FEDERAL RESERVE BANK *of* NEW YORK

Liquidity Management of Global Banks

Nicola Cetorelli   Linda Goldberg

Federal Reserve Bank of New York   Federal Reserve Bank of New York and NBER

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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.
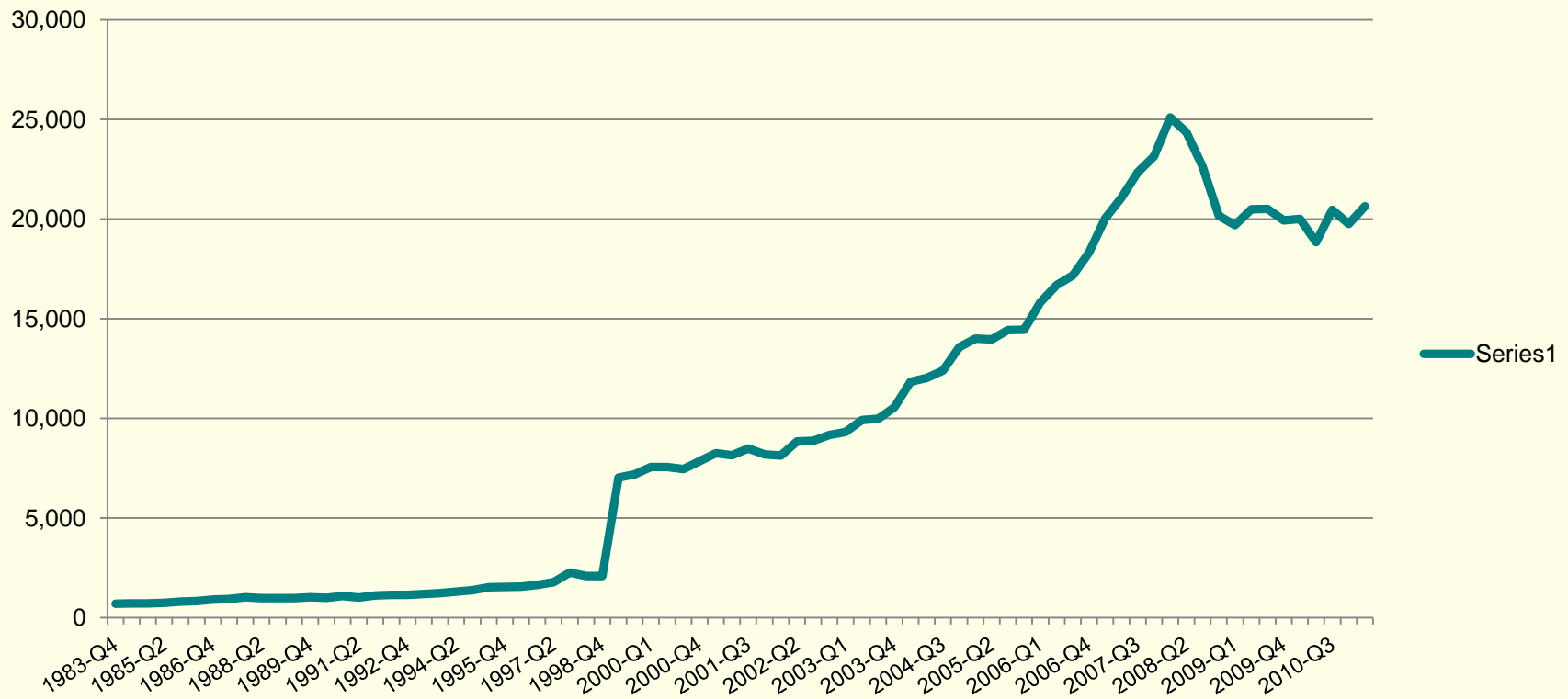
There is substance to this argument.

