Liquidity Management of U.S. Global Banks

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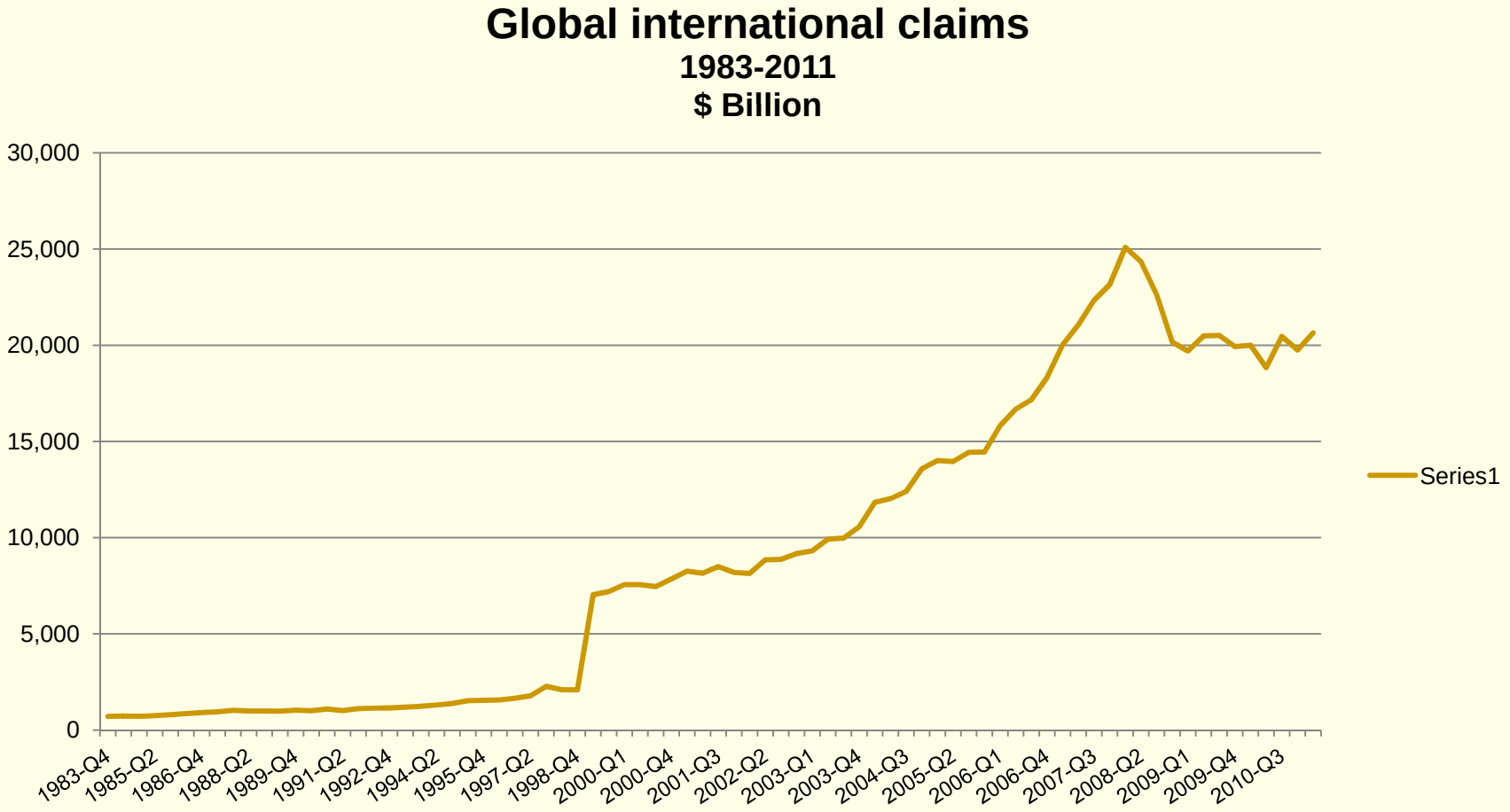
Global banks are a vehicle of international shock transmission

- Evidence on the latest crisis
  - E.g., De Haas and Lleyveld (2010), Popov and Udell (2010), Puri, Rocholl, and Steffen (2010), Cetorelli and Goldberg (2011), Buch, Koch, and Kotter (2011)

- At the center of policy discussion
  - Subsidiarization
  - Local funding pools
  - Ring fencing

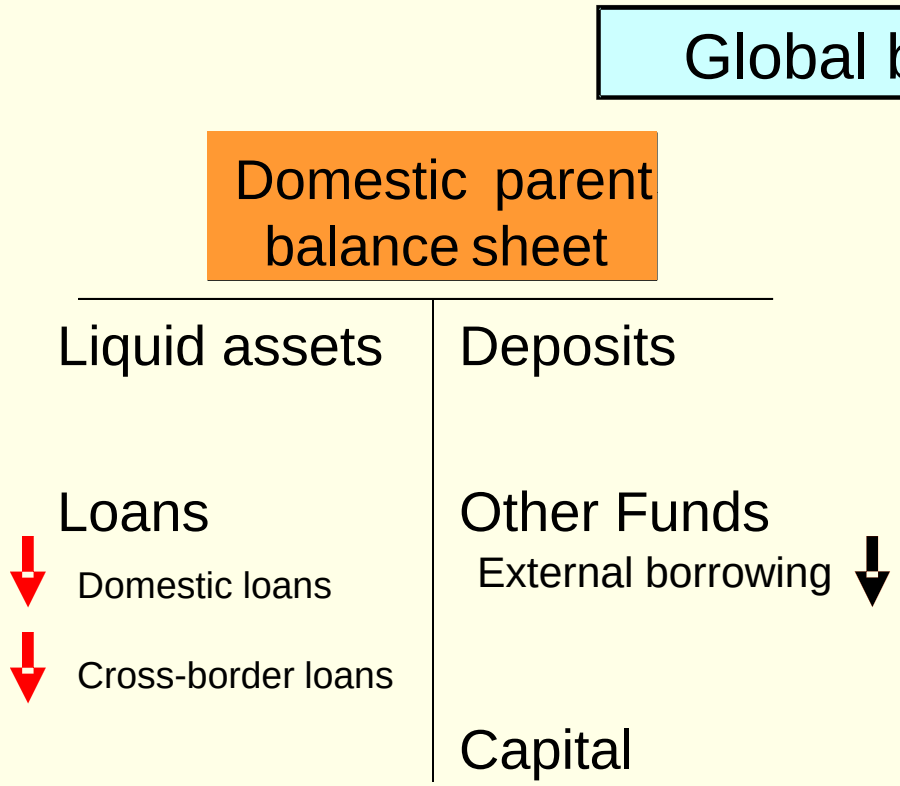
Global banks as channel of transmission not new discovery but growing in importance



