Liquidity Management of U.S. Global Banks

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Global banks much in the news recently

Mainly getting a pretty bad rap.

Argument:

- Instrumental to the propagation on a global scale of the 2007 crisis.
- More recently, mechanisms of contagion of the European sovereign crisis.

There is substance to this argument.

- The balance sheet of global banks have acted as a specific channel of international propagation of the crisis.
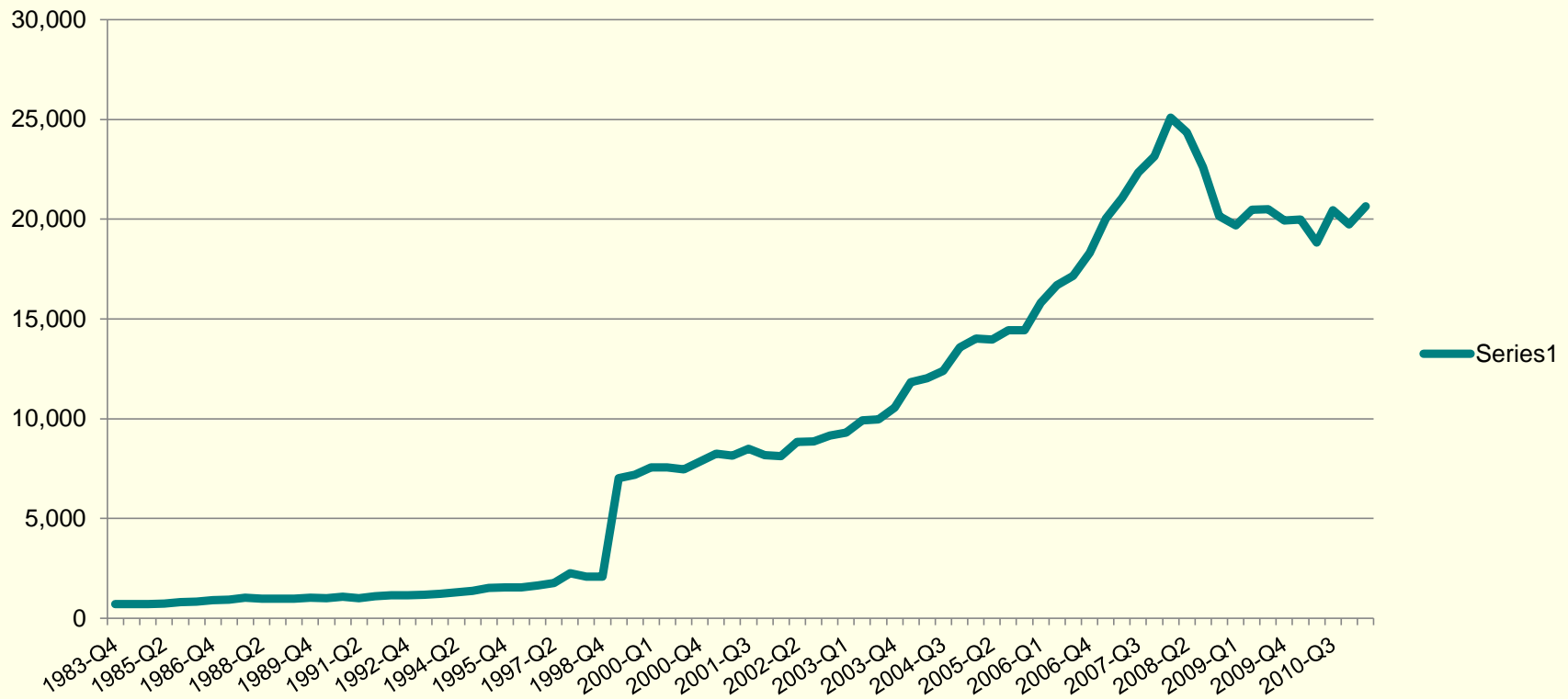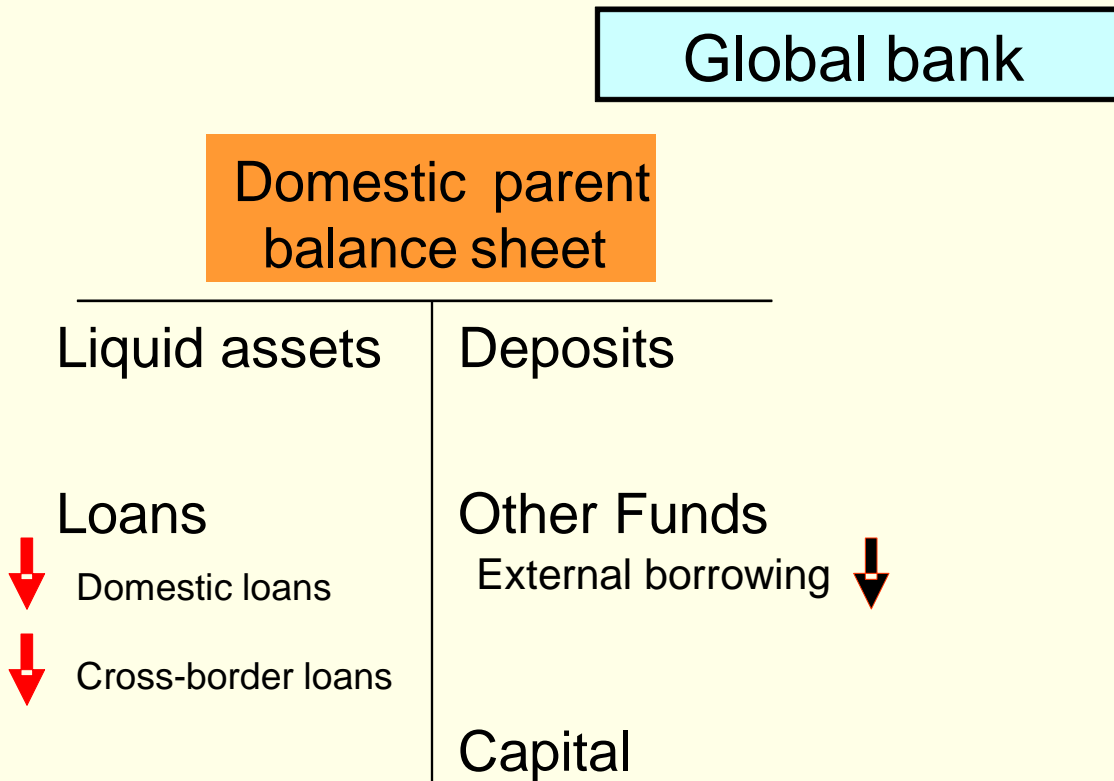
Regulatory backlash

- Negative subtext places global banking at the center of numerous discussions of future regulatory changes to their operations.

- The discussion is one sided: should global banking operations be curbed?

- Examples: "subsidiarization", "local funding pools" , "ring fencing".

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

Global international claims
1983-2011
$ Billion

How do banks transmit shocks?

Global bank

Domestic parent balance sheet

Liquid assets	Deposits
Loans	Other Funds
Domestic loans	External borrowing
Cross-border loans	
	Capital

How do banks transmit shocks?