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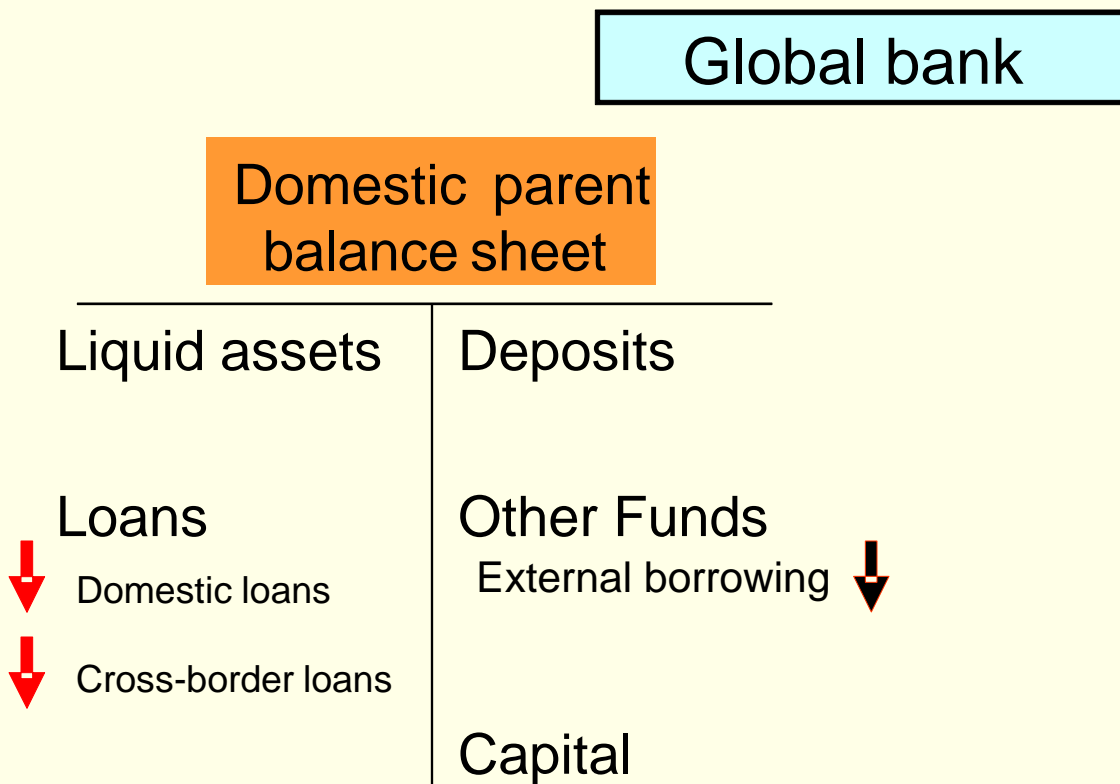
Regulatory backlash