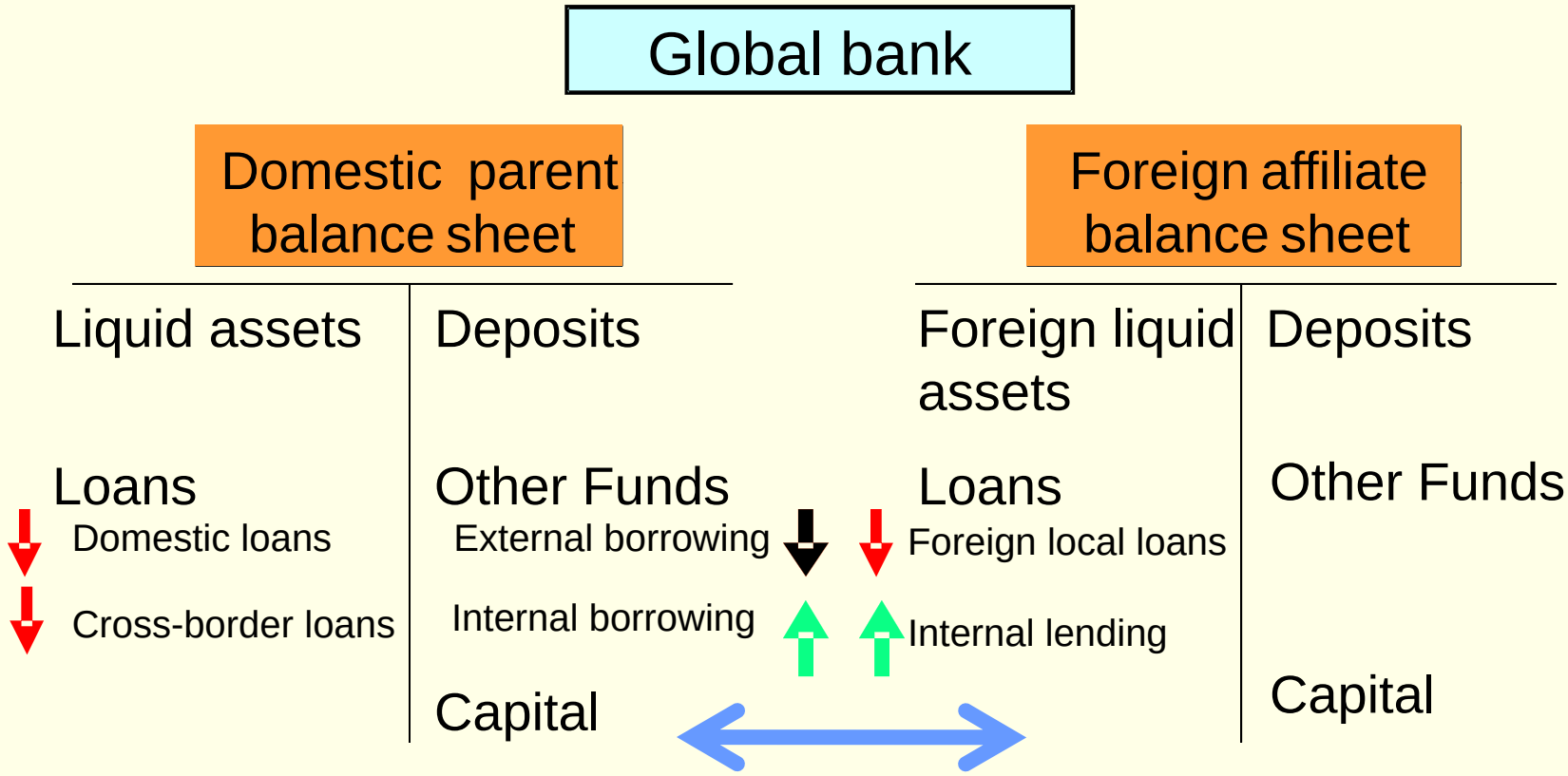
Global banks manage liquidity globally

- Funding rebalancing achieved through active internal capital market channels.
- Cross-border internal reallocation of funds.
- This is NOT a crisis-specific feature
  - Cetorelli and Goldberg (Forthcoming)

