰ We are grateful to Philip Strahan for this suggestion.

of whether banks in the original syndicate participate in the refinancing. This therefore is an analysis that looks at the impact of having a previous relationship with foreign exposed banks on loans that are refinanced. We find that having foreign exposed banks in the original syndicate is associated with lower loan amounts (negative coefficient, significant at the 5% level, on $Post * USD * ABCP_DUM * For_DUM$ in Table C3), but has no statistically significant effect on pricing. This is consistent with some borrowers choosing to borrow less (in USD) and dropping foreign exposed banks from their syndicate. However, we must be cautious in interpreting the results because of the low power of our analysis since we have fewer within-bank observations across different currencies when beginning with pre-2007 data. The full analysis can be found in Appendix C, Table C3.

Finally, since differential access to USD funding may also impact other loan terms, we analyze the effect of the ABCP funding shock on facility amount, maturity and rating. Table D1 in Appendix D presents these results. Overall, after the ABCP shock, foreign exposed banks seem to be reducing slightly the amount of their loans, and making riskier USD loans relative to their loans in other currencies (not statistically significant coefficients on $Post * USD * ABCP_DUM * For_DUM$, specifications (2) and (6)). These banks seem to be extending the maturities on their loans denominated in USD (positive coefficient on $Post * USD * ABCP_DUM * For_DUM$). However, when adding up all the marginal effects, both exposed US and foreign banks are shortening maturities on their US loans and extending maturities on their euro loans relative to the pre-shock period.

4.4. Extensive Margin

It is plausible that the real effect of a liquidity shock is in the loans that do not get made at all. While we cannot identify all borrowers that would have liked to borrow in the syndicated loan market (the full extensive margin), we can examine borrowers that previously accessed this market to see if they are able to refinance their existing loans. For this purpose, we use the set of syndicated loans outstanding at the time of the ABCP shock, and test if US dollar borrowers with foreign exposed banks in their syndicate are less likely to refinance their loans.

In Table 9, we present a Cox proportional hazard analysis of refinancing. We regress a dummy variable indicating if the borrower received a new syndicated loan package between August 9 and December 11, 2007, on our set of lender characteristics, controlling for features of the loan being refinanced that we expect to be associated with the probability of refinancing, as well as for lender specialization and experience. As before, our main variables of interest are dummy variables indicating if the bank is foreign (*For_DUM*) or exposed to US ABCP (*ABCP_DUM*), and the interaction of the two variables. Since we only look at loan refinancing after August 9, we no longer need a dummy variable for the post-ABCP shock period.

While the previous analysis considered only loans issued in 2007, for this analysis, we want to begin with a sample of loans that were outstanding at the time of the ABCP shock. For this reason, we look backward for a period of five years and begin with the 10,234 loan packages outstanding as of August 9, 2007 that were underwritten by sample banks (61,345 loan package-lender observations). In addition to looking at the facilities, in this analysis we focus on the loan package as our unit of observation, because we are interested in understanding how the crisis affects borrowers' access to loans, not the refinancing of any particular facility.

In order to isolate the effect of the loan underwriter on refinancing, we include controls for characteristics of the initial loan that might affect the probability of refinancing: the maturity

of the original loan as of August 9, 2007, the price of risk at the time of the original loan, loan rating, loan purpose, lender specialization and lender experience, and the industry of the borrower. Detailed definitions of the control variables are provided in Appendix A. The controls generally have the expected sign, with loans of longer maturity being less likely to be refinanced.

We find that the probability of refinancing a USD loan facility or package is lower for borrowers with loans from foreign exposed banks in the months following the ABCP shock. The effect is economically large, although the estimated coefficient (-0.392) in specification (3) is not statistically significant. However, when we turn to risky loans in Column (4) (i.e., when the loan being refinanced was issued originally at a spread greater than 150 basis points), we see a statistically significant coefficient (-2.513). Exposed foreign banks are less likely to refinance USD risky loans after the funding shock. This also highlights the importance of controlling for risk in the spread regressions of the previous sections, since it is likely that the risk of loans extended by foreign exposed banks in USD is falling at this time relative to their other currency loans.

Another type of extensive margin are borrowers that switch away from foreign exposed banks, but still are able to borrow. We examine this dimension in two ways: First, we look at the share of foreign exposed banks after the ABCP shock. On a univariate basis, the share of foreign exposed banks underwriting USD loans falls at this time (see Table 6, Panel A). After including controls for observable loan and borrower characteristics, the difference in the underwriting share of foreign exposed banks in USD is not statistically significant (not shown).

4.5. Loan Pricing after implementation of TAF

On December 12, 2007, the Federal Reserve announced the establishment of a temporary TAF and of foreign exchange swap lines with the ECB and the Swiss National Bank to “address elevated pressures in short-term funding markets.” (Federal Reserve (2007)) In this subsection, we expand the analysis in subsections 4.3 to include the time period after the TAF and continuing through August 31, 2008 (an end date selected to avoid disruptions associated with the collapse of Lehman Brothers). This allows us to see if the introduction of additional US dollar liquidity reverses the effects of the dollar liquidity shortage. The identification strategy grows less clean in this extended period, because demand conditions in the real economy also begin to deteriorate and the response to conditions may not be identical for USD and non-USD borrowers.

We estimate the following model:

$$\begin{aligned}
 LPC\ Term_{b,l,f,L} &= \\
 &= \Omega\Psi + \Theta\Psi * USD + \Lambda\Psi * Post + \Gamma\Psi * Post * USD + \Phi\Psi * Post_{TAF} \\
 &+ K\Psi * Post_{TAF} * USD + \mu W_L + \tau X_b + \varphi Y_l + \zeta Z_f
 \end{aligned}$$

where b indexes banks, l indexes loan facilities, L indexes lenders and f indexes borrower firms; the dependent variable $LPC\ Term_{b,l,f,L}$ is a term from the loan package, either spread, amount, or maturity; $\Omega = [\omega_i]$, $\Theta = [\theta_i]$, $\Lambda = [\lambda_i]$, $\Gamma = [\gamma_i]$, $\Phi = [\phi_i]$, and $K = [\kappa_i]$ for $i=1,\dots,4$, are row vectors of coefficients; and Ψ is a column vector of variables of interest defined as:

$$\Psi = [1, ABCP, Foreign, ABCP * Foreign]^T.$$

As in earlier analysis, USD is a dummy variable equal to 1 if the currency of the loan is USD. We define $Post_{TAF}$ equal to 1 on or after December 13, 2007 and expand the sample time period through August 31, 2008. As before, $Post$ is equal to 1 on or after August 9, 2007. In Columns (1)-(3) of Table 10, we replicate the earlier analysis of Table 7 over the longer time

period, and in Columns (4), we replicate the analysis of Table 8, including fixed effects for each bank X_b . The full set of controls from the prior analyses is included.

In Columns (1)-(3) we start by looking at the effect of the share of exposed foreign banks in the syndicate on the terms of loans denominated in USD, relative to non-USD loans after the shock. Before TAF and the foreign exchange swap lines are introduced, prices increase and amounts are lower when the syndicate share of foreign exposed banks is higher. Once additional US dollar liquidity is provided, the effect on spreads reverses, and the coefficient on the interaction of *Post_TAF*, *Foreign*, *Exposed*, and *USD* is negative and statistically significant. The institution of the TAF and other actions taken at that time appear to reverse the increase in spreads after the ABCP shock. The decrease in lending amounts also appears to reverse. We see a similar impact looking at the facility-lender data in Column (4): Foreign banks with exposure to ABCP raise interest rates on US dollar loans after the ABCP funding shock, but the effect disappears after TAF and the swap lines are in place.

5. Concluding Remarks

Our primary finding in this paper is that foreign banks borrowing in the ABCP market and operating in the United States, in particular, had to scramble for liquidity when the ABCP market froze. Their limited access to deposit and government funding sources suggests that they relied mainly on the relatively more fragile wholesale markets for funding. In turn, they passed on the cost of this fragility to their USD borrowers in the form of higher costs for the provision of syndicated loan packages.

It is interesting to consider a few issues concerning other sources of funding for the foreign banks. Clearly, as the US banks relied on their own deposit markets and government

funding, foreign banks may have also had access to such funding in their home countries. However, what these banks were scrambling for were primarily US dollars. Eventually, US dollars were made available through swap lines set up by the Federal Reserve with other central banks. However, this did not happen until December 12th 2007 (see McGuire and von Peter (2009), for example), giving us at least one quarter of data (starting with the ABCP funding shock in August 2007) from which we can identify the lending channel operating through foreign bank dollar shortages. That the TAF auctions conducted by the Federal Reserve starting in December 2007 had significant take-up by foreign banks, and that the dollar swap lines provided to foreign central banks were heavily used appear to suggest that foreign banks' US dollar needs were not fully met at least until December 2007.

Another source of US dollar funding for foreign banks, considered in the work of Cetorelli and Goldberg (2012), is that of management of liquidity across an entire banking organization, with funds flowing across international affiliates and within geographically diverse banks. They find that, faced with a shock to the parent in the ABCP market, global banks activated internal capital markets shuffling funds in and out of specific locations based on the relative importance of such locations as local funding pools. While we do not analyze how such management of liquidity contributes to – or affects – our results, if such liquidity management were relatively costless, then it should have only made it harder for us to find a differential effect between foreign and domestic banks operating in the US.

Finally, two policy issues are relevant for discussion in the context of our results. First, we find evidence that suggests that dollar-funding shortages can affect not only the stability of foreign banks, but also induce spillover into the US real economy, especially to corporations borrowing from foreign banks. A robust conclusion is that ensuring prudential regulation of

domestic banks in a country may not be sufficient for guarding against financial fragility if the economy is a large center of global banking activities.

Second, while we can draw conclusions about the changes in loan pricing after August 2007 we cannot say whether spreads on syndicated loans made by foreign banks were too low prior to August 2007, or whether the spreads rose excessively so post-August 2007 (or both). Our empirical analysis, which is based on a difference in differences approach, cannot rule in favor of one thesis or the other. Acharya and Richardson (2009) argue that bank risk-taking in the pre-crisis period was driven by regulatory arbitrage motive. Acharya, Schnabl and Suarez (2013) show convincingly that the reliance on ABCP by commercial banks was primarily the result of advantageous capital treatment accorded to issuance of such paper (and guarantees to it) by most national regulators. Shin (2012) calls the resulting provision of intermediation a “global banking glut”, arguing that it led to the underpricing of dollar-denominated maturity mismatch, and in particular to compressed loan premiums. Our results are supportive of these conclusions, but also potentially consistent with an ex-post credit crunch (excessively high spreads relative to efficient ones) due to transmission by foreign banks of their adverse funding conditions to corporations. Investigating this issue further presents a significant but worthy challenge.