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Domestic parent balance sheet

Liquid assets	Deposits
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Domestic loans	External borrowing
Cross-border loans	Internal borrowing
	Capital

Foreign affiliate balance sheet

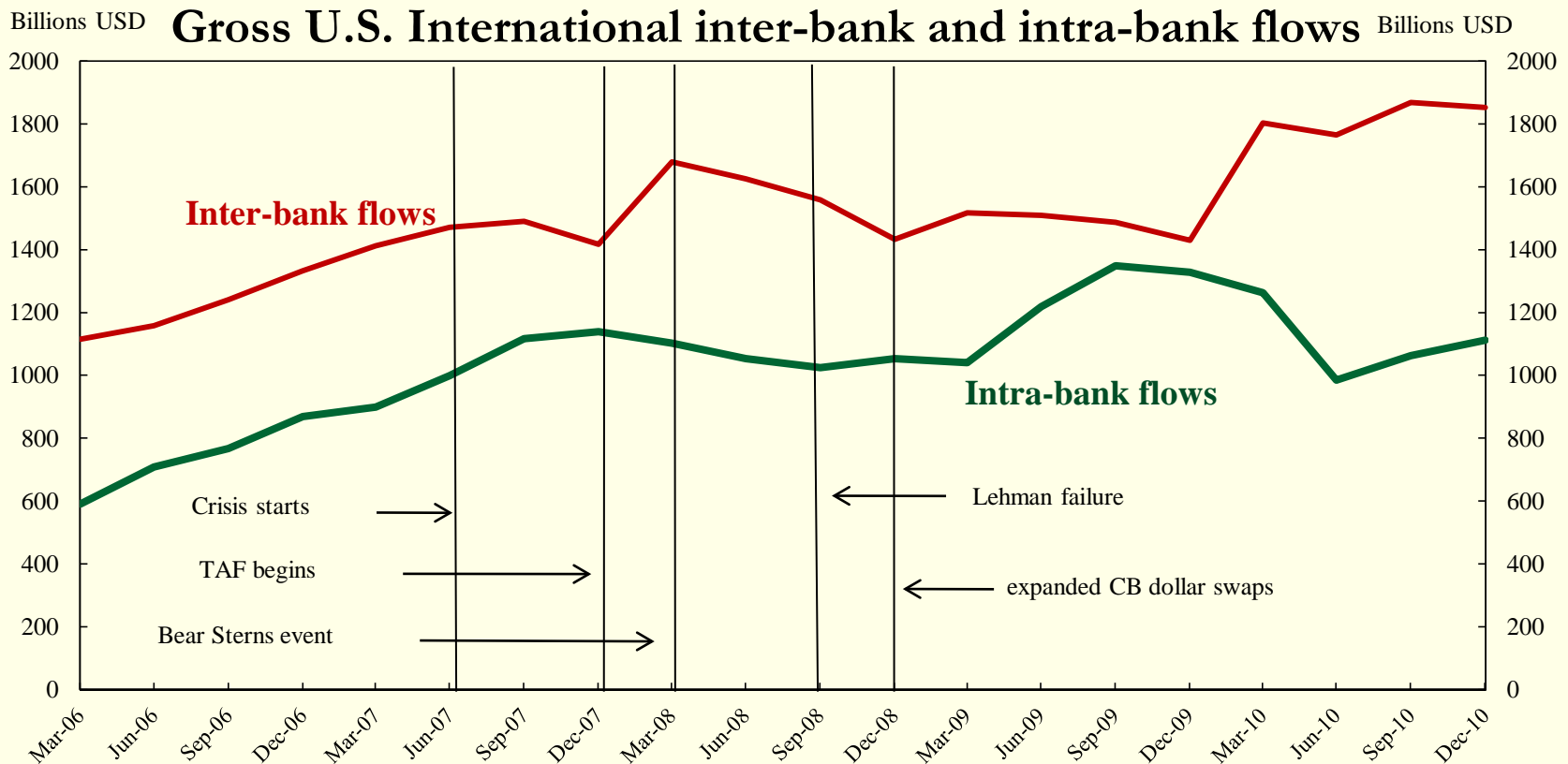| Foreign liquid assets	Deposits
Loans	Other Funds
Foreign local loans	
Internal lending	
	Capital

Global banks manage liquidity globally

- Funding rebalancing achieved through active internal capital market channels.

- Cross-border internal reallocation of funds.

- Motives can be welfare enhancing:
    - Considerations -- risk sharing, efficiency, portfolio diversification, response to financial frictions.

- This is NOT a crisis-specific feature

    - Cetorelli and Goldberg (*Journal of Finance*, Forthcoming)

Internal funding flows are large

Gross U.S. International inter-bank and intra-bank flows

Billions USD

Inter-bank flows

Intra-bank flows

Crisis starts

TAF begins

Bear Sterns event

Lehman failure

expanded CB dollar swaps

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

◄ Net due to related foreign offices, all commercial banks, seasonally adjusted (H8/H8/B1100NCBAM)