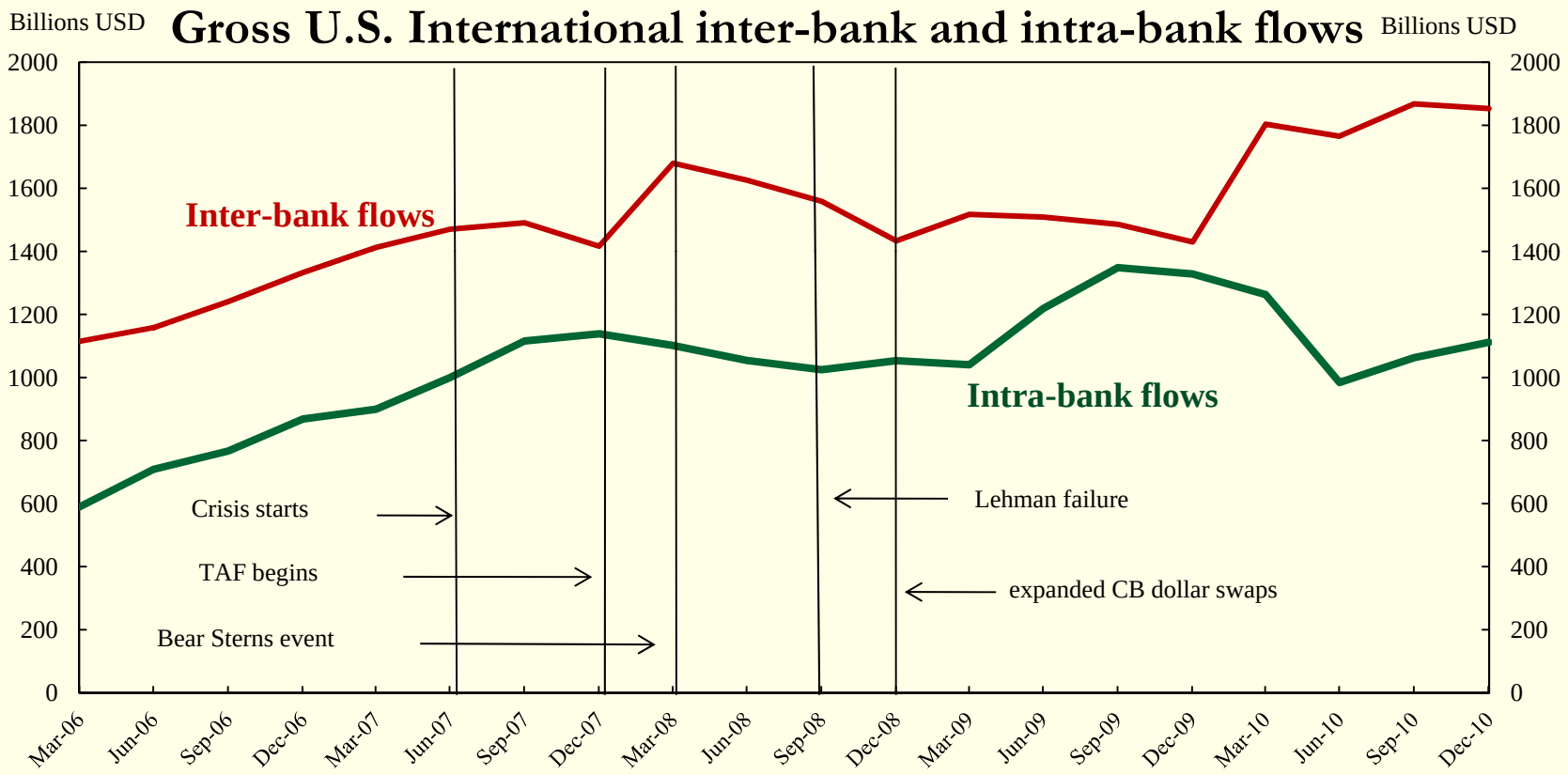
Channels of international transmission through US global banks