References

- Acharya, Viral, Heitor Almeida, and Murillo Campello. 2013. "Aggregate Risk and the Choice Between Cash and Lines of Credit," *Journal of Finance*, 68, 2059-2116.
- Acharya, Viral, and Matthew Richardson. 2009. "Causes of the Financial Crisis," *Critical Review*, 21(2-3): 195-210.
- Acharya, Viral, and Philipp Schnabl. 2010. "Do Global Banks Spread Global Imbalances? Asset-Backed Commercial Paper during the Financial Crisis of 2007-09," *IMF Economic Review*, 58, 37-73.
- Acharya, Viral, Philipp Schnabl, and Gustavo Suarez. 2013. "Securitization without Risk Transfer," *Journal of Financial Economics*, 107(3), 515-536.
- Adrian, Tobias, Paolo Colla, and Hyun Song Shin. 2012. "Which Financial Frictions? Parsing the Evidence from the Financial Crisis of 2007-09," *NBER Macroeconomics Annual*, Vol. 27.
- Aiyar, Shekhar. 2011. "How Did the Crisis in International Funding Markets Affect Bank Lending? Balance Sheet Evidence from the UK," Bank of England Working Paper.
- Armantier, Olivier, Sandra Krieger, and James McAndrews. 2008. "The Federal Reserve's Term Auction Facility." *Current Issues in Economics and Finance*, July, 14(5), 1-11.
- Ashcraft, Adam, Morten Bech, and Scott Frame. 2010. "The Federal Home Loan Bank System: the Lender of Next-to-Last Resort?" *Journal of Money, Credit and Banking*, June, 42(4), 551-83.
- Baba, Naohiko, Robert N. McCauley, and Srichander Ramaswamy. 2009. "US Dollar Money Market Funds and Non-US Banks," *BIS Quarterly Review*, March 2009, 65-81.
- Bord, Vitaly, and Joao Santos. 2014. "Banks' Liquidity and Cost of Liquidity for Corporations," *Journal of Money, Credit, and Banking*, 46(1), 13-45.
- Bottazzi, Jean-Marc, Jaime Luque, Mario Pascoa, and Suresh Sundaresan. 2012. "Dollar Shortage, Central Bank Actions, and the Cross Currency Basis," Working Paper, Columbia University.
- Brunnermeier, Markus. 2009. "Deciphering the Liquidity and Credit Crunch 2007-2008," *Journal of Economic Perspectives*, Winter.
- Carey, Mark, and Gregory Nini. 2007. "Is the Corporate Loan Market Globally Integrated? A Pricing Puzzle," *Journal of Finance*, 62(6), 2969-3001.
- Carvalho, Daniel, Miguel Ferreira, and Pedro Matos. 2011. "Lending Relationships and the Effect of Bank Distress: Evidence from the 2007-2008 Financial Crisis," *Journal of Financial and Quantitative Analysis*, forthcoming.

- Cetorelli, Nicola, and Linda S. Goldberg. 2011. "Global Banks and International Shock Transmission: Evidence from the Crisis," *International Monetary Fund Economic Review*, April 2011.
- Cetorelli, Nicola, and Linda S. Goldberg. 2012. "Liquidity Management of U.S. Global Banks: Internal Capital Markets in the Great Recession," *Journal of International Economics*, 88(2), 299–311.
- Cornett, Marcia, Jamie McNutt, Philip Strahan, and Hassan Tehranian. 2011. "Liquidity Risk Management and Credit Supply in the Financial Crisis," *Journal of Financial Economics*, 101(2) 297-312.
- Correa, Ricardo, Horacio Sapriza, and Andrei Zlate. 2013. "Liquidity Shocks, Dollar Funding Costs, and the Bank Lending Channel During the European Sovereign Crisis" Federal Reserve Board International Finance Discussion Papers
- Diamond, Douglas, and Raghuram Rajan. 2009. "The Credit Crisis: Conjectures about Causes and Remedies," *American Economic Review: Papers & Proceedings*, May.
- Duchin, Ran, Oguzhan Ozbas, and Berk Sensoy. 2010. "Costly External Finance, Corporate Investment, and the Subprime Mortgage Credit Crisis," *Journal of Financial Economics*, September, 97(3), 418-35.
- Federal Reserve. 2007. Press Release, <http://www.federalreserve.gov/newsevents/press/monetary/20071212a.htm>
- Gatev, Evan, Til Schuermann, and Philip Strahan. 2009. "Managing Bank Liquidity Risk: How Deposit-Loan Synergies Vary with Market Conditions," *Review of Financial Studies*, 22(3), 995-1020.
- Gatev, Evan, and Philip Strahan. 2006. "Banks' Advantage in Hedging Liquidity Risk: Theory and Evidence from the Commercial Paper Market," *Journal of Finance*, 61(2), 867-92.
- Giannetti, Mariassunta, and Luc Laeven. 2012. "Flight Home, Flight Abroad, and International Credit Cycles." *American Economic Review*, 102(3): 2019-24.
- Gorton, Gary. 2008. "The Panic of 2007," in *Maintaining Stability in a Changing Financial System*, a symposium sponsored by the Federal Reserve Bank of Kansas City, August 21-23.
- Goulding, William and Daniel E. Nolle. 2012. "Foreign Banks in the U.S.: A Primer," The International Finance Discussion Papers 2012-1064.
- Gozzi, Juan Carlos, and Martin Goetz. 2010. "Liquidity Shocks, Local Banks, and Economic Activity: Evidence from the 2007-2009 Crisis," Working Paper, Brown University.
- Greenlaw, David, Jan Hatzius, Anil Kashyap, and Hyun S. Shin. 2008. "Leveraged Losses: Lessons from the Mortgage Market Meltdown," US Monetary Policy Forum Report No. 2, February 2008.

- He, Zhiguo, In Gu Khang, and Arvind Krishnamurthy, 2010. "Balance Sheet Adjustment in the 2008 Crisis," *IMF Economic Review* 1, 118-156.
- Hrung, Warren, and Asani Sarkar. 2012. "The US Dollar Funding Premium of Global Banks," Working Paper, the Federal Reserve Bank of New York.
- Ivashina, Victoria. 2009. Asymmetric Information Effects on Loan Spreads. *Journal of Financial Economics* 92: 300-19.
- Ivashina, Victoria, and David Scharfstein. 2010. "Bank Lending during the Financial Crisis of 2008," *Journal of Financial Economics*, 97, 319-38.
- Ivashina, Victoria, David Scharfstein, and Jeremy Stein. 2012. "Dollar Funding and the Lending Behavior of Global Banks," Finance and Economics Discussion Series 2012-74, Board of Governors of the Federal Reserve System (U.S.).
- Kacperczyk, Marcin, and Philipp Schnabl. 2010. "When Safe Proved Risky: Commercial Paper during the Financial Crisis of 2007-2009," *Journal of Economic Perspectives*, Winter.
- Kashyap, Anil, Raghuram Rajan, and Jeremy Stein. 2002. "Banks as Liquidity Providers: An Explanation for the Coexistence of Lending and Deposit-Taking," *Journal of Finance*, 57(1), 33-74.
- Krishnamurthy, Arvind. 2010. "How Debt Markets Have Malfunctioned in the Crisis," *Journal of Economic Perspectives*, 24(1): 3-28.
- Liu, Yian. 2011. "Universal Banking Spillovers: Evidence from Financial Crises," Cox School of Business AFA 2012 Chicago Meetings Paper.
- McGuire, Patrick, and Goetz von Peter. 2009. "The US Dollar Shortage in Global Banking," BIS Quarterly Review, March 2009, Bank for International Settlements.
- Paravisini, Daniel, Veronica Rappoport, Philipp Schnabl, and Daniel Wolfenzon. 2014. "Dissecting the Effect of Credit Supply on Trade: Evidence from Matched Credit-Export Data," *Review of Economic Studies*, forthcoming.
- Pennacchi, George. 2006. "Deposit Insurance, Bank Regulation, and Financial System Risks," *Journal of Monetary Economics*, 53 (1), 1-30.
- Shin, Hyun. 2012. "Global Banking Glut and Loan Risk Premium," Mundell-Fleming Lecture, *IMF Economic Review*, 60: 155-192, July 2012.

Appendix A: Variable Definitions

Variable	Definition
Changes in Funding (2007Q2 and 2007Q3)	
<i>US Deposits</i>	Total noninterest-bearing (including total demand deposits and noninterest-bearing time and savings deposits) and interest-bearing deposits (FR Y-9C: bhdm6631, bhdm6636, bhfn6631, bhfn6636; FFIEC 031: rcon6631, rcon6636, rcfn6631, rcfn6636; FFIEC 002: rcfd2205)
<i>Repo Net</i>	Amount of securities sold under agreements to repurchase less securities bought under agreements to repurchase (FR Y-9C: bhckb995, -bhckb989; FFIC 031: rcfdb995, -rcfdb989; FFIEC 002: rcfdc422, rcfdc423, -rcfdc414, -rcfdc415)
<i>Fed Funds Net</i>	Fed funds purchased less fed funds sold in domestic offices (FR Y-9C: bhdm993, -bhdm987; FFIEC 031: rconb993, -rconb987; FFIEC 002: rcfdc420, rcfdc421, -rcfdc412, -rcfd856, -rcfdc413)
<i>Other Borrowed Money (less FHLB Advances)</i>	Borrowed money from nonrelated commercial banks and others less FHLB advances (<i>Other Borrowed Money</i> defined as FFIEC031: rcfd055, rcfd056, rcfd057, rcfd058)
<i>Cash and Balances</i>	Cash and balances due from depository institutions (FR Y-9C: bhck0081, bhck0395, bhck0397; FFIEC 031/FFIEC 002: rcfd0010)
<i>Available for Sale Securities</i>	Securities that are available for sale (FR Y-9C: bhck1773; FFIEC 031/ FFIEC 002: rcfd1773)
<i>Demand Deposits</i>	Demand deposits (FR Y-9C: bhcb2210; FFIEC 031/FFIEC 002: rcon2210)
<i>Core Deposits</i>	The sum of deposits under \$100,000 plus all transaction deposits
<i>Time Deposits (<\$100K)</i>	Total time deposits of less than \$100,000 (FR Y-9C: bhcb6648, bhod6648; FFIEC 031/ FFIEC 002: rcon6648)
<i>Time Deposits (>\$100K)</i>	Total time deposits of more than \$100,000 (FR Y-9C: bhcb2604, bhod2604; FFIEC 031/ FFIEC 002: rcon2604)
<i>Other Deposits</i>	NOW, ATS, and other transaction accounts; money market deposit accounts and other savings accounts not classified as demand deposits or time deposits
<i>Total Private Funding</i>	Sum of changes in <i>Fed Funds Net</i> , <i>Total US Deposits</i> , <i>Repo Net</i> , <i>Cash and Balances</i> , <i>Available for Sale Securities</i> , and <i>Other Borrowed Money (less FHLB Advances)</i>
<i>Discount Window</i>	The sum of primary credit borrowing at the Discount Window; excludes borrowing done through secondary credit and seasonal credit lending (Proprietary FR Database).
<i>FHLB Advance</i>	Federal Home Loan Advances over all maturities (FFIEC 031; rcon2651, rconb565, rcfdb566)
<i>Total pre-TAF Gov. Funding</i>	Sum of changes in <i>Discount Window</i> and <i>FHLB Advance</i>
<i>TAF</i>	Sum of loans awarded through TAF auctions. (data are publicly available through: http://www.federalreserve.gov/newsevents/reform_taf.htm)
<i>Total pre-TAF Funding</i>	Sum of <i>Total pre-TAF Gov. Funding</i> and <i>Total Private Funding</i> .
Changes in Funding (Jun 27, Aug 1, Aug 15, and Sep 26 of 2007)	
<i>Net Due From (To) Related Institutions</i>	The amount that is sent to (received from) related institutions that are not US banks (FR 2644: walb2154, -walb2944; FR 2069: wrss2163, -wrss2941)
<i>Borrowing from US Commercial Banks</i>	The change in the amount borrowed in aggregate from other US banks (FR 2644: walba286; FR 2069: wrssa286)