- 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
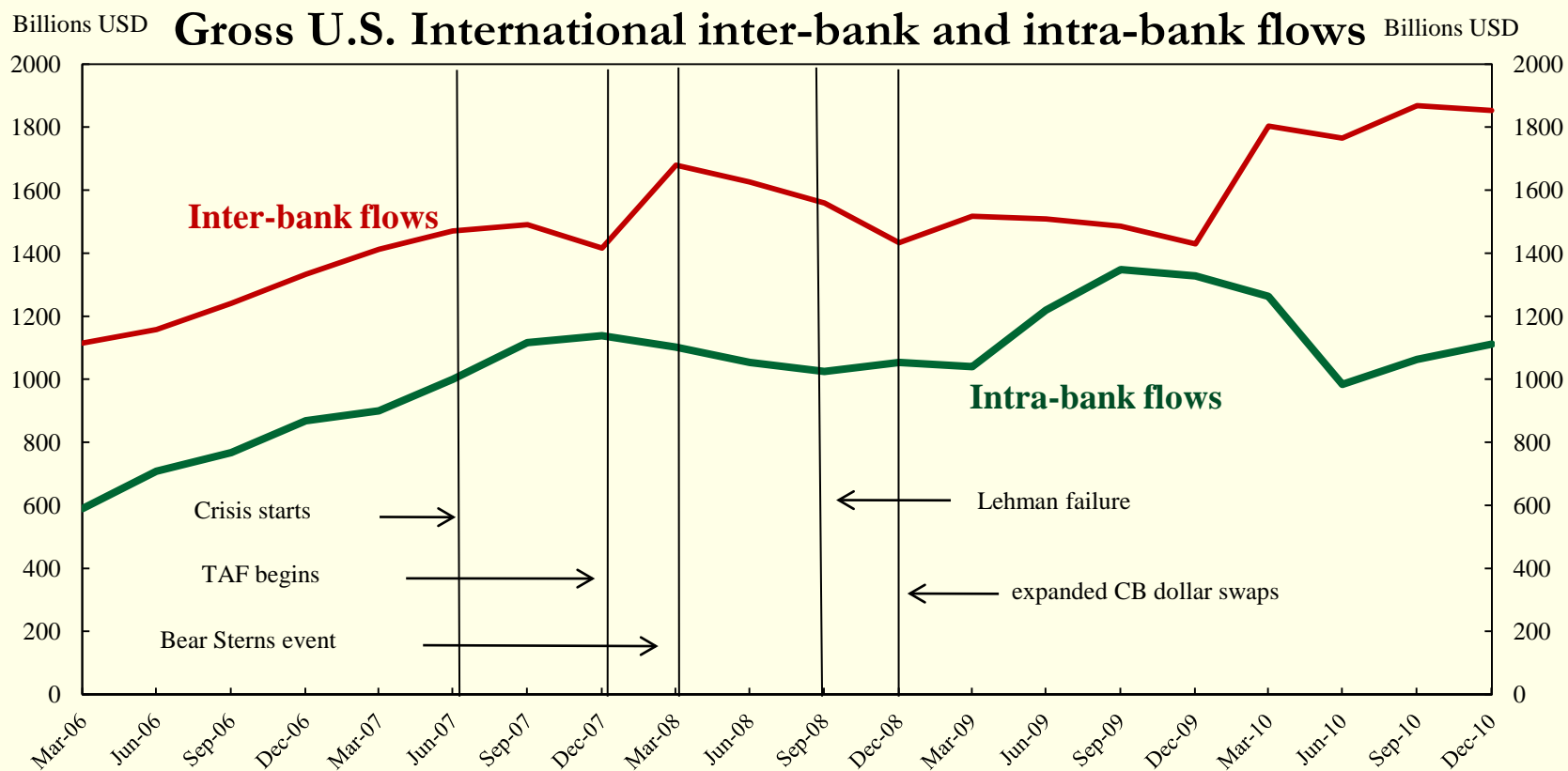**1983-2011**
$ Billion