Channels of international transmission through US global banks

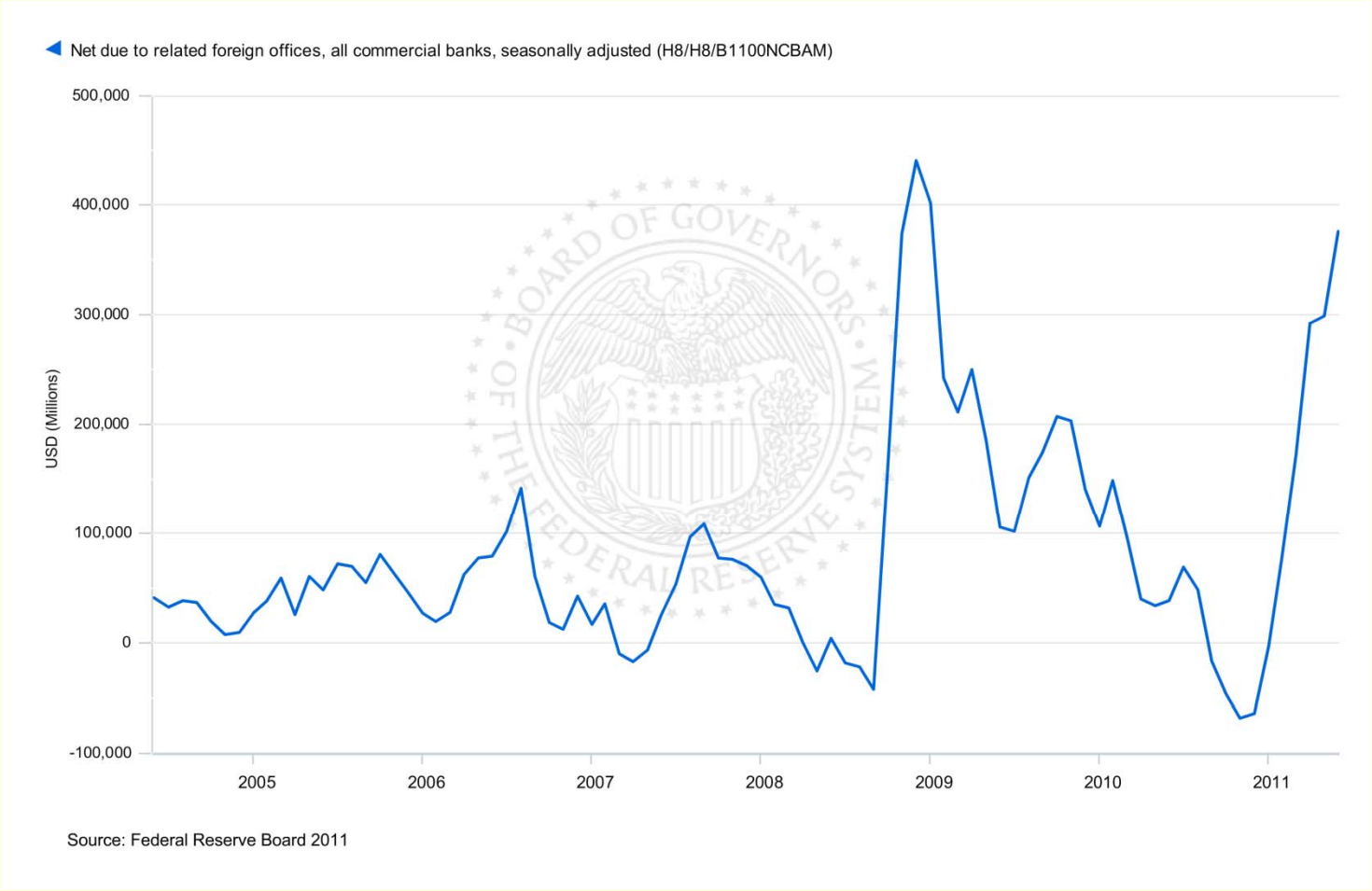


Internal funding flows are large



Source: FFIEC 009 and BIS Consolidated Banking Statistics
Note: Intra-bank flows are computed as the sum of net due to (from) of affiliates (in absolute value), from FFIEC 009. Interbank flows are computed as the sum of foreign claims of the U.S. vis-a-vis rest of world and of rest of world vis-a-vis the U.S., from BIS.

During crisis very big as well



Little is known of drivers of global banks liquidity management

- What are the factors determining actual cross border, internal funds dynamics?
- Deeper understanding has crucial normative implications
  - Are foreign banks a source of concern?
  - Should entry and/or mode of operations subject to restrictions?
- These themes on our research agenda

This paper: conjecture that individual banks' own business model matters

"Distance" from parent matters

Define "core" / "periphery" markets for each bank along two dimensions:

- Funding
- Investments

Funds mainly drawn from "core" funding markets and "periphery" investment markets

Preview of results

Extensive response of internal capital markets by global banks to shocks during the crisis

- Given an adverse shock to the parent, affiliate markets:
  - Funds drawn relatively more from core funding locations
  - Core investment locations supported relative to periphery
  - Economic significance of results are large
  - Traditional, host country-specific metrics of distance between parent and affiliate markets are less important drivers

Implications

- Global banks confirmed to be a vehicle of international transmission of shocks
- First order implications for both domestic and cross-border regulation
- "Openness" *per se* may not necessarily be a bad thing
- Bank-to-country specific characteristics matter: Argentina may be a core funding market for Santander but a core investment market for Citi

Data description

- Federal Financial Institutions Examinations Council Country Exposure Report (FFIEC 009). Confidential data.
  - Quarterly. Filed by every U.S bank or its holding company, and foreign bank subsidiaries in U.S.
    - claims, assets, and liabilities broken down by country of destination
    - Internal borrowing and lending balances of affiliates in each foreign locations
- Add in parent bank characteristics from *Federal Financial Institutions Examinations Council (FFIEC)* 031 "Call Reports".
- Plus distance characteristics of destination countries

Identification strategy

- **Pre-crisis period**: **2006Q1 – 2007Q2**

- **Shock 1**: **2007Q3 to 2007Q4**. Dollar funding pressure resulted from the subprime market collapse. Adverse shock on balance sheet of the parent banks.

- **Shock 2**: **2008Q1 - 2008Q2.** Federal Reserve institutes the Term Auction Facility (late December 2007) to provide emergency funding to banks. Positive balance sheet shock.

  We leave out the post-Lehman quarters on purpose.

Identification strategy

- **Dependent variable**: Δ (Net internal borrowing) $_{ij}$
- **Business model variables**:
  - Core funding locations: (Local liabilities / Internal + Local liabilities) $_{ij}$
  - Core investment locations: Total claims $_{ij}$ / Total claims $_{i}$
- **"Pre-existing condition"**: Ex-ante exposure of bank $_{i}$ to ABCP programs (Acharia, Schnabl and Suarez, 2009, Acharia and Schnabl, 2010, Kacperczyk and Schnabl, 2010)

Identification strategy

- Location *j* Fixed Effects (local demand conditions)
- Bank *i* Fixed Effects
- Vector of bank characteristics
- Vector of location characteristics

- Exploit both intra- and inter-bank heterogeneity

Change in Net Internal Borrowing by Affiliates
Shock 1 and Shock 2
All U.S. Reporting Banks

	Shock 1
ABCP Exposure$_i$* Core funding*$_{ij}$*	**Negative*** **
ABCP Exposure$_i$ *Core investment*$_{ij}$*	**Positive*** **

Change in Net Internal Borrowing by Affiliates
Shock 1 and Shock 2
All U.S. Reporting Banks

	Shock 1	Shock 2
ABCP Exposure$_i$* Core funding*$_{ij}$*	**Negative*** **	**Positive*** **
ABCP Exposure$_i$ *Core investment*$_{ij}$*	**Positive*** **	**Negative*** **

Lesser effects of country-specific variables

Similar pattern of results for only U.S. owned sample of banks

Economic significance of core v. periphery features of affiliates

Difference in Change in Net Borrowing Across Affiliates: Core v. periphery comparisons in Financing and Lending High ABCP exposed parents ($mil)

	Negative parent funding (shock1)		Positive parent funding (Shock 2)	
	Core funding	Core investment	Core funding	Core investment
Diff High v. Low	-345	+163	+634	-141
% change of initial net due	**-32%**	**+8.5%**	**-25%**	**-3%**

From Table 6 , column 4. US banks only. Note: ABCP low 0.2, high 0.78. Percent change of initial net due of 75th percentile ABCP exposed bank, high local finance or high loan share.

Wrapping up

- We provide first evidence of liquidity management strategies of global banks
- Contagion / transmission driven by

1) Parent bank ex ante vulnerabilities
2) Business models in affiliate markets, which can differ substantially even for the same parent. "core" versus "periphery" defined over
   - Affiliate financing structure
   - Relative importance of affiliate in lending activities
3) Lesser role of host country variable

Normative considerations

- Host country perspective: macroeconomic transmission may be less a function of overall "openness" to international banking and more of the specific characteristics of individual foreign banks engaged in its economy.
- Global liquidity management by banks at the forefront of policy discourse. Example:

> "Cross-entity funding channels are a mechanism through which liquidity pressures can spread through the group. … to mitigate the risk of contagion, a … bank may also have **limits at the subsidiary and branch level to restrict the reliance of related entities on funding from elsewhere in the bank**. Internal limits also may be set for each currency used by a bank. ..." (Basel Committee on Banking Supervision, "Principles for Sound Liquidity Risk Management and Supervision" December 2009, p. 23).