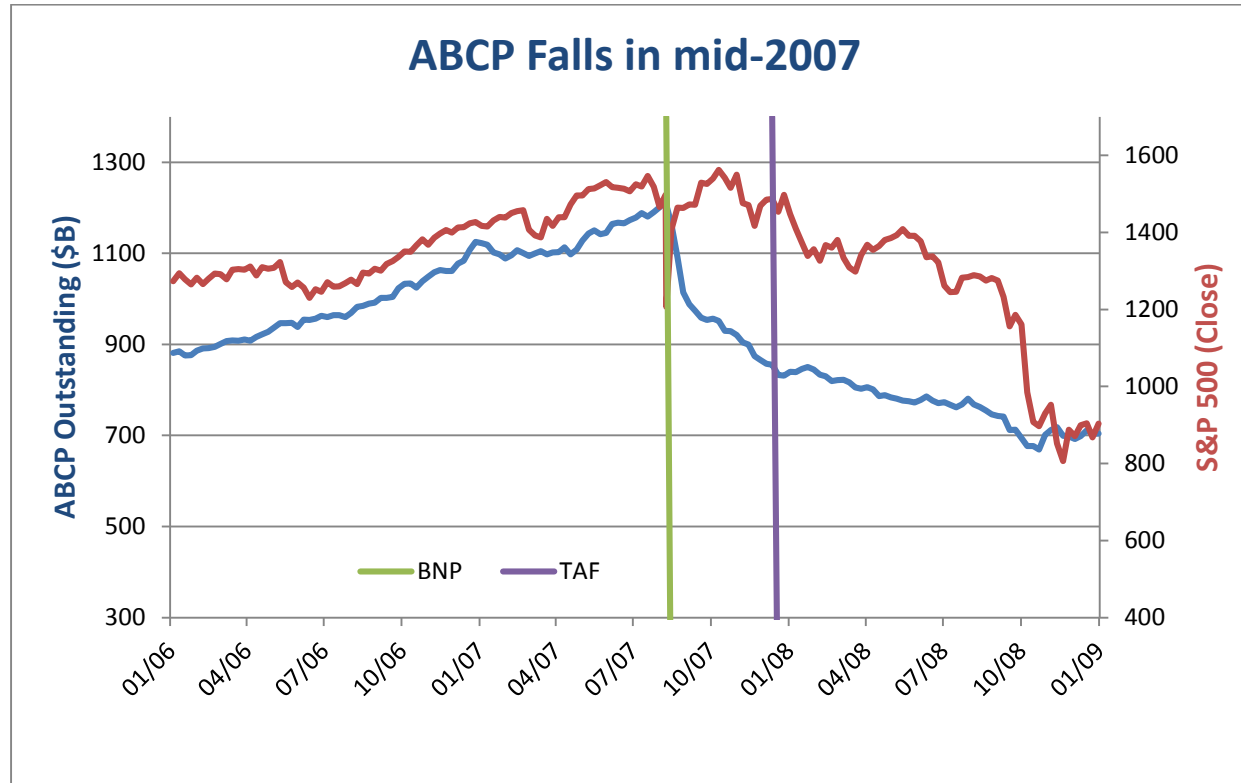
Appendix A: Variable Definitions (cont.)

Variable	Definition
<i>DealScan</i>	
<i>Spread</i>	All-in-drawn spread (in basis points) corresponding to the total cost (interest rate and fees) paid over LIBOR for each dollar drawn down under the loan facility
<i>Amount</i>	Logarithm of the total loan facility
<i>Maturity</i>	Maturity of the facility in months
<i>Unsecured</i>	Dummy variable equal to 1 if the loan is either not secured
<i>Number of Lenders</i>	Number of lenders in the syndicate
<i>Borrower Industry</i>	Dummy variables for the 1-digit SIC industry code of the borrower
<i>Deal Purpose</i>	Dummy variables for the loan purpose, aggregated to business purposes, project financing, deal, or other (CP backup, IPO related finance, pre-export, securities purchase, undisclosed, guarantee, lease finance, or other)
<i>Leverage</i>	Sales divided by package amount
<i>Rating</i>	Dummy variables for Moody's Bank Loan Rating (20 dummies). If the Moody's Bank Loan Rating is not available, we use the first available of the following ratings: S&P Loan Rating equivalent, Moody's Senior Debt, S&P Senior Debt, Fitch Senior Debt, Fitch Long-term Borrower Rating, and S&P Long-term Borrower Rating
<i>No Loan Rating</i>	Dummy variable equal to 1 if the loan and borrower are not rated
<i>Refinancing Variables</i>	
<i>Risk Price</i>	Spread of Moody's seasoned Baa corporate bond yield less the Moody's seasoned Aaa corporate bond yield at the issuance date of the original loan

Appendix B: Availability of Information on Sources of Funding Liquidity

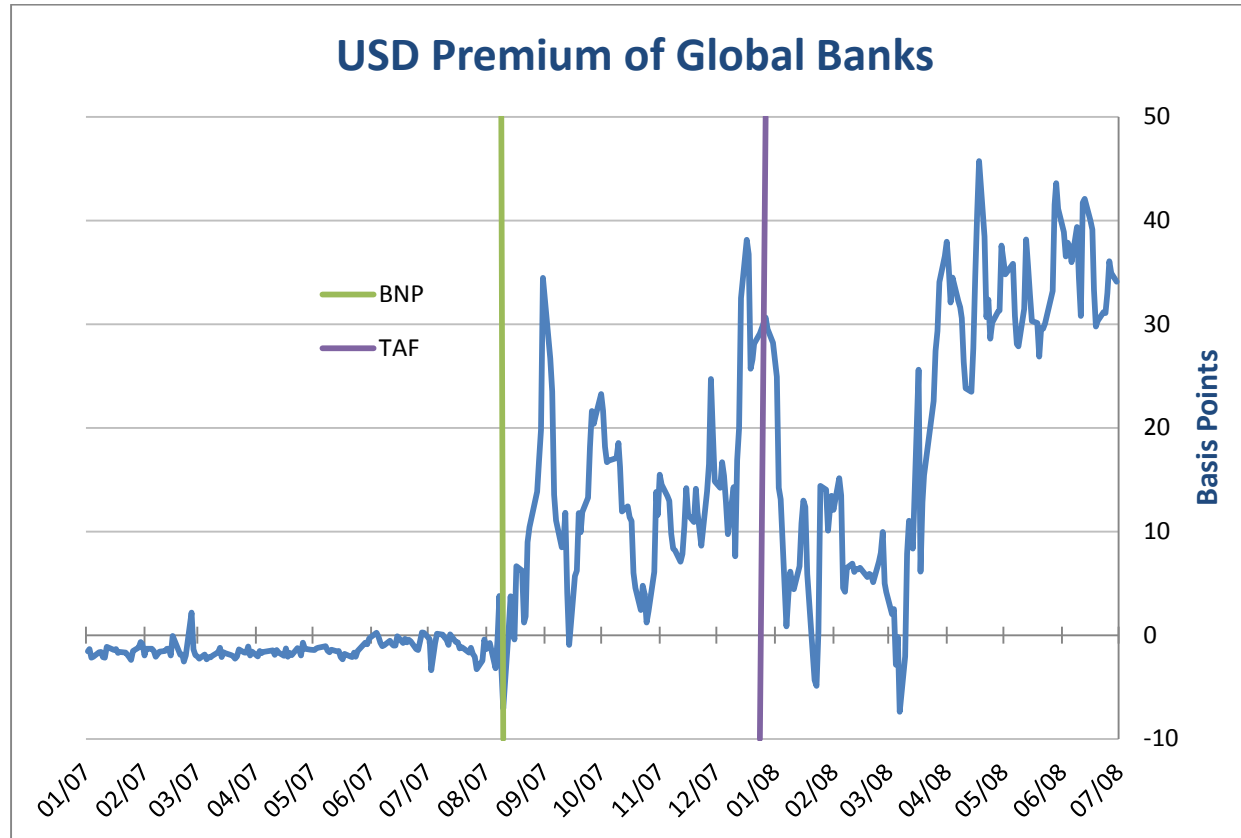
Source of ST liquidity	Data	Not Captured
<i>Private</i>		
<i>Cash</i>	Quarterly (includes non-dollar denominated currency and coin, and cash in interest-bearing balances offshore)	USD held outside of US (at FBO headquarters, etc.)
<i>AFS Securities</i>	Quarterly	AFS securities at FBO headquarters, disaggregated AFS holdings at the domestic branch and offices of foreign banks (002 filers)
<i>Fed Funds Net</i>	Quarterly at US regulated subsidiary only	
<i>Repo</i>	Quarterly	Repo of assets at foreign headquarters
<i>US Deposits (including Demand Deposits, Time Deposits, and Other Deposits)</i>	Quarterly	USD deposits held at FBO level (the Y-7Q reports figures at the FBO level but does not detail deposit figures)
<i>Government</i>		
<i>Discount Window</i>	Daily (access only for US depository institutions, and US branches and agencies of foreign banks that hold reserves)	None
<i>TAF</i>	Daily (access for US depository institutions and US branches and agencies of foreign institutions in good standing and maintaining deposits subject to reserve requirements)	None
<i>FHLB Advances</i>	Quarterly (access only for member US commercial banks and BHCs)	None

Figure 1



Adapted from Acharya, Schnabl, and Suarez (2013). The red line is the level of the S&P 500 at close; the blue line is the total amount of ABCP outstanding in billions USD; the green line indicates August 9, 2007, when BNP Paribas suspended withdrawals from 3 subprime mortgage backed funds; the purple line indicates December 12, 2007, when the Federal Reserve announced the TAF to alleviate pressure in short-term funding markets.

Figure 2



Adapted from Hrungrung and Sarkar (2012). Data are daily from January 1, 2007 to June 30, 2008. The blue line measures CIP deviations for USD loans; the green line indicates August 9, 2007, when BNP Paribas suspended withdrawals from 3 subprime mortgage backed funds; the purple line indicates December 12, 2007, when the Federal Reserve announced the TAF to alleviate pressure in short-term funding markets.

Table 1: Summary Statistics

	Full Sample	ABCP-exposed			Foreign		
		All	Foreign	Domestic	All	ABCP	No ABCP
ABCP Outstanding (\$B)	1 (6)	15 (18)	11 (11)	23 (29)	2 (6)	11 (11)	
ABCP (%)	0 (3)	4 (13)	4 (15)	3 (2)	1 (6)	4 (15)	
Total Assets (\$B)	90 (284)	873 (636)	940 (625)	698 (664)	273 (452)	940 (625)	136 (241)
US Assets (\$B)	25 (131)	270 (449)	105 (147)	698 (664)	23 (71)	105 (147)	6 (15)
Tier 1 Capital Ratio (%)	8 (7)	5 (10)	4 (11)	6 (2)	4 (7)	4 (11)	4 (4)
N	585	36	26	10	153	26	127

Table 1 displays summary statistics of bank characteristics. Summary statistics are reported separately for exposed banks and foreign banks. Characteristics are *ABCP Outstanding*, the amount of US ABCP outstanding in billions; *ABCP*, the highholder bank's US ABCP (from Moody's Investor Service and Bankscope as detailed in Acharya and Schnabl (2010)) normalized by its total 2006Q4 assets (from regulatory reports, Bankscope, and Capital IQ); *Total Assets*, the total 2006Q4 assets of the consolidated bank in billions USD (from Bankscope); *US Assets*, the 2006Q4 US assets of the bank in billions USD (from regulatory reports); and *Tier 1 Capital Ratio*, the bank's Tier 1 regulatory capital over risk-weighted assets for 2006Q4. Standard deviations are in parentheses.