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?

Global bank

Domestic parent balance sheet

Liquid assets	Deposits
Loans	Other Funds
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.

- 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 (left axis), Billions USD (right axis)

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

Two conjectures

- **1. *Organizational pecking order***

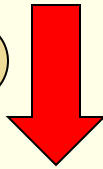 Foreign offices balance sheets subordinated to head office

  Funds move in ebb and flow

  A shock at home means a repatriation of funds across locations

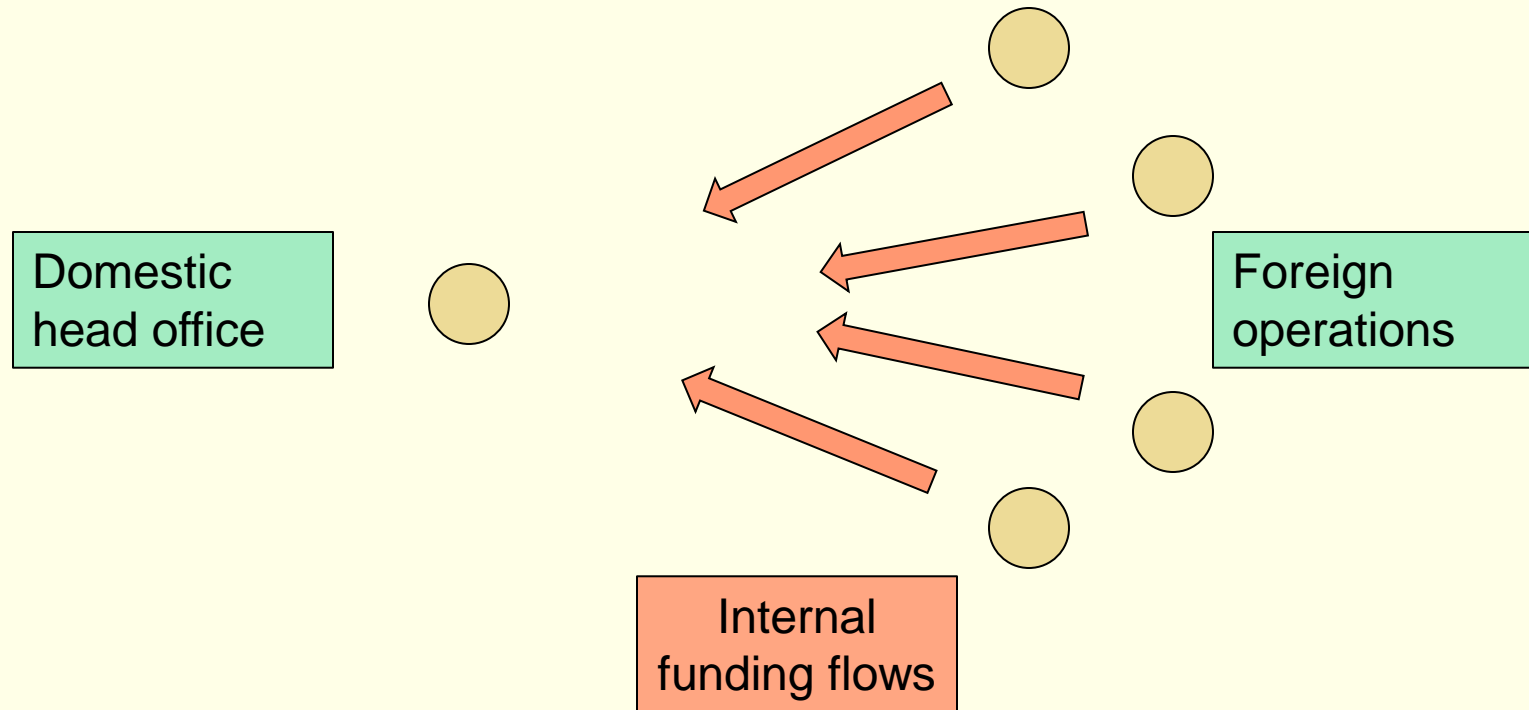 Application of "home bias" hypothesis

Organizational pecking order

Domestic head office

Foreign operations

Organizational pecking order

Domestic head office

Foreign operations

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

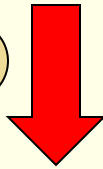- Local Investment. Each foreign location different in terms of contribution to total foreign claims