- But also: "subsidiarization", "ring fencing", …

Normative considerations

- Increased emphasis on macro-prudential supervision and regulation may lead to the introduction of possible guidelines and constraints to global liquidity management. May be ultimately a good thing, but not sure. Mechanisms and dynamics still not well-understood.
- Also potential effects on location and scope of internationalization of global banks

Reference slides

Table 1 Counts of U.S. Banks With Foreign Affiliates

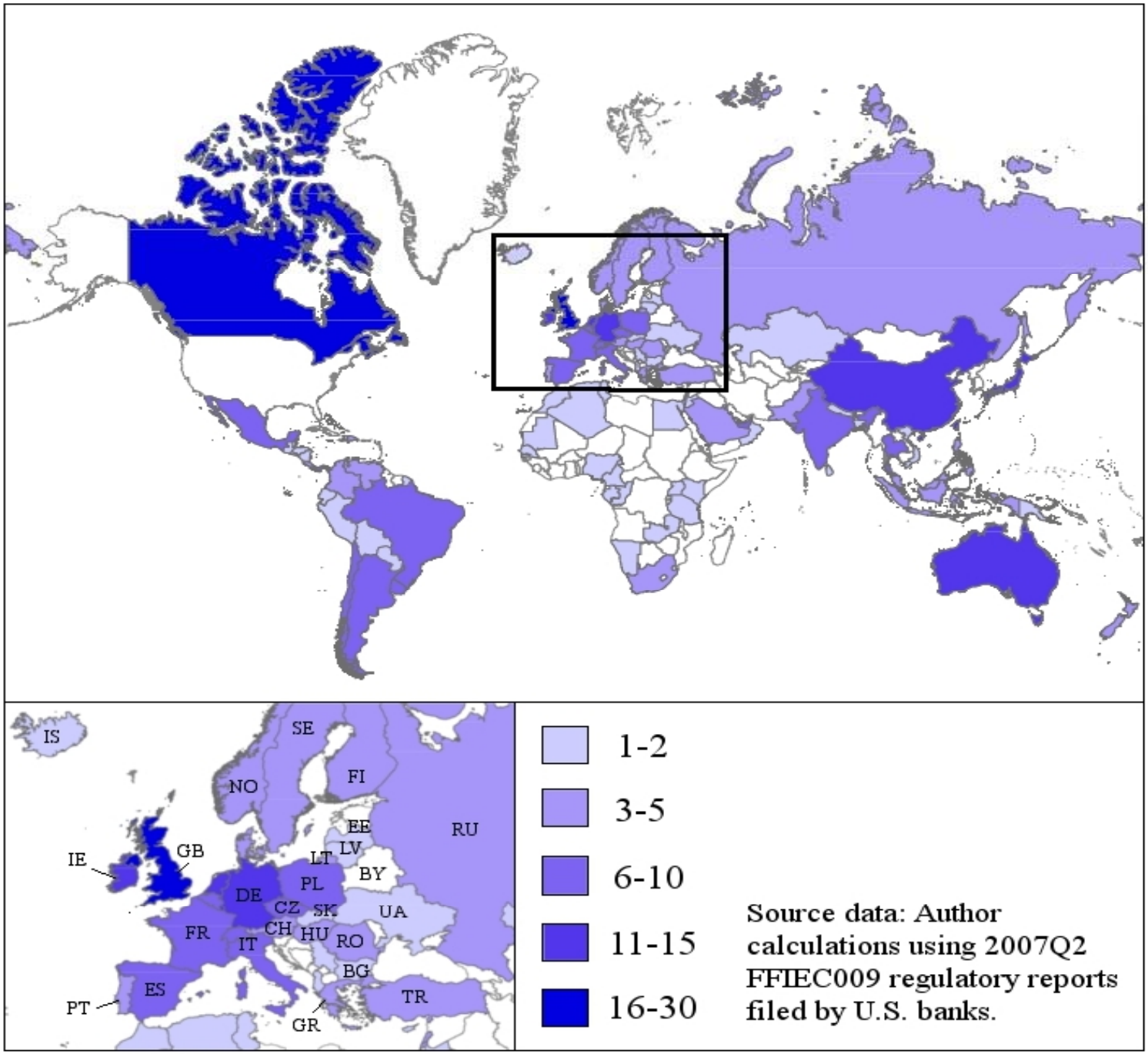
	2006q1	2007q1	2008q1	2009q1	2010q1
ALL banks					
Total	42	41	39	43	44
US-owned	27	26	26	25	25
foreign-owned	15	15	13	18	19

Source: Authors' computations based on FFIEC 009 reporting by quarter.

All of these banks have at least one affiliate abroad.

A larger number of U.S. banks borrow and lend internationally, without having foreign branches or subsidiaries.

Figure 2: Number of U.S. Banks with Affiliates in Countries



Econometric methodology (1)