Table 2, Panel A: Changes in Funding (2007Q3 - 2007Q2, \$M)

	ABCP-Exposed			Foreign			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Full Sample	All	Foreign	Domestic	All	ABCP	No ABCP
<u>Short-term assets</u>							
Cash and Balances	-13 (870)	-278 (3,442)	450 (2,384)	-2,173 (4,976)	69 (1,023)	450 (2,384)	-10 (313)
AFS Securities	41 (1,357)	-90 (3,601)	-25 (1,657)	-257 (6,539)	218 (1,603)	-25 (1,657)	268 (1,594)
<u>Short-term liabilities</u>							
Fed Funds Net	-38 (914)	-425 (3,046)	-679 (3,151)	234 (2,797)	-201 (1,531)	-679 (3,151)	-104 (895)
Repo Net (Sold - Purchased)	-58 (2,227)	-1,026 (8,754)	506 (5,148)	-5,010 (14,142)	28 (2,311)	506 (5,148)	-70 (1,062)
Total US Deposits	427 (3,329)	3,835 (10,944)	2,590 (8,925)	7,071 (15,112)	918 (4,719)	2,590 (8,925)	576 (3,219)
Demand Deposits	-58 (323)	-342 (729)	-175 (471)	-778 (1,076)	-39 (213)	-175 (471)	-11 (78)
Core Deposits	-23 (351)	-279 (574)	-217 (553)	-441 (628)	-47 (248)	-217 (553)	-12 (81)
Time Deposits (<\$100K)	48 (374)	216 (748)	-14 (106)	515 (1,085)	-5 (66)	-14 (106)	1 (15)
Time Deposits (>\$100K)	270 (2,353)	2,770 (8,020)	2,532 (8,971)	3,389 (5,099)	808 (4,285)	2,532 (8,971)	455 (2,334)
Other Deposits	180 (1,973)	1,344 (6,842)	275 (1,764)	4,123 (12,709)	157 (1,511)	275 (1,764)	133 (1,461)
Other Borrowed Money	149 (2,826)	2,372 (11,187)	-1,328 (5,343)	11,991 (16,279)	-213 (2,265)	-1,328 (5,343)	15 (462)
Total Private Funding	451 (5,708)	5,124 (21,519)	665 (9,776)	16,717 (36,450)	245 (4,753)	665 (9,776)	159 (2,872)
<u>Memo</u>							
US Assets	986 (8,031)	10,877 (30,004)	4,984 (21,988)	26,198 (42,389)	1,338 (9,563)	4,984 (21,988)	592 (3,331)
N	585	36	26	10	153	26	127

Table 2, Panel A displays changes in private funding for the entire sample (585 banks, 36 ABCP-exposed banks, 153 foreign banks). Summary statistics are reported separately for exposed banks and foreign banks. Detailed definitions of variables are in Appendix A. All values are in millions USD. Standard deviations are in parentheses.

Table 2, Panel B: Changes in Funding, H.8 FR 2644 Subsample (\$M)

	Full Sample	ABCP-Exposed			Foreign		
		All	Foreign	Domestic	All	ABCP	No ABCP
<i>Change from Jun 27, 2007 to Sep 26, 2007</i>							
Net Due From Related Institutions	48 (850)	501 (1390)	623 (1536)	11 (15)	269 (2024)	623 (1536)	-15 (2331)
Net Due To Related Institutions	-37 (569)	-205 (1659)	-255 (1859)	-5 (12)	-216 (1351)	-255 (1859)	-184 (768)
Net Due To Less From	-85 (1018)	-706 (2103)	-878 (2329)	-16 (25)	-485 (2401)	-878 (2329)	-169 (2451)
Borrowing from US Commercial Banks	84 (651)	778 (1626)	659 (1217)	1,252 (2859)	407 (978)	659 (1217)	205 (691)
N	306	30	24	6	54	24	30
<i>Change from Aug 1, 2007 to Aug 15, 2007</i>							
Net Due From Related Institutions	4 (3524)	-2,027 (7150)	-2,606 (8005)	93 (187)	0 (8858)	-2,606 (8005)	2,205 (9091)
Net Due To Related Institutions	84 (1235)	915 (3623)	1,466 (3795)	-1,106 (2037)	705 (2891)	1,466 (3795)	61 (1634)
Net Due To Less From	80 (3619)	2,942 (7950)	4,071 (8606)	-1,200 (2001)	705 (9026)	4,071 (8606)	-2,144 (8517)
Borrowing from US Commercial Banks	100 (1650)	595 (4478)	-219 (1625)	3,580 (9144)	-38 (1177)	-219 (1625)	115 (577)
N	298	28	22	6	48	22	26

Panel B displays summary statistics of changes in funding for the H.8 FR 2644 subsamples (306 and 298 banks with 30 and 28 ABCP-exposed banks and 54 and 48 foreign banks, respectively). Summary statistics are reported separately for exposed banks and foreign banks. Detailed definitions of variables are in Appendix A. All values are in millions USD. Standard deviations are in parentheses.

Table 3: Determinants of Changes in Funding

	Short-term assets		Short-term liabilities						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Cash and Balances	AFS Securities	Fed Funds Net (Purchased – Sold)	Repo Net (Sold – Purchased)	Total US Deposits	Time (<\$100K)	Core Deposits	Total Deposits – Core Deposits	Other Borrowed Money
ABCP (%)	-0.9 (50.5)	-105.6 (97.2)	-145.7 (166.0)	-204.2* (114.2)	18.0 (184.1)	-76.1 (104.0)	15.1 (90.8)	2.9 (147.4)	127.1 (103.6)
For_DUM	1396.5 (924.1)	-517.9 (622.1)	948.0 (2274.9)	247.6 (456.6)	2797.4 (1720.0)	-769.5* (405.5)	-286.2 (538.9)	3083.7* (1668.7)	114.8 (505.0)
ABCP (%) * For_DUM	-23.4 (57.4)	100.6 (96.4)	70.7 (182.6)	35.8 (113.3)	-276.4 (188.8)	203.2 (124.5)	-11.2 (91.9)	-265.2* (153.2)	-113.7 (104.5)
Log US Assets (\$B)	293.4 (189.7)	32.2 (134.1)	359.8 (444.1)	142.4 (113.0)	682.3* (352.8)	-99.6 (173.6)	-66.0 (73.5)	748.4** (349.1)	67.1 (104.8)
Log Assets (\$B)	-310.2 (214.8)	-26.4 (133.8)	-267.4 (540.6)	-99.7 (99.4)	-807.9** (397.5)	6.1 (66.0)	-23.9 (110.9)	-784.0** (385.2)	-48.8 (116.6)
Constant	80.3 (362.8)	624.2 (499.4)	-448.6 (1269.2)	-84.6 (263.2)	1827.1* (995.3)	1557.3 (1082.9)	1014.9 (864.3)	812.1 (982.2)	-42.2 (217.7)
N	585	585	585	585	585	466	585	585	585
Adjusted R ²	0.015	-0.004	0.002	0.107	0.023	-0.009	-0.008	0.024	-0.001

Table 3 displays univariate regression results on changes in private funding. Each dependent variable is normalized by the highholder bank's total 2006Q4 assets; they are quarterly changes from 2007Q2 to 2007Q3 in millions USD of (1) *Cash and Balances*, the cash and balances due from depository institutions; (2) *AFS Securities*, the amount of available-for-sale securities; (3) *Fed Funds Net (Purchased -Sold)*, the amount of fed funds purchased (borrowed) less the amount sold (lent); (4) *Repo Net (Sold-Purchased)*, the amount of securities sold under agreements to repurchase less the securities bought under agreements to repurchase; (5) *Total US Deposits*, total US Deposits; (6) *Time (<\$100K)*, the total time deposits of less than \$100,000; (7) *Core Deposits*, the amount of transaction deposits and insured time deposits; (8) *Total Deposits - Core Deposits*, the amount of total deposits less core deposits; and (9) *Other Borrowed Money*, the amount of borrowed money from nonrelated commercial banks and others less the FHLB advances. The independent variables are *ABCP (%)*, the highholder bank's US ABCP normalized by its total 2006Q4 assets; *For_DUM*, a dummy variable equal to 1 if the highholder bank is foreign; *ABCP (%) * For_DUM*, the interaction between *ABCP* and *For_DUM*; *Log US Assets*, the natural logarithm of the 2006Q4 US assets of the bank in billions USD (from regulatory reports and Bankscope); and *Log Assets*, the natural logarithm of the total 2006Q4 assets of the consolidated bank in billions USD (from regulatory reports, Bankscope, and Capital IQ). Detailed definitions of variables are in Appendix A. Robust standard errors are in parentheses; *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 4, Panel A: Changes in Government Funding (\$M)

	Full Sample	ABCP-Exposed			Foreign		
		All	Foreign	Domestic	All	ABCP	No ABCP
Discount Window	22 (242)	183 (560)	79 (424)	453 (778)	21 (192)	79 (424)	10 (89)
FHLB Advance	137 (1,019)	1,403 (3,686)	97 (549)	4,797 (5,853)	29 (268)	97 (549)	15 (161)
Total pre-TAF Gov. Funding	159 (1,133)	1,586 (3,928)	176 (663)	5,250 (6,175)	51 (323)	176 (663)	25 (187)
TAF	42 (247)	262 (549)	362 (621)	4 (8)	152 (459)	362 (621)	109 (408)
Total pre-TAF Funding	610 (6,354)	6,709 (23,759)	841 (10,005)	21,967 (39,484)	296 (4,829)	841 (10,005)	184 (2,863)

Table 4, Panel A displays summary statistics of changes in government funding for the entire sample (585 banks, 36 ABCP-exposed banks, 153 foreign banks). Summary statistics are reported separately for exposed banks and foreign banks. Detailed definitions of variables are in Appendix A. All values are in millions USD. Standard deviations are in parentheses.

Table 4, Panel B: Determinants of Changes in Government Funding

	(1)	(2)	(3)	(4)
	FHLB Advances	Discount Window	TAF	TAF + FHLB Advances
ABCP (%)	64.6 (121.1)	-0.1 (11.0)	-22.4** (11.0)	42.2 (118.4)
For_DUM	-595.7*** (91.2)	-30.3* (18.0)	87.9 (94.7)	-507.8*** (133.4)
ABCP (%) * For_DUM	-65.6 (120.9)	-0.2 (10.9)	20.0* (10.2)	-45.7 (118.1)
Log US Assets (\$B)	13.7 (14.9)	4.2 (4.0)	32.5 (25.2)	46.2 (29.3)
Log Assets (\$B)	3.6 (11.7)	4.0 (3.3)	-15.7 (20.1)	-12.1 (23.2)
Constant	463.8** (234.8)	-40.8 (54.5)	-105.0* (56.0)	358.8 (248.9)
N	585	585	585	585
Adjusted R ²	0.020	-0.005	0.005	0.016

Table 4, Panel B displays univariate regression results on changes in government funding. Each dependent variable is normalized by the bank's total 2006Q4 assets; they are (1) *FHLB Advances*, the sum of all FHLB advances; (2) *Discount Window*, the borrowing amount of primary credit at the discount window excluding all borrowing done through secondary credit and seasonal credit lending programs; (3) *TAF*, the amount borrowed from the Term Auction Facility auctions held on December 17th and 20th of 2007; and (4) *TAF + FHLB Advances*, the sum of *TAF* borrowing and the change in *FHLB Advances*. The independent variables are *ABCP*, the highholder bank's US ABCP normalized by its total 2006Q4 assets; *For_DUM*, a dummy variable equal to 1 if the highholder bank is foreign; *ABCP (%) * For_DUM*, the interaction between *ABCP* and *For_DUM*; *Log US Assets*, the natural logarithm of the 2006Q4 US assets of the bank in billions USD (from regulatory reports and BankScope); and *Log Assets*, the natural logarithm of the total 2006Q4 assets of the consolidated bank in billions USD (from regulatory reports, BankScope, and CapIQ). Detailed definitions of variables are in Appendix A. Robust standard errors are in parentheses; *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 5: Mismatch between USD Underwriting and US Assets

	Sum	Means	
	Amount (\$B)/No. lenders	% of Total Assets	% of US Assets
Domestic, ABCP	2,625.0	37.0	37.0
Domestic, No ABCP	832.5	40.9	40.9
Foreign, ABCP	2,928.8	14.6	190.0
Foreign, No ABCP	671.4	12.8	422.6
<i>Revolvers</i>			
Domestic, ABCP	1,585.3	23.7	23.7
Domestic, No ABCP	481.9	22.8	22.8
Foreign, ABCP	1,553.6	7.7	96.3
Foreign, No ABCP	344.4	4.5	158.5
<i>25% * Revolvers + 5% * Term Loans</i>			
Domestic, ABCP	438.1	6.5	6.5
Domestic, No ABCP	135.9	6.5	6.5
Foreign, ABCP	445.2	2.2	27.8
Foreign, No ABCP	100.0	1.5	51.7

Table 5 displays summary statistics on the mismatch between USD underwriting and US regulated assets. The sample includes all outstanding USD currency denominated loans in DealScan made by the 603 banks in our panel, defined as any facility with a start date before August 9, 2007 and an end date after August 9, 2007 (N=146,492 facility-lenders). The columns display sums of outstanding amounts (in billions USD) over number of lenders, as well as mean outstanding amounts as a percentage of total bank assets and US bank assets. *Domestic, ABCP* are domestic headquartered banks with exposure to US ABCP; *Domestic, No ABCP* are domestic headquartered banks with no exposure to US ABCP; *Foreign, ABCP* are foreign headquartered banks with exposure to US ABCP; *Foreign, No ABCP* are foreign-headquartered banks with no exposure to US ABCP.