Global bank more likely to …

Draw funds from core *local funding sources*

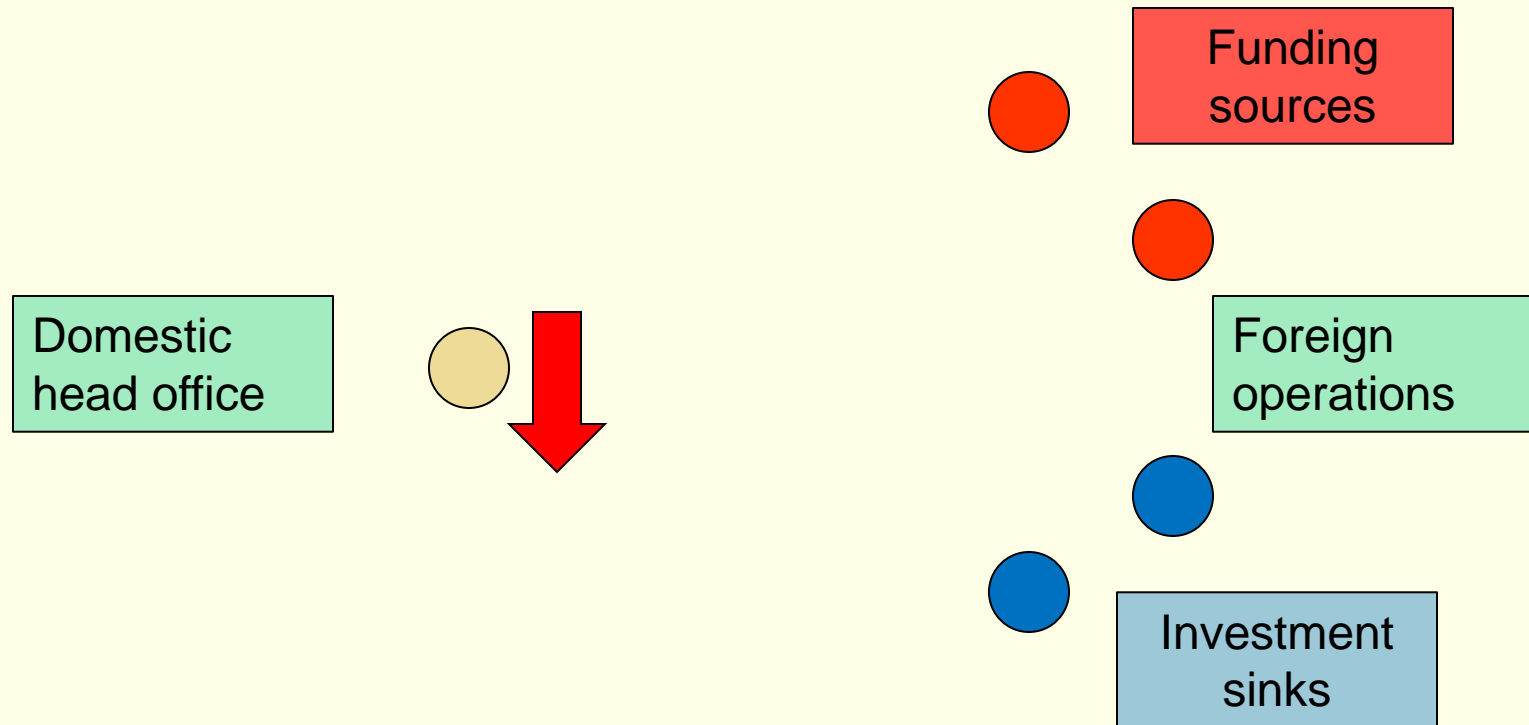Shield core *investment sinks*

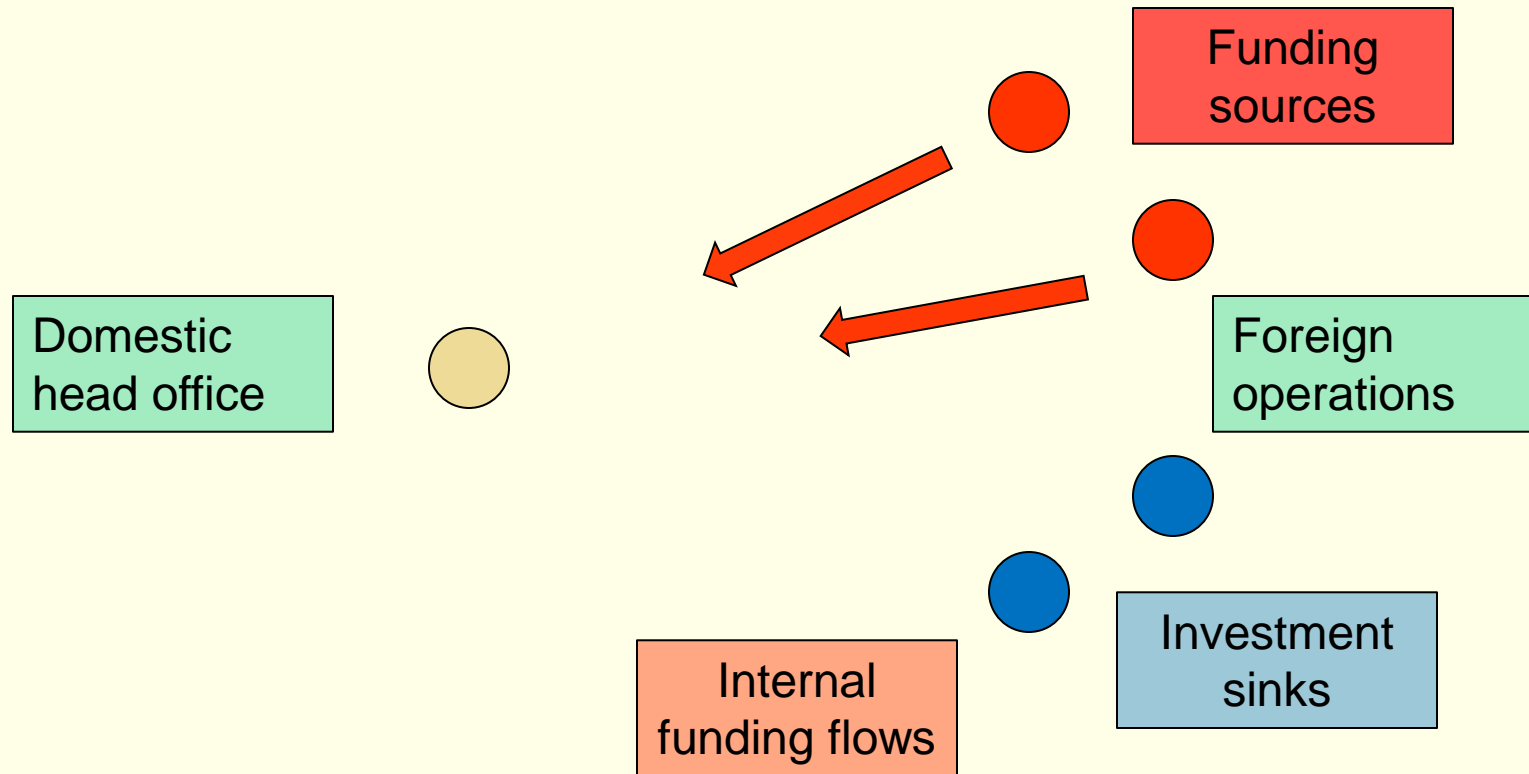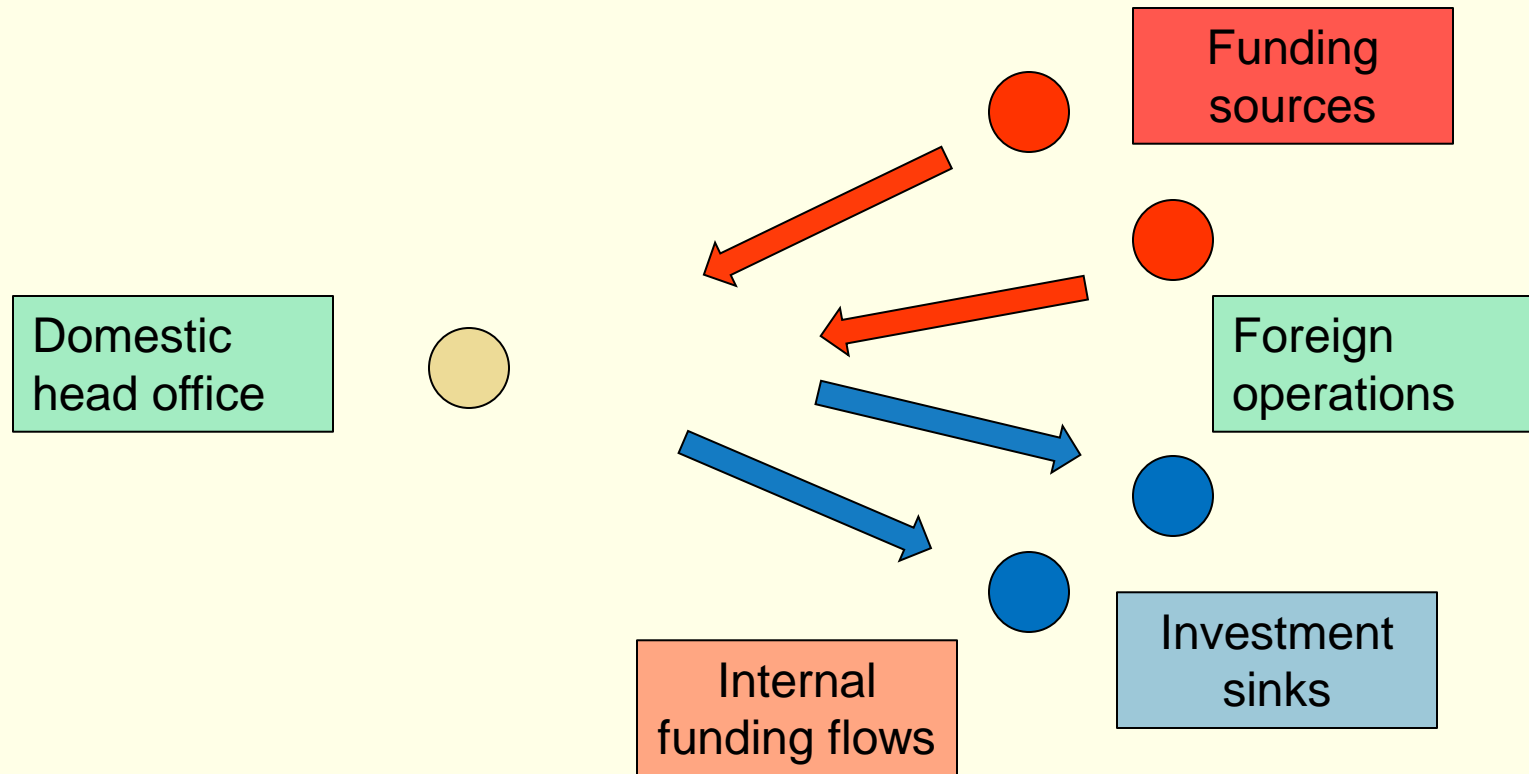# Locational pecking order