Source: Federal Reserve Board 2011

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

Global banks manage liquidity globally

Domestic head office

Foreign operations

Internal funding flows
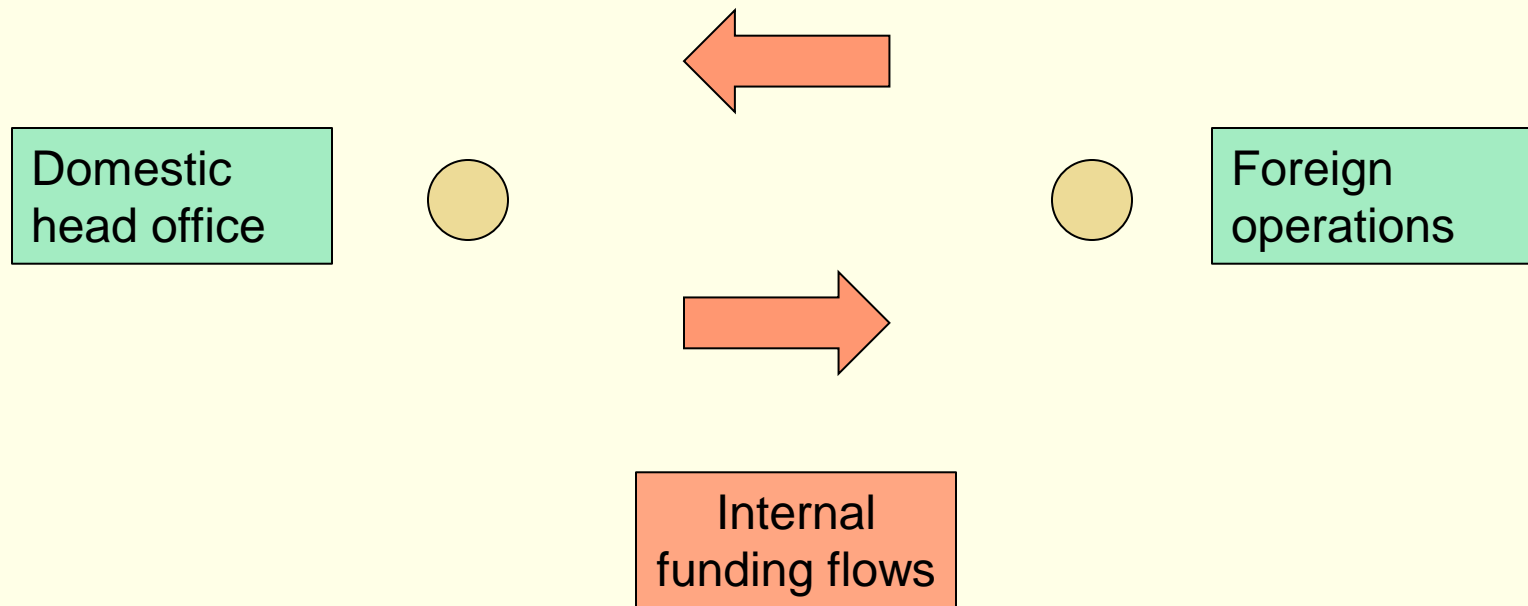
Two conjectures

- 1. *Organizational pecking order*

  Foreign offices balance sheets subordinated to head office

  Funds move in ebb and flow

  A shock at home means a repatriation of funds across locations for each parent bank.
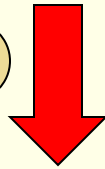
Global banks manage liquidity globally

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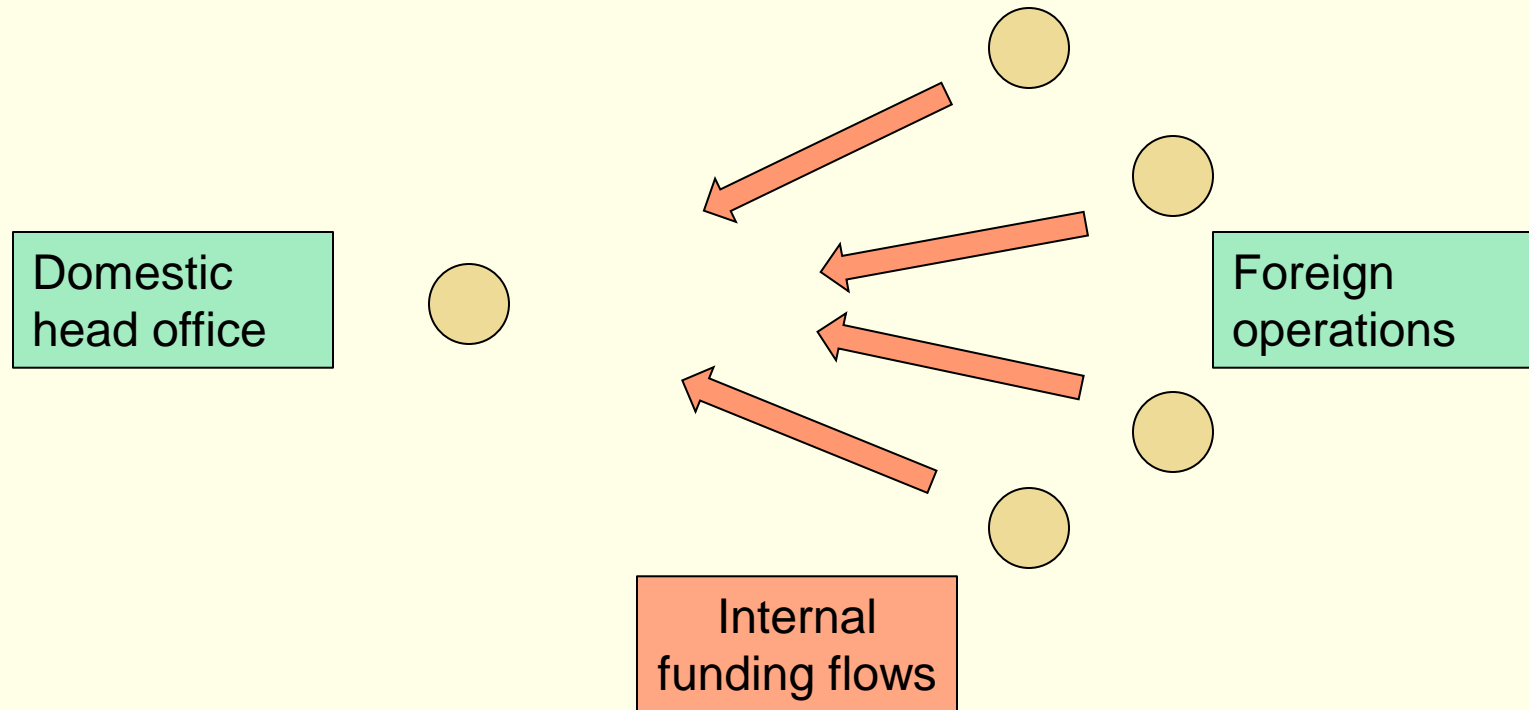
Organizational pecking order

Domestic head office

Foreign operations

Organizational pecking order

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Internal funding flows

Two conjectures

- **2. *Locational pecking order***

  Each bank manages liquidity needs taking into account relative costs and benefits from pulling and allocating a marginal dollar across each location of operation.

  No obvious organizational subordination

Two bank-specific dimensions driving liquidity management strategies

- **Local Funding.**
  - Each foreign location different in terms of importance in raising local funds

- **Local Investment.**
  - Each foreign location different in terms of contribution to total foreign claims

Global bank more likely to …

- ❑ Draw funds from locations that are normally significant *local funding sources*
    - ■ reflects a comparative advantage in obtaining access to external market funds