Table 6, Panel A: Summary Statistics of Syndicate Lending Terms by Currency

	USD Loans			Euro Loans		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
<u>Pre-Paribas</u>						
Amount (\$M)	2,047	396.4	993.8	114	556.8	1,187.0
Spread (bps)	2,047	224.3	149.0	114	236.4	131.9
Maturity (yrs.)	2,047	5.1	1.6	114	6.8	2.0
<i>Lender Underwriting</i>						
S_Foreign	2,047	33.6	30.4	114	76.9	30.8
S_ABCP * S_Foreign	2,047	25.4	26.6	114	53.5	26.8
S_ABCP	2,047	69.8	29.4	114	68.2	25.1
<u>Post-Paribas</u>						
Amount (\$M)	668	533.6	1,180.3	34	1,099.7	1,539.4
Spread (bps)	668	197.3	155.1	34	218.2	187.9
Maturity (yrs.)	668	4.7	1.6	34	6.7	2.0
<i>Lender Underwriting</i>						
S_Foreign	668	31.9	30.8	34	83.6	19.9
S_ABCP * S_Foreign	668	24.4	25.4	34	44.1	27.9
S_ABCP	668	69.5	27.4	34	56.4	27.5

Table 6, Panel B: Summary Statistics of Syndicate Lending Terms by Currency-Headquarters

	Foreign			Domestic		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.
USD Loans						
<u>Pre-Paribas</u>						
Amount (\$M)	4,496	864.6	1,309.4	6,486	611.8	1,108.4
Spread (bps)	4,496	156.2	125.1	6,486	172.2	126.2
Maturity (yrs.)	4,496	5.1	1.5	6,486	5.1	1.4
<u>Post-Paribas</u>						
Amount (\$M)	1,891	824.7	1,143.9	2,432	739.6	1,342.6
Spread (bps)	1,891	133.6	114.6	2,432	158.0	134.5
Maturity (yrs.)	1,891	4.8	1.5	2,432	4.8	1.4
Euro Loans						
<u>Pre-Paribas</u>						
Amount (\$M)	511	953.3	1,348.9	124	897.4	1,749.9
Spread (bps)	511	183.9	136.3	124	228.7	128.9
Maturity (yrs.)	511	5.9	2.5	124	5.9	2.2
<u>Post-Paribas</u>						
Amount (\$M)	242	940.2	976.7	39	1,690.8	1,689.6
Spread (bps)	242	152.0	119.7	39	184.4	192.6
Maturity (yrs.)	242	6.1	1.5	39	5.6	2.2

Table 6, Panel A shows lending summary statistics by currency and Table 6, Panel B shows similar statistics further split by bank headquarters. The sample is the 16,221 facilities underwritten by the 603 matched banks in our panel between January 1 and December 12, 2007, and denominated in USD, Euros, or British pounds. Statistics are presented for loans made by foreign and domestic banks. *Amount* is the amount of the loan facility in millions USD. Euro/GBP loans are converted by LPC using the currency conversion rate at the facility start date. *Spread* is the all-in-drawn spread from DealScan in basis points. *Maturity* is the maturity of the loan in years. $S_{Foreign}$ is the percentage of banks in the syndicate that are foreign. S_{ABCP} is the percentage of banks in the syndicate in the syndicate that have any US ABCP exposure. $S_{ABCP} * S_{Foreign}$ is the interaction of these two variables.

Table 7: Loan Terms Pre and Post ABCP Shock (Facility Level)

	(1)	(2)	(3)	(4)	(5)	(6)
	Spread		Amount		Maturity	
Post	-57.45*	-599.1***	0.192	8.638***	-7.809	-200.9***
	(30.21)	(166.2)	(0.893)	(1.891)	(14.01)	(23.03)
Post * USD	52.99	594.1***	-0.225	-8.653***	3.811	195.2***
	(32.52)	(166.7)	(0.910)	(1.892)	(14.25)	(23.07)
Post * S_ABCP	124.7**	1243.6***	0.699	-8.386***	9.822	245.3***
	(61.36)	(256.8)	(1.217)	(2.710)	(20.09)	(36.92)
Post * USD * S_ABCP	-104.3	-1217.2***	-0.332	8.753***	-6.893	-242.8***
	(63.90)	(257.3)	(1.231)	(2.712)	(20.35)	(36.99)
USD	49.26***	5.786	-0.612***	-0.728	-15.83***	-19.14*
	(12.94)	(28.17)	(0.161)	(0.500)	(3.390)	(9.879)
S_Foreign	-18.33	-91.02**	-0.153	-0.758	8.706***	11.18
	(17.93)	(36.25)	(0.172)	(0.630)	(2.422)	(11.91)
S_ABCP	-18.50	-71.82**	0.0903	0.0401	-1.472	-5.840
	(12.84)	(32.96)	(0.120)	(0.674)	(2.049)	(17.40)
S_ABCP * S_Foreign	39.24*	129.9**	0.580***	1.297	-6.565**	-11.79
	(22.85)	(52.41)	(0.214)	(1.092)	(3.200)	(20.13)
Post * S_Foreign		578.0***		-8.680***		200.8***
		(178.0)		(2.007)		(25.11)
Post * S_ABCP * S_Foreign		-1283.2***		9.161***		-246.9***
		(297.9)		(3.284)		(44.68)
Post * USD * S_Foreign		-578.4***		8.573***		-193.5***
		(185.2)		(2.022)		(25.11)
Post * S_Foreign * Exposed * USD		1268.7***		-9.082***		245.4***
		(305.6)		(3.307)		(44.85)
USD * S_Foreign		78.11*		0.712		-5.321
		(43.23)		(0.654)		(12.26)
USD * S_ABCP		51.85		0.0516		4.420
		(35.26)		(0.682)		(17.54)
USD * S_ABCP * S_Foreign		-91.07		-0.809		6.639
		(58.52)		(1.112)		(20.46)
Loan and Lender Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	2863	2863	2863	2863	2863	2863
Adjusted R ²	0.474	0.477	0.498	0.499	0.316	0.321

Table 7 shows the results of regressions for 2,863 syndicated loan facilities underwritten by the 603 banks in our panel between January 1 and December 12, 2007. The dependent variables are *Spread*, the all-in-drawn spread in basis points; *Amount*, the natural logarithm of facility amount; and *Maturity*, the maturity of the facility in months. Each specification includes the following loan level controls: a dummy variable equal to 1 if the loan is denominated in USD, the spread (if the dependent variable is not *Spread*), the natural logarithm of loan amount (if not *Amount*), maturity (if not *Maturity*), an unsecured dummy, the number of lenders in the facility, the number of facilities in the loan package, deal purpose, loan type, and loan rating (a categorical variable). Each specification also controls for borrower characteristics with borrower sales divided by package amount and fixed effects for the 1-digit SIC code of the borrower. Finally, each controls for lender specialization in a 2-digit SIC code and recent loan activity in a given currency. Detailed definitions of variables are provided in Appendix A. *Post* is equal to 1 if the loan start date occurs after August 9, 2007. *USD* is a dummy variable equal to 1 if the loan is denominated in USD. *S_Foreign* is the percentage of banks in the syndicate that are foreign. *S_ABCP* is the percentage of banks in the syndicate that have any US ABCP exposure. Robust standard errors clustered on package are in parentheses; *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 8: Spread Pre and Post ABCP Shock

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					Relationship	No Relationship	Public	Private
Post	-18.52 (26.96)	-11.91 (27.47)	-16.94 (19.16)	-35.41 (27.54)	-88.83** (38.70)	-9.816 (35.31)	-40.51 (40.16)	-44.88 (50.14)
Post * USD	21.49 (27.36)	18.65 (27.61)	25.36 (19.56)	45.30 (27.87)	89.72** (39.29)	23.06 (35.84)	45.94 (39.93)	71.26 (51.34)
Post * ABCP	12.54 (10.70)	62.28* (33.96)	14.78 (14.40)	78.21** (31.82)	89.05** (34.55)	93.15** (45.64)	70.23*** (25.61)	94.54 (58.87)
Post * USD * ABCP	-7.403 (11.47)	-56.77* (34.08)	-13.77 (14.33)	-74.65** (32.04)	-78.06** (35.35)	-92.35** (46.27)	-60.40** (25.77)	-104.9* (59.98)
USD	21.71* (12.94)	-4.408 (23.46)	22.88* (12.36)	11.23 (22.50)	-50.26 (35.25)	45.36** (21.79)	-8.025 (31.82)	37.52 (31.38)
Foreign	-8.900* (4.607)	-34.50 (23.79)						
ABCP	-1.745 (2.747)	-18.21 (14.24)						
ABCP * Foreign	4.796 (3.524)	17.57 (14.78)						
Post * Foreign		-9.765 (38.20)		22.41 (33.68)	110.6** (54.43)	-1.117 (42.58)	85.22** (34.73)	30.67 (53.73)
Post * ABCP * Foreign		-54.04 (40.73)		-75.42** (35.22)	-126.7*** (47.20)	-86.32* (52.44)	-38.33 (33.85)	-120.7* (63.04)
Post * USD * Foreign		-0.631 (39.14)		-27.04 (34.87)	-97.34* (55.05)	-12.08 (44.56)	-82.64** (35.36)	-27.79 (56.36)
Post * Foreign * Exposed * USD		55.27 (41.38)		71.31** (35.59)	105.1** (47.81)	90.95* (52.52)	30.37 (34.45)	112.5* (63.45)
USD * Foreign		29.63 (23.89)		16.78 (23.07)	87.67** (43.19)	2.118 (22.22)	45.08 (31.38)	7.995 (34.45)
USD * ABCP		16.31 (14.66)		4.299 (15.39)	62.78** (28.34)	-17.26 (21.57)	18.92 (21.27)	-14.92 (21.06)
USD * ABCP * Foreign		-13.05 (14.99)		-5.974 (15.39)	-71.57** (31.46)	5.139 (21.74)	-11.02 (21.87)	-9.092 (23.19)
Loan Level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender Fixed Effects	No	No	Yes	Yes	Yes	Yes	Yes	Yes
N	16221	16221	16221	16221	8443	7778	10654	5567
Adjusted R ²	0.532	0.533	0.550	0.550	0.568	0.524	0.588	0.440