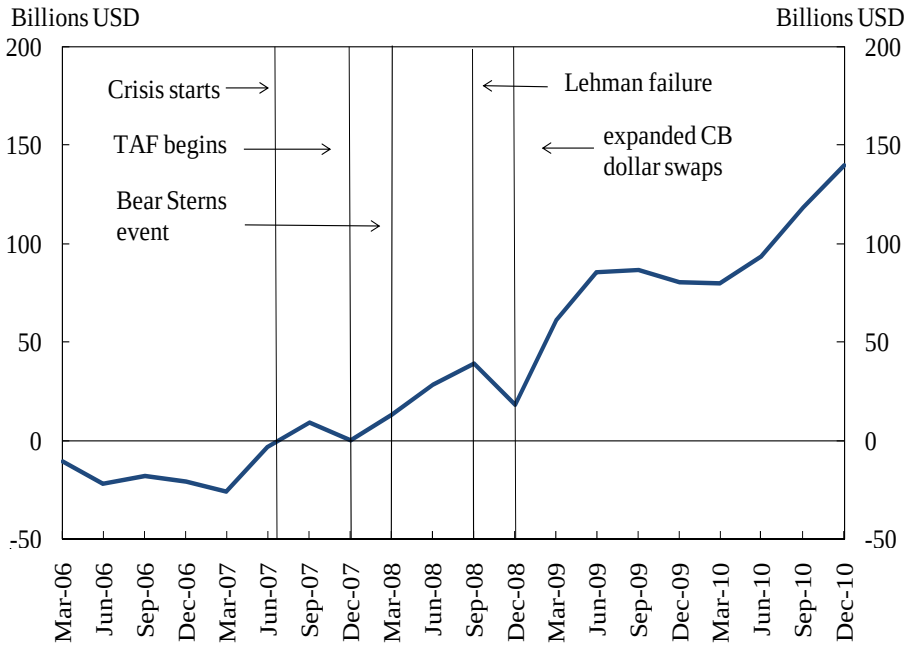
$$\Delta L_{ij} = \beta_0 + \beta_1 \cdot \Delta D_i + \varepsilon_{ij}$$

$$\beta_1 = \beta_0 + \bar{\beta}_i \bar{X}_i + \bar{\beta}_j \bar{X}_j + \bar{\beta}_{ij} \bar{X}_{ij},$$

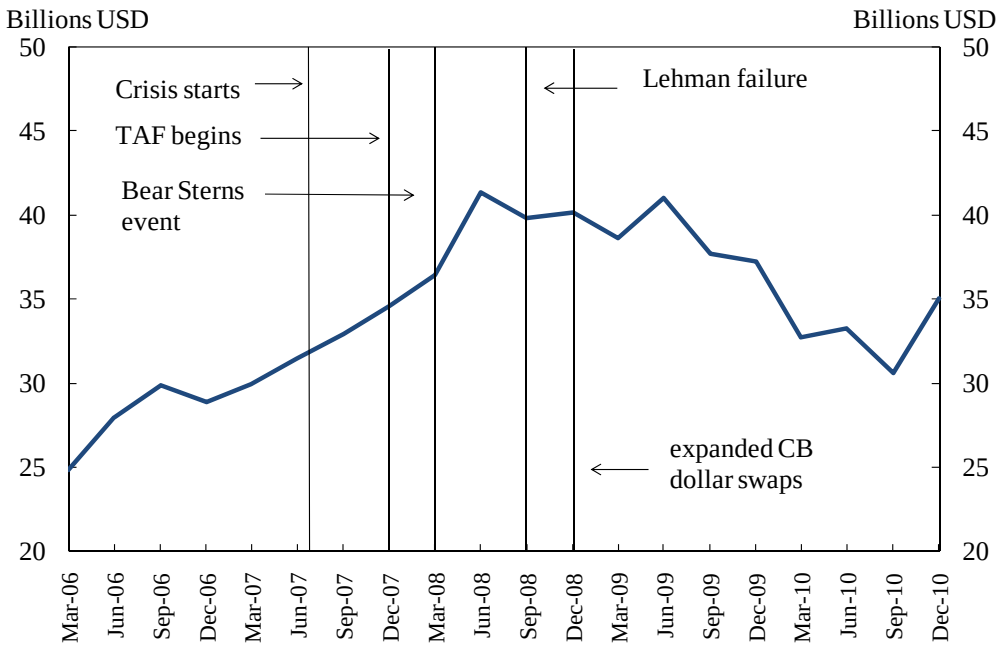
$$\Delta D_i \sim ABCP_i$$

- Parent banks denoted by *i*, affiliate locations by *j*.
- Conjectures: Decisions to alter internal capital flows depend on bank-affiliate features
  - 1 Funding structure of foreign affiliate, by bank
  - 2 Importance of each foreign affiliate to the parent bank