- ❑ Shield locations that are normally considered important *investment sinks*
    - ■ reflects better returns on investment.
    - ■ such locations may be net receivers of funds.
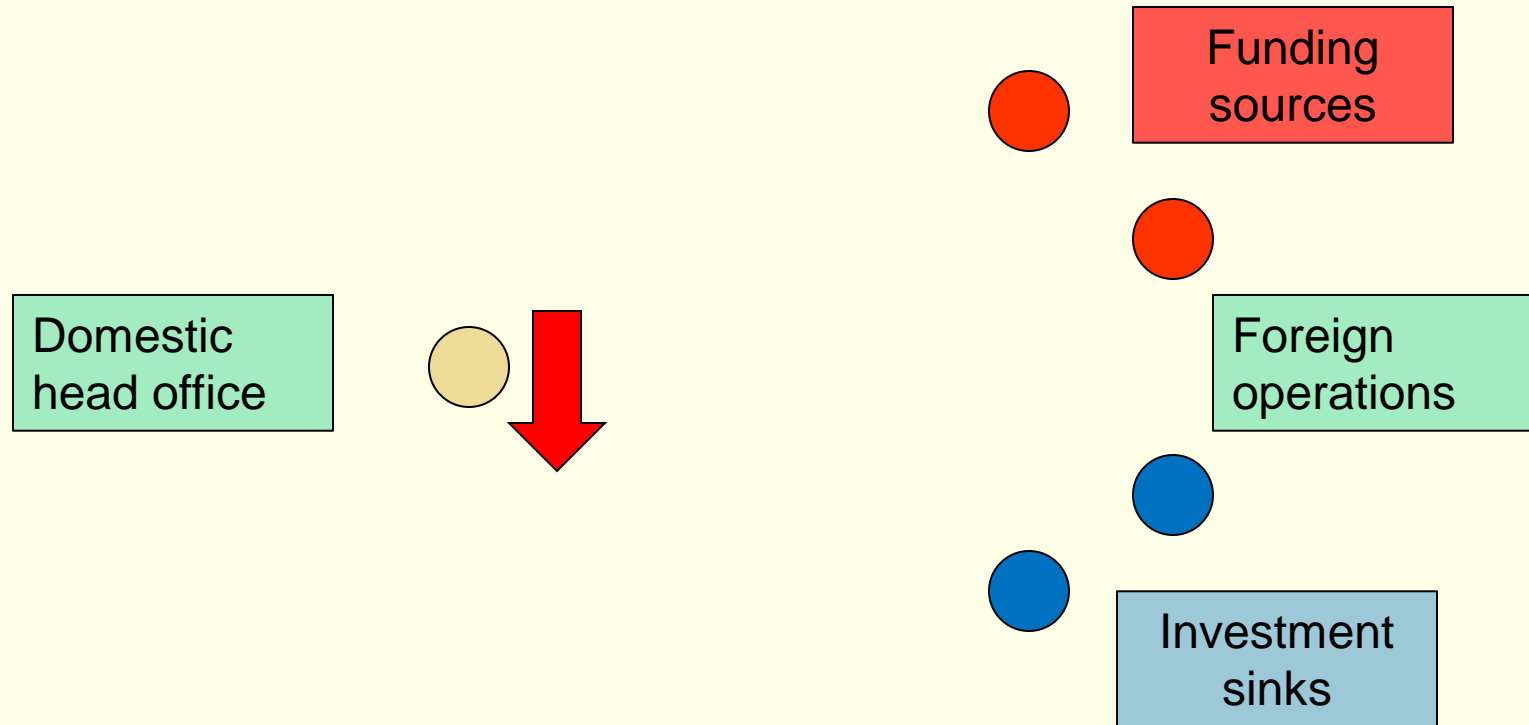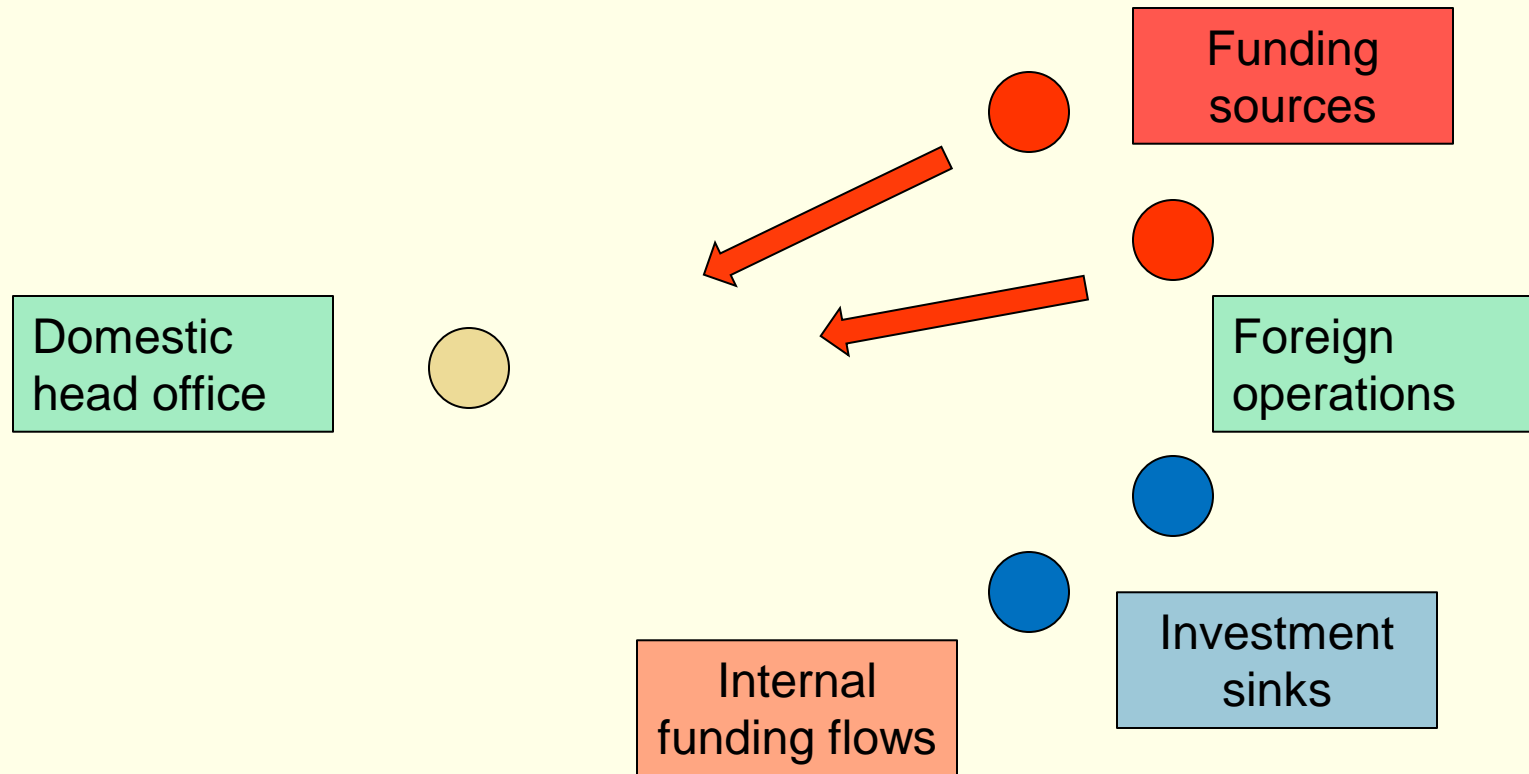
Locational pecking order