Table 8: Spread Pre and Post ABCP Shock (cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
					Relationship	No Relationship	Public	Private
<u>Marginal Effects</u>								
<i>ABCP-exposed</i>								
Domestic Lender, USD Loan	8.11	12.25	9.43	13.45	11.88	14.04	15.26	16.02
Domestic Lender, Euro Loan	-5.98	50.37	-2.16	42.80	0.22	83.33	29.72	49.66
Foreign Lender, USD Loan	8.11	3.08	9.43	4.71	3.54	5.48	9.88	10.70
Foreign Lender, Euro Loan	-5.98	-13.44	-2.16	-10.21	-15.88	-4.10	76.61	-40.37
<i>Not ABCP-exposed</i>								
Domestic Lender, USD Loan	2.97	6.74	8.42	9.89	0.89	13.24	5.43	26.38
Domestic Lender, Euro Loan	-18.52	-11.91	-16.94	-35.41	-88.83	-9.816	-40.51	-44.88
Foreign Lender, USD Loan	2.97	-3.66	8.42	5.26	14.15	0.05	8.01	29.26
Foreign Lender, Euro Loan	-18.52	-21.68	-16.94	-13.00	21.77	-10.93	44.71	-14.21

Table 8 shows the results of regressions for 16,221 syndicated loan facilities underwritten by the 603 banks in our panel between January 1 and December 12, 2007. The dependent variable is *Spread*, the all-in-drawn spread in basis points. Each specification includes the following loan level controls: a dummy variable equal to 1 if the loan is denominated in USD, the natural logarithm of loan, maturity, an unsecured dummy, the number of lenders in the facility, the number of facilities in the loan package, deal purpose, loan type, and loan rating (a categorical variable). Each specification also controls for borrower characteristics with borrower sales divided by package amount and fixed effects for the 1-digit SIC code of the borrower. Finally, each controls for lender specialization in a 2-digit SIC code and recent loan activity in a given currency. Lender fixed effects are included in specifications (3) through (8). Specifications (5) and (6) split the sample between borrowers for which the lender has previously participated in the lending syndicate in the last five years and those with no previous relationship. Specifications (7) and (8) split the sample between borrowers with and without publicly traded equity. *Post* is equal to 1 if the loan start date occurs after August 9, 2007. *USD* is a dummy variable equal to 1 if the loan is denominated in USD. *For_DUM* is equal to 1 if the highholder bank is foreign. *ABCP_DUM* is a dummy variable equal to 1 if the highholder bank has US ABCP. Detailed definitions of variables are provided in Appendix A. Robust standard errors clustered on package are in parentheses; *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 9: Extensive Margin

	(1)		(2)		(3)		(4)	
	Package-Lender				Facility-Lender			
	All	Risky	All	Risky	All	Risky	All	Risky
USD * ABCP_DUM	-0.026	1.781**	0.001	1.038***	(0.613)	(0.841)	(0.518)	(0.344)
USD * For_DUM	0.979	18.020***	0.676	3.563***	(0.774)	(0.763)	(0.833)	(1.148)
USD * ABCP_DUM * For_DUM	-0.224	-17.141***	-0.392	-2.513***	(0.630)	(0.111)	(0.575)	(0.901)
ABCP_DUM	0.038	-1.790**	0.009	-0.996***	(0.612)	(0.839)	(0.518)	(0.340)
For_DUM	-0.873	-18.021***	-0.562	-3.576***	(0.774)	(0.755)	(0.837)	(1.152)
ABCP_DUM * For_DUM	0.168	17.177	0.308	2.485***	(0.630)	(.)	(0.578)	(0.892)
Maturity	-0.002	-0.002	-0.004	-0.003	(0.003)	(0.004)	(0.003)	(0.004)
Risk Price	-0.027	-0.216	0.105	-0.111	(0.240)	(0.376)	(0.259)	(0.442)
USD	-0.242	-0.940	0.080	-0.441	(0.640)	(0.760)	(0.511)	(0.547)
Loan Level Controls	Yes	Yes	Yes	Yes				
Lender Fixed Effects	No	No	No	No				
N	61345	23667	93871	42073				

Table 9 shows results from estimating a Cox proportional hazard regression on a binary dependent variable, *Refinancing*, equal to 1 if a loan is refinanced between August 9 and December 11, 2007. The sample is 93,871 loan facility-lender observations and 61,345 package-lender observations underwritten in the five years preceding the ABCP shock that were outstanding as of August 9, 2007. Specifications (2) and (4) subset on only risky loans, defined as loans with all-in-drawn spreads greater than 150 basis points. Each specification includes the following loan level controls: a dummy variable equal to 1 if the loan is denominated in USD, maturity, an unsecured dummy, the number of lenders in the facility, the number of facilities in the loan package, deal purpose, loan type, and loan rating (a categorical variable). Each specification also controls for borrower characteristics with borrower sales divided by package amount and fixed effects for the 1-digit SIC code of the borrower. Finally, each includes controls for the lender's 2007 specialization in a 2-digit SIC code and the lender's recent loan activity in a given currency. *USD* is equal to 1 if the facility (package) is denominated in USD. *For_DUM* is equal to 1 if the bank is foreign. *ABCP_DUM* is a dummy variable equal to 1 if the lender has any US ABCP exposure. *Maturity* is the maturity of the facility in months. *Risk Price* is the difference between Moody's seasoned Baa corporate bond yield and Aaa corporate bond yield. Robust standard errors clustered by borrower are in parentheses; *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table 10: Loan Terms Pre and Post TAF

	(1)	(2)	(3)	(1)
	Spread	Amount	Maturity	Spread
Post	-576.0*** (163.1)	9.831*** (1.864)	-201.3*** (19.18)	-29.70 (29.16)
Post * USD	567.9*** (163.6)	-9.841*** (1.866)	195.3*** (19.26)	38.16 (29.51)
Post * ABCP	1184.7*** (260.5)	-10.07*** (2.765)	251.3*** (31.38)	81.89*** (29.57)
Post * USD * ABCP	-1156.9*** (261.0)	10.43*** (2.770)	-248.9*** (31.53)	-76.88** (29.85)
Post TAF	544.3*** (162.3)	-11.20*** (1.796)	202.3*** (17.33)	48.58* (26.05)
Post TAF * USD	-525.0*** (162.9)	11.35*** (1.801)	-205.0*** (17.37)	-26.78 (26.68)
Post TAF * ABCP	-1035.0*** (271.1)	10.54*** (2.699)	-264.4*** (28.48)	-64.26* (36.67)
Post TAF * USD * ABCP	1022.3*** (272.0)	-10.98*** (2.715)	261.6*** (28.65)	64.34* (36.95)
USD	14.45 (27.63)	-0.633 (0.513)	-19.05** (9.425)	13.77 (23.42)
Foreign	-74.94** (37.19)	-0.661 (0.629)	8.011 (11.64)	
ABCP	-54.50* (30.50)	0.233 (0.691)	-6.763 (16.94)	
ABCP * Foreign	107.1** (52.45)	1.161 (1.077)	-9.813 (20.10)	
Post * Foreign	548.5*** (173.5)	-9.855*** (1.983)	201.6*** (21.19)	21.13 (37.21)
Post * ABCP * Foreign	-1200.0*** (305.3)	10.92*** (3.397)	-255.8*** (38.61)	-73.90** (35.09)
Post * USD * Foreign	-537.4*** (181.0)	9.768*** (2.004)	-192.5*** (21.37)	-23.47 (38.43)
Post * Foreign * Exposed * USD	1178.4*** (313.1)	-10.87*** (3.425)	252.8*** (38.94)	68.30* (35.63)
Post TAF * Foreign	-461.2*** (174.1)	12.40*** (1.928)	-222.2*** (21.88)	-1.971 (37.05)
Post TAF * ABCP * Foreign	998.5*** (314.2)	-13.53*** (3.293)	298.4*** (38.86)	62.17 (41.60)
Post TAF * USD * Foreign	472.7*** (181.3)	-12.15*** (1.957)	222.5*** (22.27)	25.91 (38.13)
Post TAF * Foreign * Exposed * USD	-989.3*** (320.7)	13.70*** (3.335)	-298.9*** (39.25)	-75.51* (42.42)
USD * Foreign	56.57 (44.22)	0.582 (0.652)	-3.024 (11.99)	15.28 (24.82)
USD * ABCP	34.05 (32.83)	-0.0452 (0.697)	5.694 (17.09)	5.511 (16.39)
USD * ABCP * Foreign	-65.12 (58.86)	-0.675 (1.098)	5.870 (20.43)	-1.301 (16.57)
Loan and Lender Level Controls	Yes	Yes	Yes	Yes
Lender Fixed Effects	No	No	No	Yes
Observations	3920	3920	3920	22664
Adjusted R-squared	0.436	0.487	0.342	0.519

Table 10 extends regression results for Tables 7 and 8 into the post-TAF period by lengthening the sample period to August 31, 2008. Columns (1)-(3) above follow the same specification outlined under Table 7, and column (4) follows the specification outlined under Table 8. *Post TAF* is equal to 1 if the loan start date occurs after December 12, 2007. Robust standard errors clustered on package are in parentheses; *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Appendix C: Internet Appendix (I)

I. Alternative Intensive Margin Analysis

In Appendix C, we present an intensive margin analysis on the subset of borrowers with pre-2007 loans that have been refinanced in the post-time period. We analyze loan terms for the post-2007 loans, but the bank syndicate is set to be the original (pre-2007) syndicate. For example, if borrower A borrowed in 2005 from BNP Paribas, BNP Paribas will be in the controls regardless of whether BNP Paribas is in the 2007 syndicate. Less than a third of non-USD borrowers had a previous syndicated loan in the LPC dataset (as compared to slightly more than half of the USD borrowers.) Therefore, we have only a small sample of borrowers' pre-2007 syndicates to analyze. This may reflect either of the following: the amount of non-USD syndicated borrowers is increasing (fewer non-USD refinancings), or LPC coverage of this market is increasing.

Tables C2 and C3 present this analysis, replicating that presented in Tables 7 and 8. Results are qualitatively similar to those presented in the paper. Looking at the facility level analysis (comparable to Table 7 in the main text), we find that USD loans with foreign exposed banks in the original syndicate are associated with higher spreads (positive coefficient, significant at the 1% level, on $Post * USD * S_ABCP * S_Foreign$ in specification (2)), a positive effect on amounts (specification (4)) and a negative effect on loan maturity (specification (6)). Looking at the within bank effect (in Table C3 below, comparable to Table 8), we find a negative effect on amounts, and no statistically significant effect on spreads and maturity. This is consistent with some borrowers choosing to borrow less and dropping foreign banks from their syndicate. However, we must be cautious in interpreting the results due to the low power of our analysis, as illustrated in Table C1 below in the small sample sizes in some of the pairs of loan underwriting date (post vs. pre) and loan type (denominated in USD vs. non-USD).

Table C1: Observations Table

Full Sample				Previous Syndicate			
	Pre	Post	Total		Pre	Post	Total
non-USD	635	281	916	non-USD	324	139	463
USD	10,982	4,323	15,305	USD	8,530	2,371	10,901
Total	11,617	4,604	16,221	Total	8,854	2,510	11,364
Facility-Level				Previous Syndicate, Facility-Level			
	Pre	Post	Total		Pre	Post	Total
non-USD	114	34	148	non-USD	50	10	60
USD	2,047	668	2,715	USD	1,392	370	1,762
Total	2,161	702	2,863	Total	1,442	380	1,822

Table C1 shows the number of facilities underwritten by the 603 banks in our panel between January 1 and December 12, 2007. *Post (Pre)* denotes loans with start date after (before) August 9, 2007. *USD* indicates loans denominated in USD. *Non-USD* indicates loans denominated in euros or pounds. *Previous Syndicate* matches the borrower's 2007 loan terms with the lender characteristics of its most recent loan underwritten from 2002-2007.