Domestic head office

Foreign operations

Locational pecking order

Funding sources

Foreign operations

Investment sinks

Domestic head office

Locational pecking order

Locational pecking order

Data description

- FFIEC 009. Confidential data.

  - Quarterly. Filed by every U.S bank or its holding company, and foreign bank subsidiaries in U.S.

  - For each bank, data by each country in the world

    - cross border claims and claims and liabilities where bank has local offices

    - Net internal borrowing/credit for each location

- Add in parent bank characteristics (Call Report).

- Plus characteristics of destination countries

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 $_i$

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.

- **"Pre-existing condition"**: Ex-ante exposure of bank $_i$ to ABCP programs (Acharya, Schnabl and Suarez, Journal of Financial Economics, Forthcoming)

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

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 $\gamma_0 \neq 0 \ \gamma_3 \neq 0$

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$_{ii}$*	**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***

Evidence in support of the locational pecking order hypothesis

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

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

Predicted internal borrowing and lending from/to foreign locations
First shock event

By country, share of total gross flows

Inflows

Outflows

■ Total inflows as a share of total gross flows   ■ Total outflows as a share of total gross flows
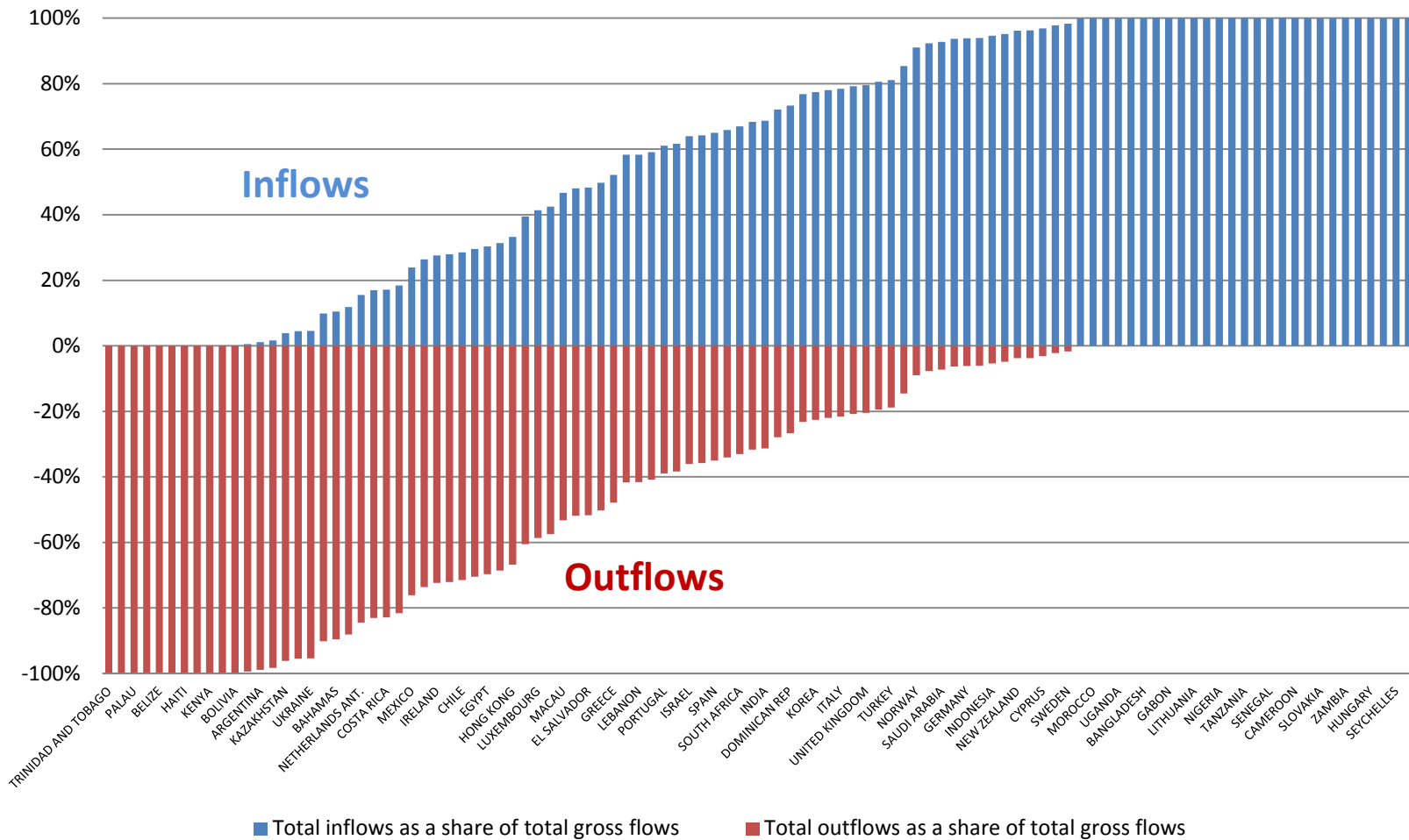
Reference slides

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 Affiliate Borrowing from Parents
Testing Organizational v. Locational Pecking Order – Shock 1

	(a)	(b)	(c)	(d)	(e)
Shock$_i$	-5695.7*	-7156	-2219.9		-8389.4*
*Shock$_i$*CoreFunding$_{ij}$*	**-1157.5***	**-1158.6***	**-569.9****	**-1312.9***	**-1565***
*Shock$_i$*CoreInvestment$_{ij}$*	**14120.8***	**13215.8***	**8867.6***	**16755.3***	**24093.4***
Constant	-770.2	-753.3	-1680.4	-1460.8	-1506.1
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	509	509	480	509	432
R-squared	0.24	0.32	0.29	0.33	0.31
	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)
$Shock_i$	3806***	4266.2***	2162*		6086***
$Shock_i*CoreFunding_{ij}$	1147.8***	1101.1***	308.5***	1218.7***	1520.3***
$Shock_i*CoreInvestment_{ij}$	-6600.5**	-5732.8*	-1526	-7509.8**	-11760.6***
$Constant$	-1341.1	-6.6	-713.7	14411***	-1775.6
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
$Observations$	517	517	489	517	442
$R\text{-}squared$	0.23	0.30	0.26	0.25	0.27

The crisis provided a natural experiment for testing changes in liquidity allocation across global firms.