Domestic head office

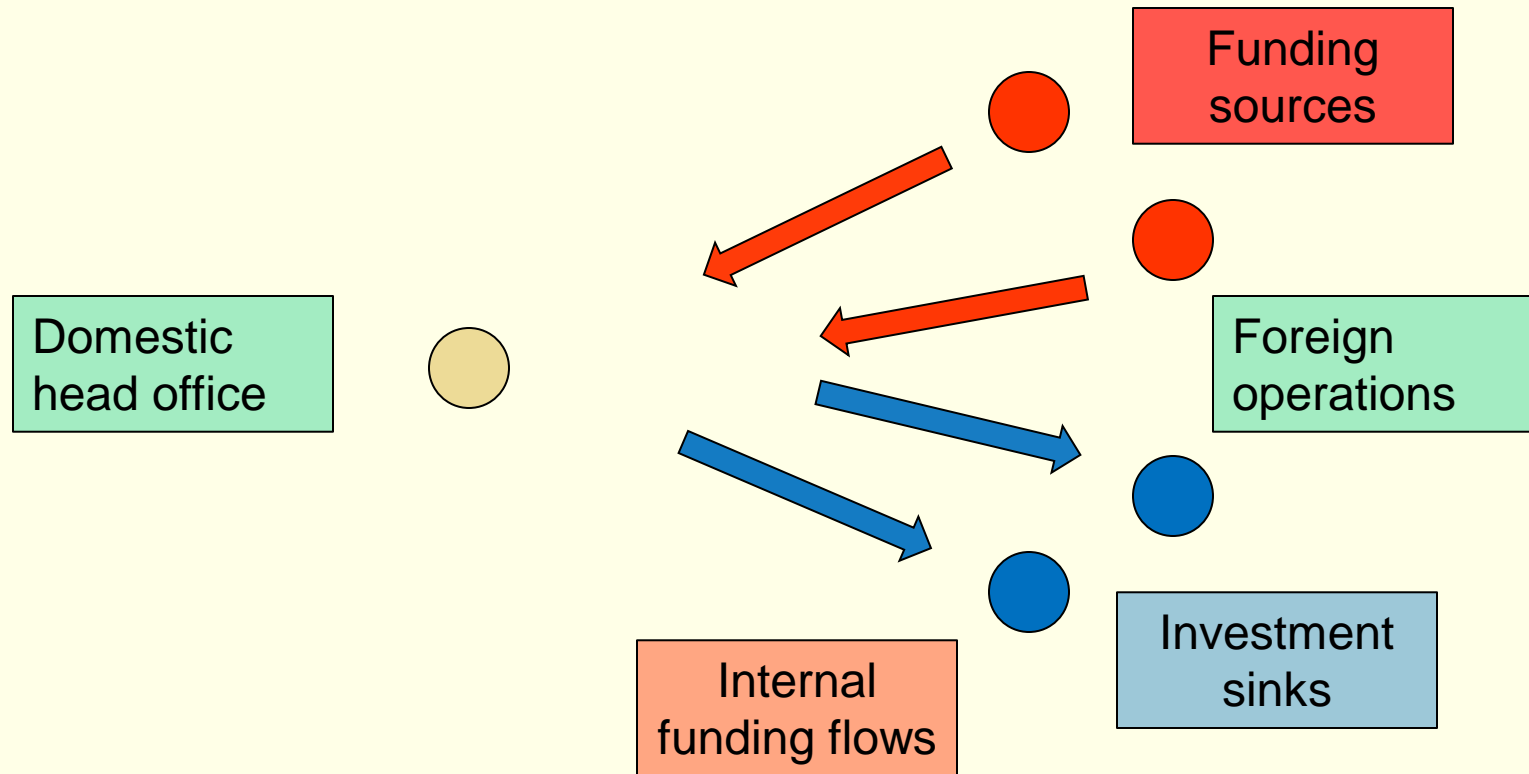Foreign operations

Locational pecking order

Funding sources

Foreign operations

Domestic head office

Investment sinks

Locational pecking order

Funding sources

Foreign operations

Investment sinks

Internal funding flows

Domestic head office

Locational pecking order

Funding sources

Foreign operations

Domestic head office

Investment sinks

Internal funding flows

Preview of Main Findings

Support for locational pecking order conjecture

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

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, liabilities - by country of destination

    - Internal borrowing and lending of affiliates in each foreign location

- Add in parent bank characteristics from *Federal Financial Institutions Examinations Council (FFIEC)* 031 "Call Reports".

- Plus distance characteristics of destination countries

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
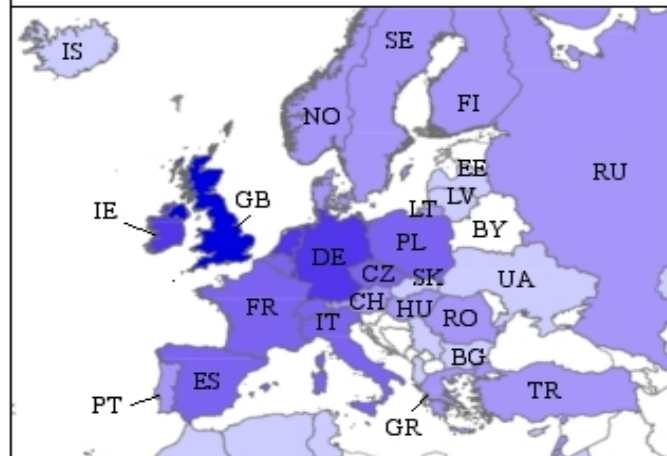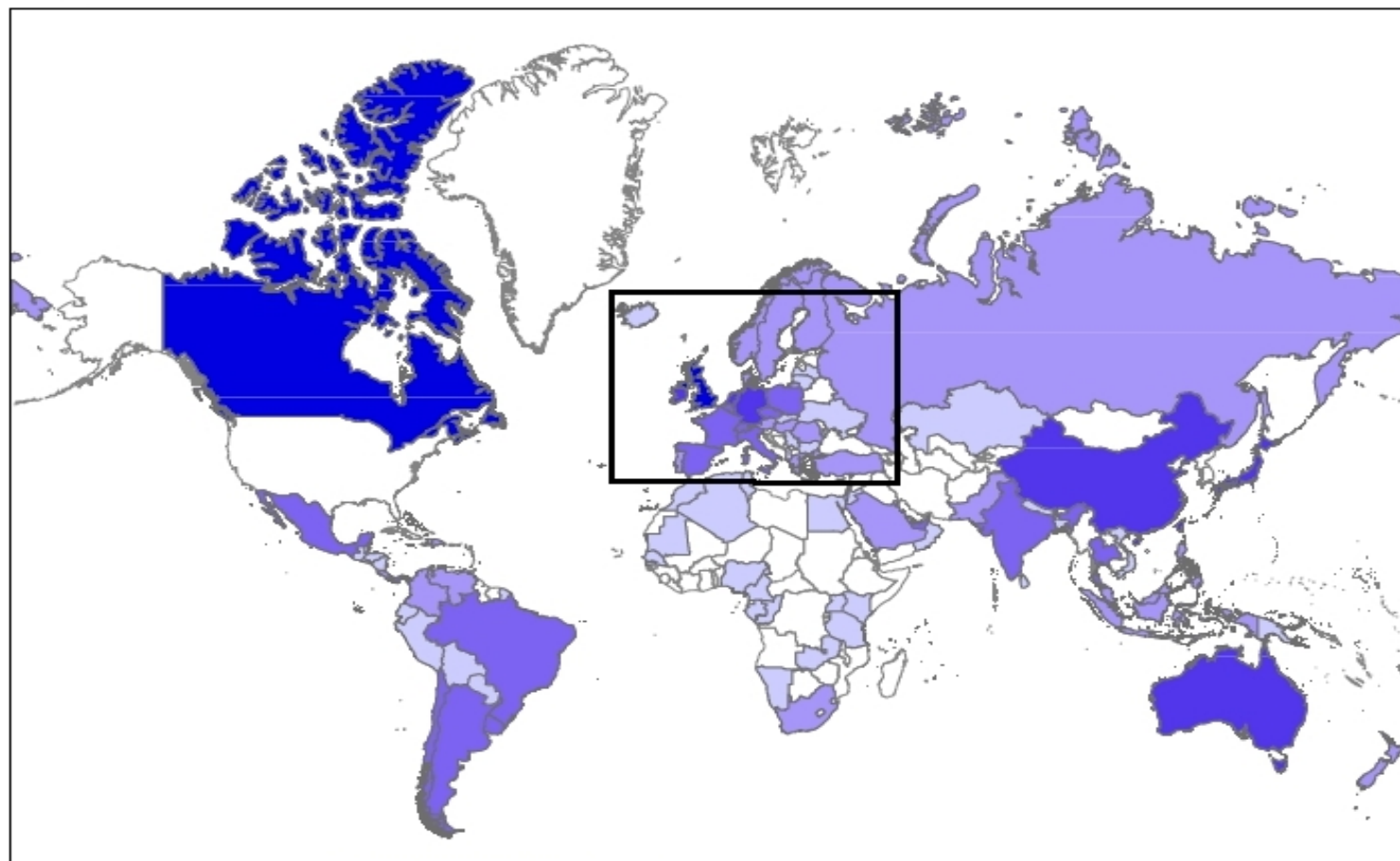
Source data: Author calculations using 2007Q2 FFIEC009 regulatory reports filed by U.S. banks.