Table C2: Loan Terms Pre and Post ABCP Shock (Previous Lenders, Facility Level)

	(1)	(2)	(3)	(4)	(5)	(6)
	Spread		Amount		Maturity	
Post	171.4*	-120.4	4.980***	-2.126	11.39	124.3***
	(94.62)	(161.1)	(1.520)	(2.047)	(17.43)	(25.39)
Post * USD	-129.2	159.5	-4.821***	2.231	-21.44	-136.4***
	(96.40)	(163.4)	(1.555)	(2.059)	(17.58)	(25.43)
Post * S_ABCP	-223.4	444.7**	-4.602***	5.032*	-35.34*	-184.7***
	(138.2)	(224.7)	(1.756)	(3.015)	(18.11)	(38.16)
Post * USD * S_ABCP	180.3	-461.7**	4.639***	-4.760	48.72***	199.0***
	(139.9)	(227.6)	(1.794)	(3.010)	(18.33)	(38.25)
USD	28.09	-44.24	0.0192	0.174	-10.27*	-5.082
	(20.06)	(39.56)	(0.233)	(0.320)	(5.874)	(6.374)
S_Foreign	-11.67	-108.4	0.177	3.280*	0.608	-59.58
	(21.43)	(129.8)	(0.216)	(1.681)	(3.768)	(51.99)
S_ABCP	9.614	-28.04	0.236	1.164**	-8.864***	-8.773
	(14.19)	(34.10)	(0.146)	(0.584)	(2.509)	(12.06)
S_ABCP * S_Foreign	26.64	71.72	0.299	-4.296**	0.501	78.07
	(25.62)	(140.7)	(0.256)	(1.869)	(4.422)	(50.70)
Post * S_Foreign		1725.8**		30.79***		-432.6***
		(712.3)		(8.808)		(120.9)
Post * S_ABCP * S_Foreign		-2526.9***		-38.72***		540.6***
		(907.9)		(11.38)		(149.4)
Post * USD * S_Foreign		-1687.2**		-30.33***		445.2***
		(715.0)		(8.792)		(121.0)
Post * S_Foreign * Exposed * USD		2417.9***		37.71***		-551.3***
		(908.8)		(11.32)		(149.5)
USD * S_Foreign		96.25		-3.208*		58.74
		(130.2)		(1.683)		(52.19)
USD * S_ABCP		32.50		-0.998*		-0.401
		(35.28)		(0.587)		(12.05)
USD * S_ABCP * S_Foreign		-24.77		4.886***		-77.76
		(143.3)		(1.880)		(50.91)
Loan Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Borrower Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	1822	1822	1822	1822	1822	1822
Adjusted R ²	0.495	0.497	0.482	0.485	0.299	0.304

Table C2 shows the results of regressions for 1,822 syndicated loan facilities underwritten by the 603 banks in our panel between January 1 and December 12, 2007. The dependent variables are *Spread*, the all-in-drawn spread in basis points; *Amount*, the natural logarithm of facility amount; and *Maturity*, the maturity of the facility in months. Each specification includes the following loan level controls: a dummy variable equal to 1 if the loan is denominated in USD, the spread (if the dependent variable is not *Spread*), the natural logarithm of loan amount (if not *Amount*), maturity (if not *Maturity*), an unsecured dummy, the number of lenders in the facility, the number of facilities in the loan package, deal purpose, loan type, and loan rating (a categorical variable). Each specification also controls for borrower characteristics with borrower sales divided by package amount and fixed effects for the 1-digit SIC code of the borrower. Finally, each controls for lender specialization in a 2-digit SIC code and recent loan activity in a given currency. Detailed definitions of variables are provided in Appendix A. *Post* is equal to 1 if the loan start date occurs after August 9, 2007. *USD* is a dummy variable equal to 1 if the loan is denominated in USD. *S_Foreign* is the percentage of banks in the previous syndicate that are foreign. *S_ABCP* is the percentage of banks in the previous syndicate that have any US ABCP exposure. Robust standard errors clustered on package are in parentheses; *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table C3: Loan Terms Pre and Post ABCP Shock (Previous Lenders)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Spread				Amount				Maturity			
			Public	Private			Public	Private			Public	Private
Post	-0.583 (29.55)	-31.55 (56.58)	-9.527 (52.86)	-6.111 (72.05)	1.292*** (0.371)	1.461*** (0.435)	1.474*** (0.536)	0.342 (0.624)	-1.466 (8.891)	-1.780 (8.096)	4.035 (9.017)	-6.840 (8.281)
Post * USD	20.00 (30.03)	47.19 (56.64)	25.43 (52.81)	25.56 (70.27)	-1.190*** (0.386)	-1.314*** (0.449)	-1.491*** (0.535)	0.0745 (0.657)	-0.928 (8.922)	-1.185 (8.042)	-7.068 (9.015)	4.171 (8.657)
Post * ABCP	-9.378 (16.55)	10.97 (40.76)	2.282 (30.48)	-49.78 (69.87)	-0.312* (0.169)	-0.896** (0.383)	-0.507 (0.500)	-0.417 (0.397)	-1.910 (2.520)	0.769 (6.060)	-5.747 (7.311)	0.768 (6.926)
Post * USD * ABCP	4.551 (16.58)	-8.519 (40.97)	-4.863 (30.72)	60.37 (70.93)	0.315* (0.175)	0.907** (0.393)	0.556 (0.506)	0.340 (0.444)	3.831 (2.523)	1.225 (6.101)	7.000 (7.384)	1.847 (7.209)
USD	-1.044 (23.21)	-46.86 (47.44)	-11.93 (34.28)	-87.79 (81.33)	-0.396* (0.237)	-0.278 (0.398)	-0.232 (0.451)	-0.293 (0.714)	1.483 (7.316)	-1.911 (5.010)	3.419 (6.134)	-10.62* (5.526)
Post * Foreign		24.29 (57.43)	-8.158 (49.48)	9.224 (93.75)		-0.263 (0.514)	-0.183 (0.513)	0.128 (0.869)		2.591 (9.622)	7.187 (9.352)	-25.74** (11.84)
Post * ABCP * Foreign		-5.453 (42.11)	18.65 (32.23)	35.50 (83.77)		0.803** (0.379)	0.299 (0.459)	0.625 (0.636)		-6.345 (6.427)	0.0497 (7.716)	6.510 (10.01)
Post * USD * Foreign		-11.11 (57.40)	21.23 (49.52)	5.450 (92.43)		0.117 (0.520)	0.0691 (0.511)	-0.462 (0.872)		-1.002 (9.704)	-7.069 (9.396)	28.41** (12.05)
Post * Foreign * Exposed * USD		-15.71 (42.56)	-32.68 (33.10)	-77.25 (84.82)		-0.776** (0.393)	-0.305 (0.464)	-0.350 (0.672)		5.920 (6.629)	1.002 (7.849)	-8.511 (10.24)
USD * Foreign		46.26 (47.64)	14.44 (38.43)	93.37 (82.75)		-0.165 (0.414)	-0.405 (0.449)	1.182 (0.873)		8.732 (7.562)	7.427 (6.923)	-20.47** (9.840)
USD * ABCP		25.51 (25.49)	14.76 (21.74)	6.143 (32.82)		-0.339 (0.225)	-0.363 (0.270)	-0.119 (0.281)		3.923 (3.926)	-0.601 (4.554)	6.107 (5.410)
USD * ABCP * Foreign		-14.00 (32.31)	12.46 (26.52)	-22.78 (51.30)		0.474* (0.279)	0.279 (0.268)	-0.183 (0.545)		-10.42** (5.107)	-1.740 (6.135)	1.119 (8.166)
Loan Level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	11364	11364	7933	3431	11364	11364	7933	3431	11364	11364	7933	3431
Adjusted R ²	0.580	0.580	0.634	0.442	0.475	0.475	0.454	0.526	0.365	0.365	0.397	0.394

Table C3 shows the results of regressions for 11,364 syndicated loan facilities underwritten by the 603 banks in our panel between January 1 and December 12, 2007. The dependent variables are *Spread*, the all-in-drawn spread in basis points; *Amount*, the natural logarithm of facility amount; and *Maturity*, the maturity of the facility in months. Each specification includes the following loan level controls: a dummy variable equal to 1 if the loan is denominated in USD, the spread (if the dependent variable is not *Spread*), the natural logarithm of loan amount (if not *Amount*), maturity (if not *Maturity*), an unsecured dummy, the number of lenders in the facility, the number of facilities in the loan package, deal purpose, loan type, and loan rating (a categorical variable). Each specification also controls for borrower characteristics with borrower sales divided by package amount and fixed effects for the 1-digit SIC code of the borrower. Finally, each specification controls for lender specialization in a 2-digit SIC code, recent loan activity in a given currency, and previous lender fixed effects. Specifications (3), (4), (7), (8), (11) and (12) split the sample between borrowers with (*Public*) and without (*Private*) publicly traded equity. *Post* is equal to 1 if the loan start date occurs after August 9, 2007. *USD* is a dummy variable equal to 1 if the loan is denominated in USD. *For_DUM* is equal to 1 if the previous highholder bank was foreign. *ABCP_DUM* is a dummy variable equal to 1 if the previous highholder bank had US ABCP. Detailed definitions of variables are provided in Appendix A. Robust standard errors clustered on package are in parentheses; *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Appendix D: Internet Appendix (II)

I. Other Loan Terms

In Appendix D we analyze the effect of the ABCP funding shock on other important loan terms such as facility amount, maturity, and rating. Since loan terms may be jointly determined, we include controls for other loan terms such as spread, amount, or maturity. Beginning with loan amounts, we do not find statistically significant differences in the post-shock period. USD-denominated loan amounts decline slightly relative to other loans, but the effect is not statically significant.

Turning to facility maturity (specifications (3) and (4)), we find that foreign exposed banks seem to be shortening maturities on loans after the shock: we estimate a negative coefficient on $Post * ABCP_DUM * For_DUM$ after including controls for bank fixed effects and loan ratings. In contrast to our expectations, foreign exposed banks actually seem to be extending maturities on their USD loans relative to their loans in other currencies (positive coefficient on $Post * USD * ABCP_DUM * For_DUM$). However, when adding up all the marginal effects, we see that, relative to the pre-shock period, both exposed US and foreign banks are shortening maturities on their US loans and extending maturities on their euro loans (Foreign banks: -1.0 USD vs. 4.0 Euro). This result is different from that presented in Table 7, suggesting that the extension of the maturities found in the cross section (without controlling for bank fixed effects) is consistent with unobservable differences in the types of borrowers that have foreign banks in their lending syndicate.

Finally, we look at the riskiness of loans as measured by loan ratings. In specifications (5) and (6) in Panel A of Table D1, we are simply trying to understand if the average rating of loans done in the post-shock period has changed. Therefore, we do not include controls for other loan

terms (amount, maturity, and spread). Generally, all banks seem to be making less risky loans in the post-shock period. Overall, after the ABCP shock, foreign banks are making less risky USD loans (negative, but not statistically significant, coefficient on $Post * USD * For_DUM$ in specification (6)). Similarly, exposed banks are also making less risky USD loans (negative, but not statistically significant, coefficient on $Post * USD * ABCP_DUM$), although exposed foreign banks seem to be increasing slightly the riskiness of their loans (insignificant positive coefficient on $Post * USD * ABCP_DUM * For_DUM$).