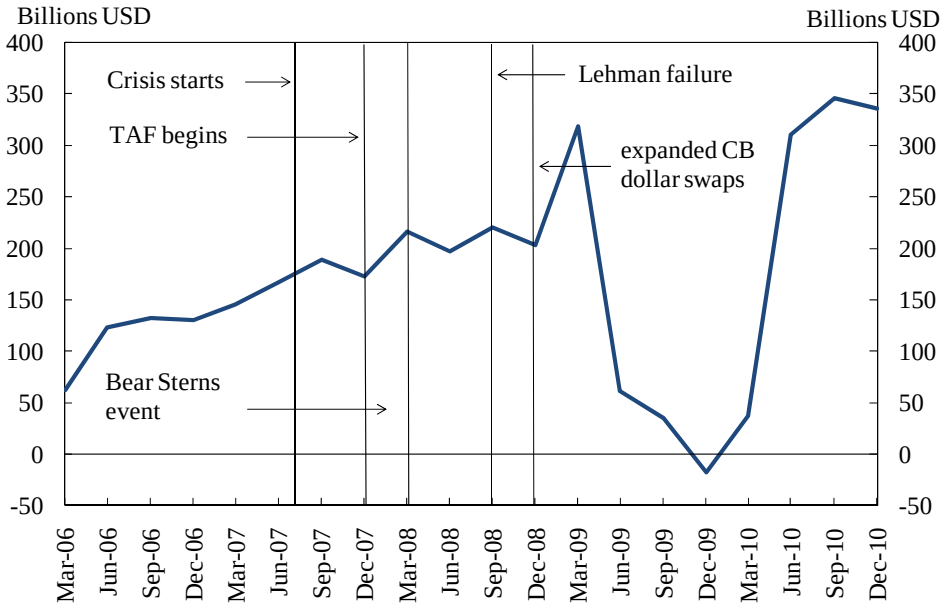
i) Africa, Asia, and Australia



ii) North America



iii) Europe



iv) Central and South America

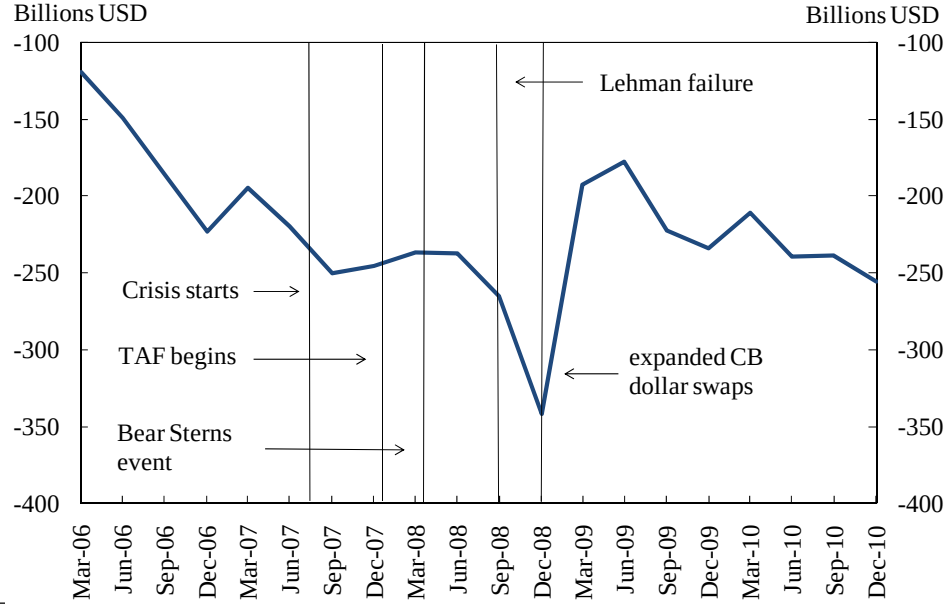


Table 2 Basic Balance Sheet Information of U.S. Banks with Foreign Affiliates (2007Q2 unless otherwise indicated)

Statistics on U.S. Banking Organization		All Banks	Lower LL	Higher LL	Lower IC	Higher IC
Number of parent banks (2006Q1-2010Q4 average quarterly)	median	42	23	25	32	33
Bank asset size (billions USD)	median	552.56	552.56	1395.62	552.56	539.87
Total Net Due From / assets (%)	median	0.74	0.88	1.77	0.74	0.74
Foreign loans / assets (%)	median	4.11	4.11	4.11	4.11	4.30
Bank liquid assets / total assets (%)	median	7.75	7.75	24.24	7.75	7.45
Bank solvency ratio (%)	median	7.61	7.61	6.07	6.95	7.91

Source: Authors' computation using FFIEC 009 data

Table 2 (cont.) Basic Balance Sheet Information of U.S. Banks with Foreign Affiliates (2007Q2 unless otherwise indicated)

Statistics by Affiliated Banking Organizations		All Banks	Lower LL	Higher LL	Lower IC	Higher IC
Number of bank-affiliate observations (2006Q1-2010Q4 average quarterly)	median	550	180	180	264	264
Local liabilities / total affiliate liabilities [LL] (%)	median	77.63	20.45	100.00	79.86	60.56
Local and cross border claims / total affiliate local and cross border claims (immediate counterparty basis) [IC] (%)	median	0.50	1.04	0.85	0.05	2.19

Source: Authors' computation using FFIEC 009 data

Explanatory variables

Table 3 Summary of Explanatory Variables

	By Banking Organization	By Affiliate Location	By Bank-Affiliate Country	Initial shock scaling
Regression Sample	$\overline{X}_i$	$\overline{X}_j$	$\overline{X}_{ij}$	
	$Solv_i$ $Liquid_i$ $FMshare_i$ $Herf_i$ $Fowner_i$ $Size$	$Distance_j$ $Polity_j$ $Dollarpeg_j$ $ChinnKC_j$ OFC_j	$Localshare_{ij}$ $Loanshare_{ij}$	$ABCP_i$

Table 3 Change in Net Internal Borrowing by Affiliates - Shock1, All U.S. Reporting Banks.

Significant role of bank-affiliate features

	(3) OLS	(4) Country FEs
ABCP exposure$_i$	-8.134	-23.52
Exp$_i$**Local finance*$_{ij}$	**-400.6*****	**-465.1*****
Exp$_i$**Loan share*$_{ij}$	**8,955*****	**9,405*****
Constant	-7.915	
Observations	546	512
R-squared	0.174	0.298

Similar pattern of results for only U.S. owned sample of banks

Range of specifications show robustness of results, joint role of other controls. Mainly bank size as additional driver early in crisis.

	(1) OLS Country controls	(2) OLS Bank controls	(3) OLS Country and Bank controls	(4) Country FE Country and Bank controls	(5) OLS Level controls included
ABCP exposure$_i$	-535.0	-406.2	-1,615	-1,392	**-4,223***
Exp$_i$**Local finance*$_{ij}$	**-313.6****	**-849.2*****	**-890.3*****	**-811.6*****	**-908.4*****
Exp$_i$**Loan share*$_{ij}$	**8,865*****	**10,603*****	**10,863*****	**10,483*****	**10,866*****
Country variables					
Exp$_i$**OFC*$_j$	-92.80		20.27	59.38	**88.08****
Exp$_i$**kaopen*$_j$	-6.343		-0.0642	20.51	5.486
Exp$_i$**ldistnyc*$_j$	62.21		158.2	100.7	108.6
Exp$_i$**exrate*$_j$	**80.73***		-80.40	34.24	-39.86
Bank variables					
Exp$_i$**Total asset*$_i$		**0.304****	**0.457*****	**0.376***	0.0791
Exp$_i$**Liquidity*$_i$		1,171	762.5	1,114	13,844
Exp$_i$**Solvency*$_i$		5,344	3,567	5,476	**32,642***
Exp$_i$**Loan Herf*$_i$		-709.4	-680.4	-185.5	-391.7
Constant	-6.103	**-89.85***	-90.88		-381.6
Observations	500	546	500	475	500
R-squared	0.193	0.202	0.234	0.332	0.244

Table 7 Change in Net Internal Borrowing by Affiliates – Shock 2, All U.S. Reporting Banks