Legend:
- 1-2
- 3-5
- 6-10
- 11-15
- 16-30

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)

  Parent banks denoted by i, affiliate locations by j.

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

Econometric methodology

.

$$\Delta NetDueTo_{ijt}^{1} =$$

$$NetDueTo_{ijt|average(2007Q3-2007Q4)} - NetDueTo_{ijt|average(2006Q1-2007Q2)}$$

$$\Delta NetDueTo_{ijt}^{2} =$$

$$NetDueTo_{ijt|average(2008Q1-2008Q2)} - NetDueTo_{ijt|average(2007Q3-2007Q4)}$$

Econometric methodology

.

$$\Delta NetDueTo_{ij}^{p} = \beta_0 + \beta_1 \cdot Shock_i + \beta_2 \cdot X_{it}$$

$$+ \beta_3 \cdot X_j + \beta_4 \cdot X_{ijt} + \varepsilon_{ijt}$$

$$\beta_1 = \gamma_0 + \gamma_1 \cdot X_{it} + \gamma_2 \cdot X_j + \gamma_3 \cdot X_{ijt}$$

- Conjectures:
  - Organization pecking order $\gamma_0 \neq 0 \; \gamma_3 = 0$
  - Locational pecking order $\gamma_0 \neq 0 \; \gamma_3 \neq 0$

Explanatory variables

Table 3 Summary of Explanatory Variables

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

Table 3: Change in Affiliate Borrowing from Parents
Testing Organizational v. Locational Pecking Order – Shock 1

	(a)	(b)	(c)	(d)	(e)
$Shock_i$	**-5427****	**-7395****	**-4682***		**-9698*****
$Shock_i*CoreFunding_{ij}$	**-885*****	**-948****	**-875.6*****	**-755****	**-1041****
$Shock_i*CoreInvestment_{ij}$	**14420*****	**13890*****	**13946*****	**13209*****	**18814***
$Constant$	-134	**-846.8****	-261.6	-3475.8	-510.3
Bank Controls	Yes	Yes	Yes	No	Yes
Country Controls	Yes	No	Yes	Yes	Yes
Foreign Office Controls	Yes	Yes	Yes	Yes	Yes
$Country\ FE$	No	Yes	No	No	No
$Bank\ FE$	No	No	No	Yes	No
$Observations$	500	500	474	500	423
$R\text{-}squared$	0.30	0.39	0.31	0.36	0.33

Full sample, OLS   Drop Caymens, OLS   US Only

Table 4: Change in Affiliate Borrowing from Parents Testing Organizational v. Locational Pecking Order – Shock 2

	(a)	(b)	(c)	(d)	(e)
$Shock_i$	**5700*****	**6498*****	3003		**6218****
$Shock_i*CoreFunding_{ij}$	**1673*****	**1679*****	**634*****	**1720*****	**2052*****
$Shock_i*CoreInvestment_{ij}$	**-9437*****	**-8994*****	-2206	**-9828*****	**-12930****
Constant	-785	398	-67	-7841	-887
Bank Controls	Yes	Yes	Yes	No	Yes
Country Controls	Yes	No	Yes	Yes	Yes
Foreign Office Controls	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	No	No
Bank FE	No	No	No	Yes	No
Observations	513	513	485	513	438
R-squared	0.28	0.37	0.34	0.30	0.33

# Economic significance of core v. periphery features of affiliates

Difference in Change in Net Borrowing of Affiliates from Parents: Core v. periphery comparisons in Financing and Lending High ABCP exposed parents ($mil)				
	Shock1		Shock 2	
	Core funding	Core investment	Core funding	Core investment
Diff High v. Low	-$586 M	$236 M	$1148 M	-$154 M
% change of initial net due	**-53**	**12**	**45**	**-3**

From Table 3 , column **. 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. The average $NetDueTo_{ijt}$ value prior to the crisis for banks of high ex-ante exposure, in relatively important core funding locations, was -1,094 million, i.e. a $1 billion net creditor vis-à-vis the rest of its banking organization.

**Fig 5 Predicted inflows & outflows after first shock
By country, share of total gross flows**
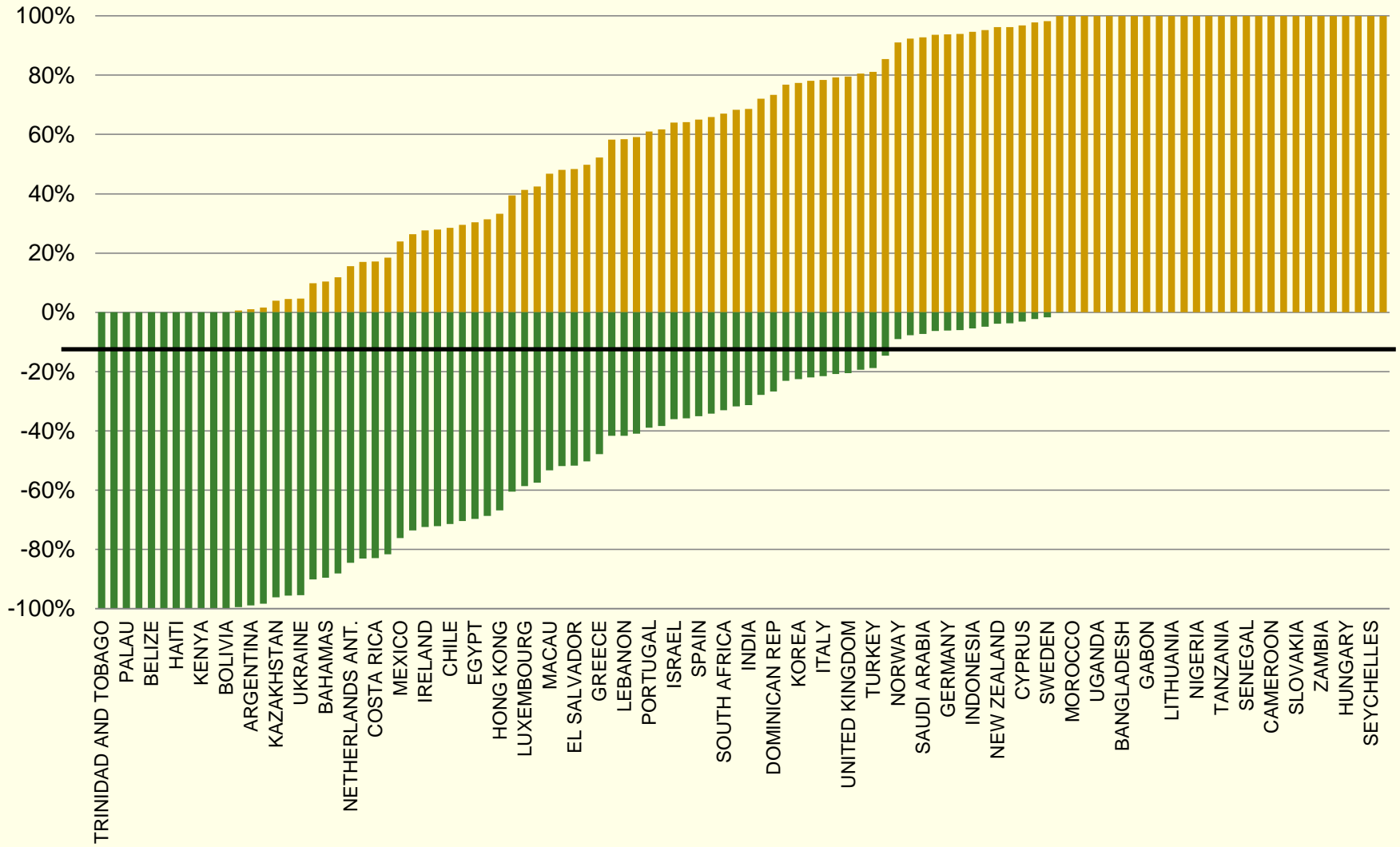
Legend: Total inflows as a share of total gross flows ■ Total outflows as a share of total gross flows ■