As in Table 8, we split the sample in two alternative ways. First, we split the borrowers between those for which the lender has previously participated in the lending syndicate in the last five years (columns (1) and (5) in Panel B of Table D1) and those with no previous relationship (columns (2) and (6)). Second, we split the sample between banks with public equity (specifications (3) and (7)) and those without public equity (specifications (4) and (8)). Consistent with the results in Panel A, foreign exposed banks seem to be extending maturities on their USD loans relative to their loans in other currencies (positive significant coefficient on $Post * USD * ABCP_DUM * For_DUM$ for borrowers with previous relationship). When adding up all the marginal effects, we see that foreign exposed banks are shortening maturities on their US loans, and extending maturities on their euro loans for borrowers with previous relationship but shortening the maturities of all loans for banks with no previous relationship.

In summary, the impact of differential funding access of domestic and foreign banks to USD funding seems predominantly on the cost (spreads) of syndicated loans, rather than on their maturity, size, or risk.

Table D1, Panel A: Amount, Maturity, and Rating

	(1)	(2)	(3)	(4)	(5)	(6)
	Amount		Maturity		Rating	
Post	0.201 (0.286)	0.715* (0.372)	0.747 (7.775)	-14.38** (7.217)	-1.545 (2.281)	-5.359 (3.622)
Post * USD	-0.0969 (0.294)	-0.554 (0.376)	-2.973 (7.859)	11.65 (7.226)	0.996 (2.328)	4.777 (3.635)
Post * ABCP	0.0224 (0.222)	-0.180 (0.276)	2.817 (4.014)	17.50** (8.239)	1.246 (1.531)	1.203 (2.817)
Post * USD * ABCP	0.0250 (0.224)	0.234 (0.277)	-2.215 (4.016)	-17.10** (8.286)	-0.817 (1.548)	-0.707 (2.829)
USD	-0.630*** (0.205)	-0.321 (0.218)	-4.814 (6.126)	-8.642** (4.210)	-4.651*** (1.109)	-1.501 (1.535)
Post * Foreign		-0.575 (0.417)		15.47* (9.034)		4.959* (2.920)
Post * ABCP * Foreign		0.177 (0.318)		-13.98* (7.414)		-0.875 (2.708)
Post * USD * Foreign		0.391 (0.432)		-13.49 (8.977)		-4.945 (3.076)
Post * Foreign * Exposed * USD		-0.128 (0.335)		13.39* (7.512)		0.831 (2.826)
USD * Foreign		-0.294 (0.258)		0.751 (6.508)		-3.240* (1.664)
USD * ABCP		-0.324 (0.209)		5.651 (6.208)		-1.335 (1.663)
USD * ABCP * Foreign		0.301 (0.210)		-2.059 (5.247)		0.462 (1.651)
Loan Level Controls	Yes	Yes	Yes	Yes	Yes	Yes
Lender Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
N	16221	16221	16221	16221	16221	16221
Adjusted R ²	0.476	0.476	0.337	0.337	0.239	0.243

Table D1, Panel A: Amount, Maturity, and Rating (cont.)

	(1)	(2)	(3)	(4)	(5)	(6)
	Amount		Maturity		Rating	
<u>Marginal Effects</u>						
<i>ABCP-exposed</i>						
Domestic Lender, USD Loan	0.15	0.21	-1.62	-2.25	-0.15	-0.14
Domestic Lender, Euro Loan	0.22	0.39	3.14	2.73	-0.36	-4.26
Foreign Lender, USD Loan	0.15	0.07	-1.62	-1.02	-0.15	-0.10
Foreign Lender, Euro Loan	0.22	0.07	3.14	3.95	-0.36	-0.28
<i>Not ABCP-exposed</i>						
Domestic Lender, USD Loan	0.10	0.15	-2.34	-2.74	-0.53	-0.62
Domestic Lender, Euro Loan	0.20	0.75	1.31	-13.84	-1.73	-5.44
Foreign Lender, USD Loan	0.10	0.02	-2.34	-0.94	-0.53	-0.47
Foreign Lender, Euro Loan	0.20	0.14	1.31	1.99	-1.73	-0.18

Table D1, Panel A shows the results of regressions for 16,221 syndicated loan facilities underwritten by the 603 banks in our panel between January 1 and December 12, 2007. The dependent variables are *Amount*, the natural logarithm of facility amount, *Maturity*, the maturity of the facility in months, and *Rating*, the loan rating. Each specification includes the following loan level controls: a dummy variable equal to 1 if the loan is denominated in USD, the spread (if the dependent variable is not *Spread*), the natural logarithm of loan amount (if not *Amount*), maturity (if not *Maturity*), an unsecured dummy, the number of lenders in the facility, the number of facilities in the loan package, deal purpose, loan type, and *loan rating* (a categorical variable). Each specification also controls for borrower characteristics with borrower sales divided by package amount and fixed effects for the 1-digit SIC code of the borrower. Finally, each controls for lender specialization in a 2-digit SIC code and recent loan activity in a given currency. Spread is included in specifications (1) through (4), natural logarithm of loan amount in (3) and (4), and maturity in (1) and (2). Lender fixed effects are included in all specifications. *Post* is equal to 1 if the loan start date occurs after August 9, 2007. *For_DUM* is equal to 1 if the bank is foreign. *USD* is a dummy variable equal to 1 if the loan is denominated in USD. *ABCP_DUM* is a dummy variable equal to 1 if the lender has any US ABCP exposure. Detailed definitions of variables are provided in Appendix A. Robust standard errors clustered on package are in parentheses; *, **, and *** indicate significance at the 10%, 5%, and 1% level.

Table D1, Panel B: Amount and Maturity Subsamples

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Amount				Maturity			
	Relationship	No Relationship	Public	Private	Relationship	No Relationship	Public	Private
Post	1.194*** (0.421)	0.394 (0.321)	0.580 (0.454)	0.498 (0.453)	-33.35*** (8.301)	-1.389 (6.339)	-10.78 (8.229)	-5.724 (4.533)
Post * USD	-1.251*** (0.426)	-0.0918 (0.327)	-0.581 (0.453)	-0.132 (0.479)	28.63*** (8.419)	-0.0933 (6.298)	7.349 (8.232)	4.540 (4.974)
Post * ABCP	-1.066** (0.526)	0.284 (0.294)	-0.250 (0.333)	0.0268 (0.349)	26.13** (11.96)	10.78 (9.449)	14.31 (8.919)	4.866 (8.473)
Post * USD * ABCP	1.251** (0.539)	-0.217 (0.314)	0.306 (0.336)	0.00489 (0.345)	-23.78* (12.13)	-11.83 (9.505)	-13.55 (9.001)	-4.677 (8.671)
Post * Foreign	-1.510** (0.646)	-0.118 (0.420)	0.119 (0.431)	0.102 (0.488)	42.62*** (13.81)	1.017 (7.525)	18.60** (8.097)	-3.509 (6.402)
Post * ABCP * Foreign	0.662 (0.740)	-0.0822 (0.420)	-0.900** (0.448)	0.101 (0.410)	-32.39** (13.16)	-13.50 (10.15)	-12.12 (8.790)	-6.681 (8.660)
Post * USD * Foreign	1.576** (0.652)	-0.210 (0.443)	-0.213 (0.442)	-0.433 (0.569)	-40.69*** (13.98)	0.807 (7.568)	-19.33** (8.139)	10.81 (6.843)
Post * Foreign * Exposed * USD	-0.862 (0.744)	0.246 (0.430)	0.910** (0.451)	0.0727 (0.482)	31.14** (13.30)	13.75 (10.21)	13.10 (8.929)	2.304 (9.077)
USD * Foreign	-1.242*** (0.462)	-0.0153 (0.271)	-0.660** (0.273)	0.445 (0.344)	29.42** (12.76)	-5.992 (5.018)	15.10* (8.080)	-13.31*** (4.841)
USD * ABCP	-0.556 (0.394)	-0.364* (0.211)	-0.321 (0.267)	-0.0259 (0.249)	15.59 (10.85)	-2.740 (6.253)	9.082 (7.734)	-1.358 (5.400)
USD * ABCP * Foreign	1.012*** (0.387)	0.229 (0.295)	0.366 (0.245)	-0.00354 (0.287)	-18.70* (11.04)	1.686 (6.661)	-9.005 (6.472)	4.152 (5.421)
USD	-0.0917 (0.376)	-0.251 (0.233)	-0.447* (0.267)	-0.443 (0.295)	-14.92** (7.558)	-5.497 (4.359)	-4.000 (6.211)	-13.28*** (3.765)
Loan Level Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lender Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	8443	7778	10654	5567	8443	7778	10654	5567
Adjusted R ²	0.454	0.500	0.461	0.481	0.362	0.389	0.320	0.479

Table D1, Panel B: Amount and Maturity Subsamples (cont.)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Amount				Maturity			
	Relationship	No Relationship	Public	Private	Relationship	No Relationship	Public	Private
<u>Marginal Effects</u>								
<i>ABCP-exposed</i>								
Domestic Lender, USD Loan	0.13	0.37	0.06	0.40	-2.37	-2.53	-2.67	-1.00
Domestic Lender, Euro Loan	0.13	0.68	0.33	0.52	-7.22	9.39	3.53	-0.86
Foreign Lender, USD Loan	-0.01	0.21	-0.03	0.24	-1.69	-0.46	-2.42	1.93
Foreign Lender, Euro Loan	-0.72	0.48	-0.45	0.73	3.01	-3.09	10.01	-11.05
<i>Not ABCP-exposed</i>								
Domestic Lender, USD Loan	-0.06	0.30	0.00	0.37	-4.72	-1.48	-3.43	-1.18
Domestic Lender, Euro Loan	1.19	0.39	0.58	0.50	-33.35	-1.39	-10.78	-5.72
Foreign Lender, USD Loan	0.01	-0.03	-0.10	0.04	-2.79	0.34	-4.16	6.12
Foreign Lender, Euro Loan	-0.32	0.28	0.70	0.60	9.27	-0.37	7.82	-9.23
N	8443	7778	10654	5567	8443	7778	10654	5567
Adjusted R ²	0.454	0.5	0.461	0.481	0.362	0.389	0.32	0.479

Table D1, Panel B shows the results of regressions for 16,221 syndicated loan facilities underwritten by the 603 banks in our panel between January 1 and December 12, 2007. Specifications (1), (2), (5), and (6) split the sample between borrowers for which the lender has previously participated in the lending syndicate in the last five years (*Relationship*) and those with no previous relationship (*No Relationship*). Specifications (3), (4), (7), and (8) split the sample between borrowers with (*Public*) and without (*Private*) publicly traded equity. The dependent variables are *Amount*, the natural logarithm of facility amount, and *Maturity*, the maturity of the facility in months. Each specification includes the following loan level controls: a dummy variable equal to 1 if the loan is denominated in USD, the spread (if the dependent variable is not *Spread*), the natural logarithm of loan amount (if not *Amount*), maturity (if not *Maturity*), an unsecured dummy, the number of lenders in the facility, the number of facilities in the loan package, deal purpose, loan type, and loan rating (a categorical variable). Each specification also controls for borrower characteristics with borrower sales divided by package amount and fixed effects for the 1-digit SIC code of the borrower. Finally, each controls for lender specialization in a 2-digit SIC code and recent loan activity in a given currency. Lender fixed effects are included in all specifications. *Post* is equal to 1 if the loan start date occurs after August 9, 2007. *For_DUM* is equal to 1 if the bank is foreign. *USD* is a dummy variable equal to 1 if the loan is denominated in USD. *ABCP_DUM* is a dummy variable equal to 1 if the highholder bank has US ABCP. Detailed definitions of variables are provided in Appendix A. Robust standard errors clustered on package are in parentheses; *, **, and *** indicate significance at the 10%, 5%, and 1% level.