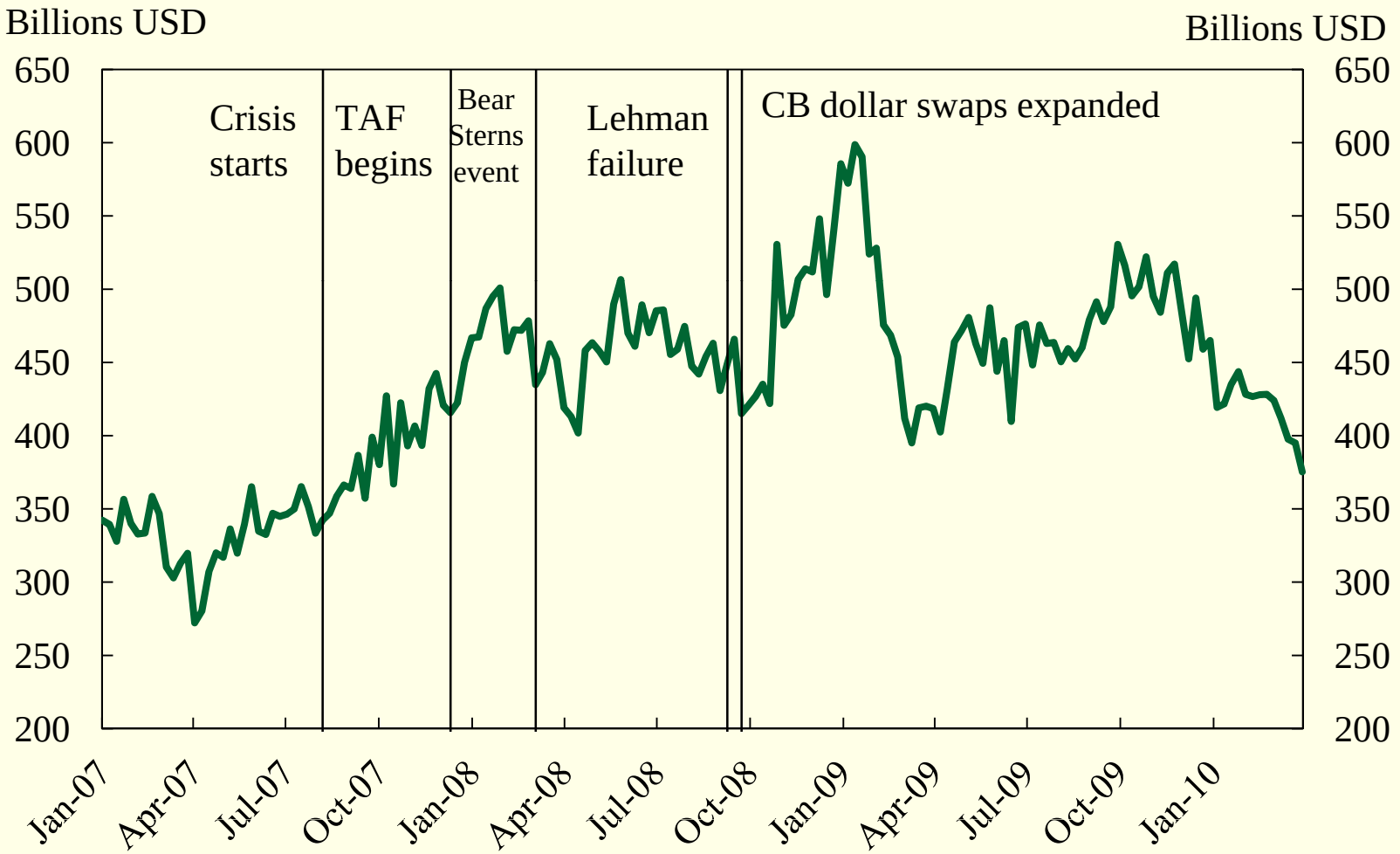
Second shock a positive funding shock due to TAF, which reverses some of the prior internal flows.

	(3) OLS	(4) Country FEs
ABCP exposure$_i$	-13.74	59.21
Exp$_i$**Local finance*$_{ij}$	**780.0****	**872.4*****
Exp$_i$**Loan share*$_{ij}$	**-6,333*****	**-7,912*****
Constant	14.07	
Observations	559	525
R-squared	0.118	0.218

As crisis proceeds, additional roles for differentiating across affiliates by distance and across parents by solvency

	(1) OLS Country controls	(2) OLS Bank controls	(3) OLS Country and Bank controls	(4) Country FE Country and Bank controls	(5) OLS Level controls
ABCP exposure$_i$	**3,757*** **	**-1,384*** **	**2,895***	**3,269***	**4,827*** **
Exp$_i$**Local finance*$_{ij}$	**646.4***	**1,122*** **	**1,104*** **	**1,072*** **	**1,123*** **
Exp$_i$**Loan share*$_{ij}$	**-6,275*** **	**-7,096*** **	**-7,279*** **	**-8,283*** **	**-7,310*** **
Country variables					
Exp$_i$**OFC*$_j$	337.2		187.0	157.5	164.1
Exp$_i$**kaopen*$_j$	-71.98		-85.16	-117.3	-94.13
Exp$_i$**ldistnyc*$_j$	**-432.9*** **		**-502.4*** **	**-553.8*** **	**-472.7*** **
Exp$_i$**exrate*$_j$	-9.296		79.07	181.3	144.3
Bank variables					
Exp$_i$**Total asset*$_i$		**-0.229** **	**-0.287** **	**-0.242** **	**-0.693*** **
Exp$_i$**Liquidity*$_i$		**2,545***	2,483	2,945	-3,194
Exp$_i$**Solvency*$_i$		**9,922*** **	**11,540*** **	**14,074** **	-3,435
Exp$_i$**Loan Herfindhal*$_i$		**1,677*** **	**1,642*** **	1,003	-30.68
Constant	0.456	**73.33***	**68.03***		120.9
Observations	513	559	513	488	513
R-squared	0.154	0.140	0.186	0.267	0.195

Internal borrowing by U.S. chartered banks from related foreign offices



Internal lending by U.S.-based FBOs to affiliates abroad