Shows differences across banks within affiliate markets

Overview of Findings

Support for locational pecking order conjecture

❑ Given an adverse shock to the parent, affiliate markets:

- Do not similarly source funds to the parent

- Funds drawn relatively more from core funding locations

- Core investment locations supported relative to periphery

- Economic significance of results are large

❑ We provide insight into the structure of international transmission through internal capital markets

❑ Different transmission possible if banks otherwise instructed!

Normative considerations

- Host country perspective on foreign shock transmission

    - less about overall "openness" to international banking

    - more about the specific characteristics of individual foreign banks engaged in its economy.

    - Bank-to-country specific characteristics matter: Argentina may be a core funding market for Santander but a core investment market for Citi

- Policies that constrain global liquidity management?

    - May be ultimately a good thing, but not sure

    - Mechanisms and dynamics still not well-understood.

Reference slides

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

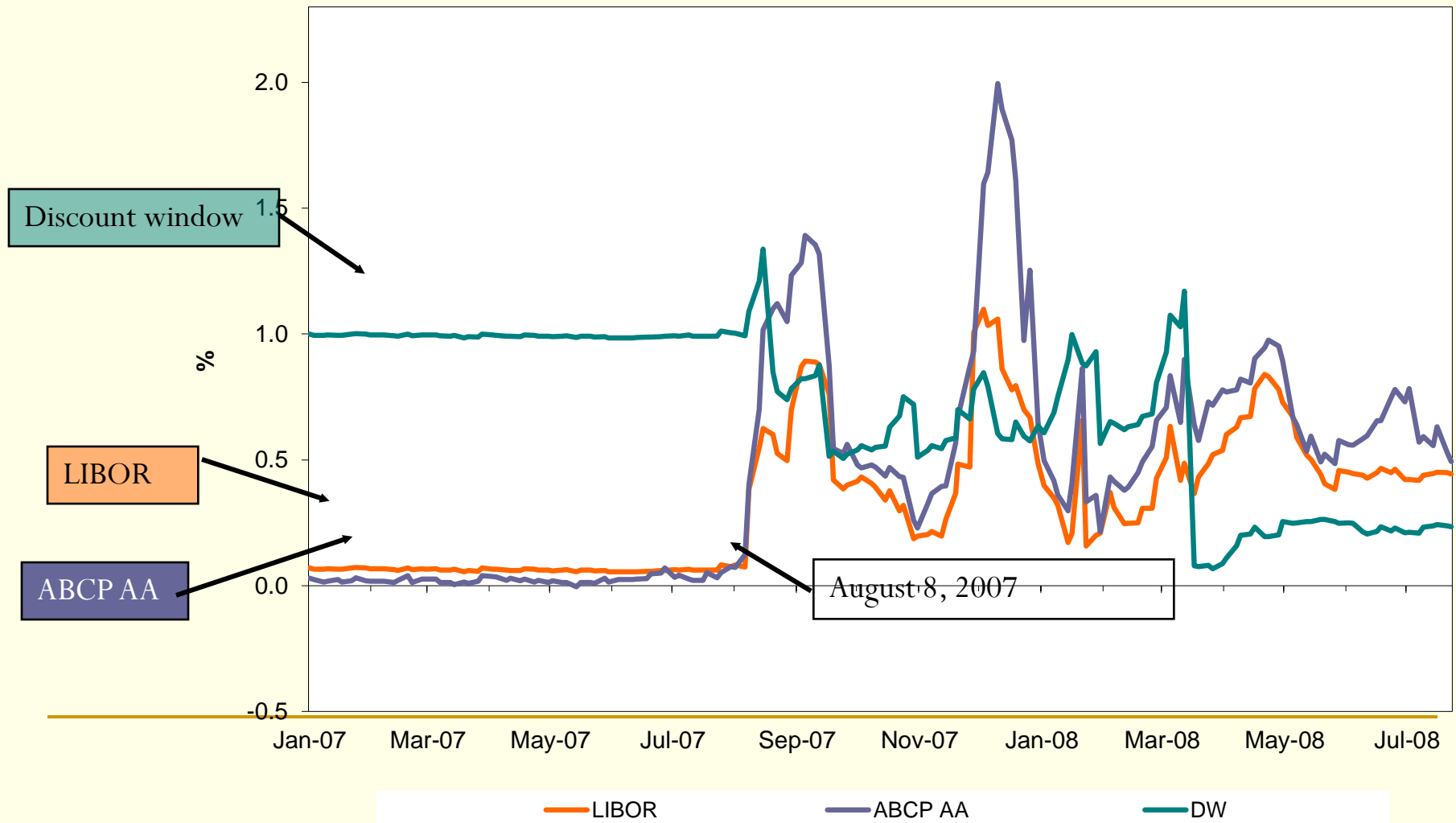| Statistics on U.S. Banking Organization		All Banks	Lower LL	Higher LL	Lower IC	Higher IC
Number of parent banks (2006Q1-2010Q4 average quarterly)	median	42	23	25	32	33
Bank asset size (billions USD)	median	552.56	552.56	1395.62	552.56	539.87
Total Net Due From / assets (%)	median	0.74	0.88	1.77	0.74	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)

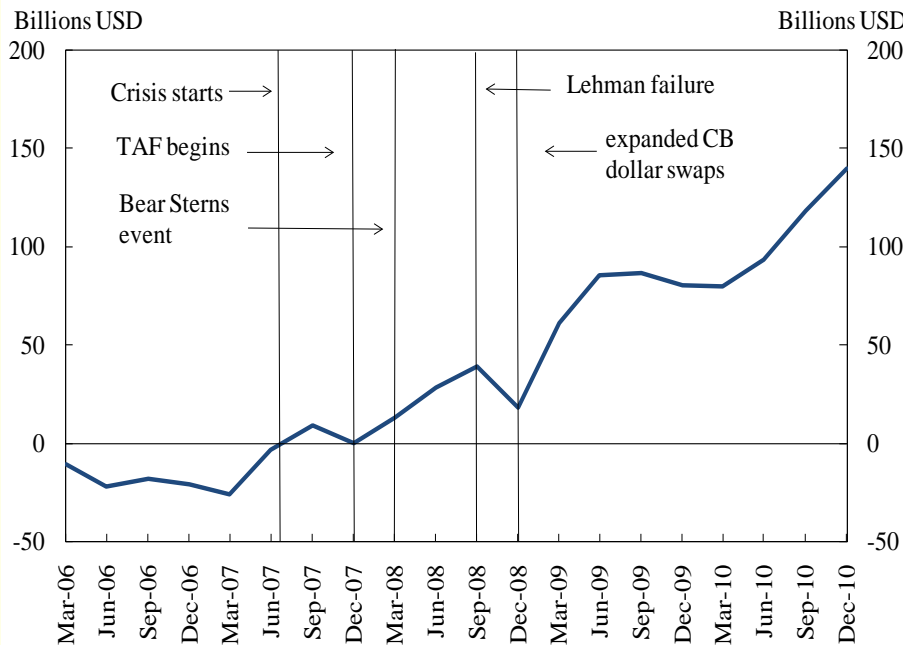| Statistics by Affiliated Banking Organizations		All Banks	Lower LL	Higher LL	Lower IC	Higher IC
Number of bank-affiliate observations (2006Q1-2010Q4 average quarterly)	median	550	180	180	264	264
Local liabilities / total affiliate liabilities [LL] (%)	median	77.63	20.45	100.00	79.86	60.56
Local and 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

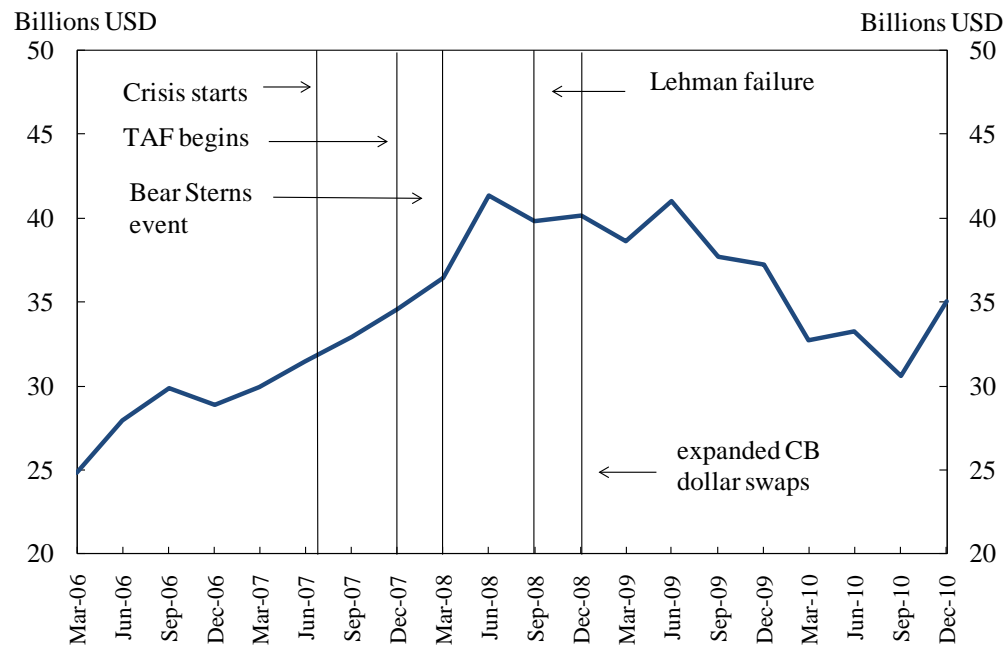# The crisis provided a natural experiment for testing changes in liquidity allocation across global firms.
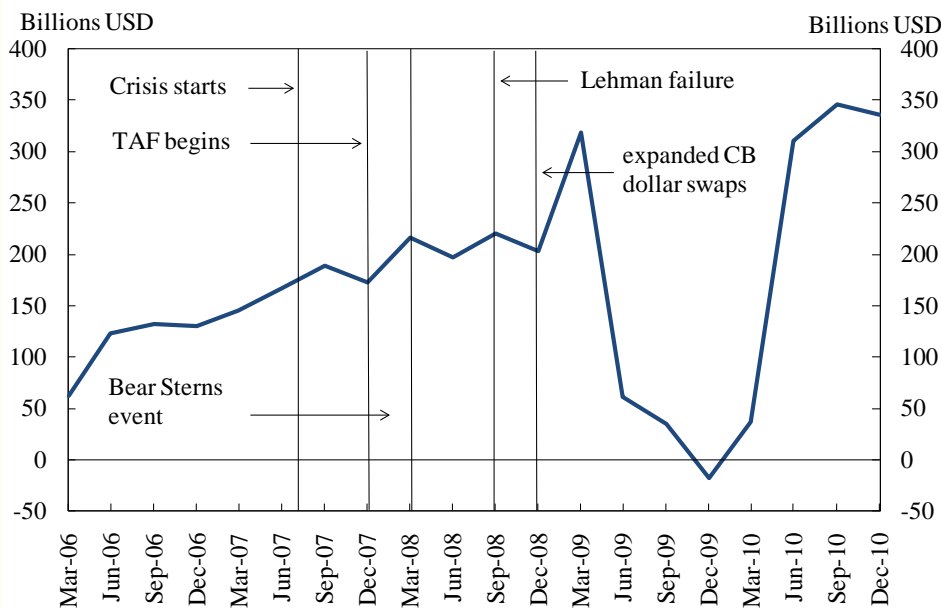
Spread of One Month Rates to OIS

i) Africa, Asia, and Australia

Billions USD

- Crisis starts →
- TAF begins →
- Bear Sterns event →
- ← Lehman failure
- ← expanded CB dollar swaps

ii) North America

Billions USD

- Crisis starts →
- TAF begins →
- Bear Sterns event →
- ← Lehman failure
- ← expanded CB dollar swaps

iii) Europe

Billions USD

- Crisis starts →
- TAF begins →
- Bear Sterns event →
- ← Lehman failure
- ← expanded CB dollar swaps

iv) Central and South America

Billions USD

- Crisis starts →
- TAF begins →
- Bear Sterns event →
- ← Lehman failure
- ← expanded CB dollar swaps