Spread of One Month Rates to OIS
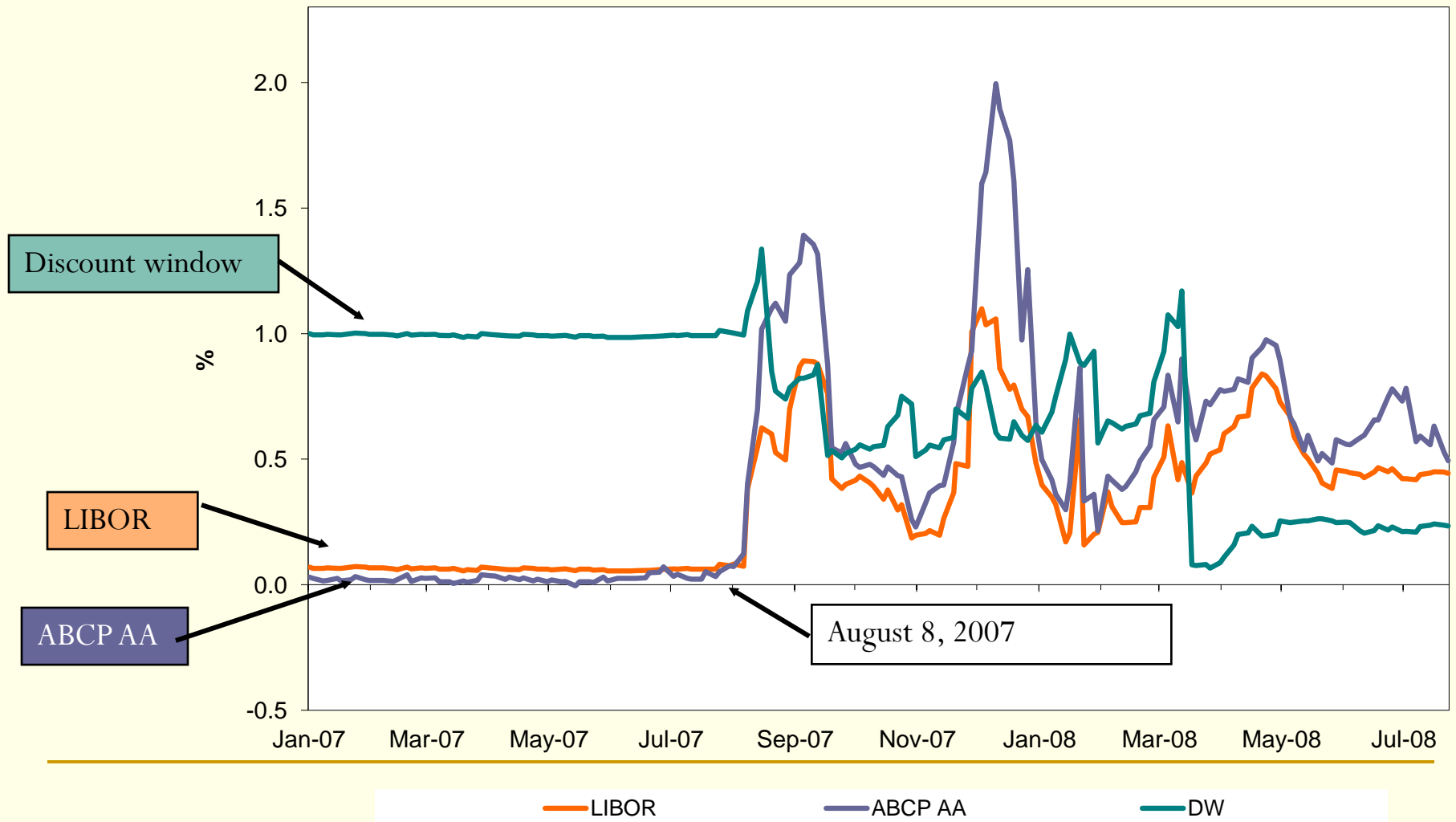
# Table 1 Counts of U.S. Banks With Foreign Affiliates

ALL banks	2006q1	2007q1	2008q1	2009q1	2010q1
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
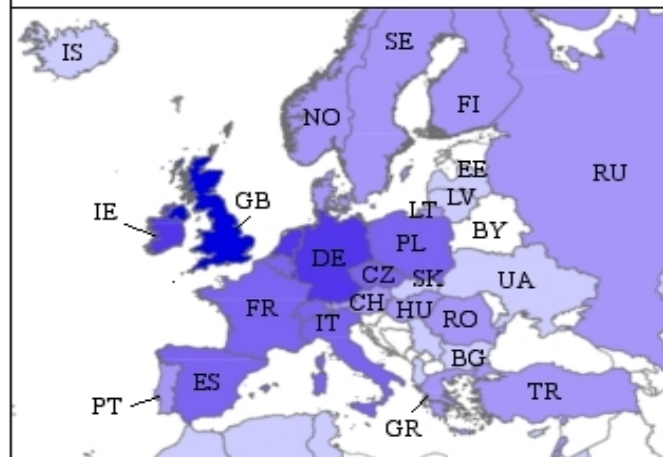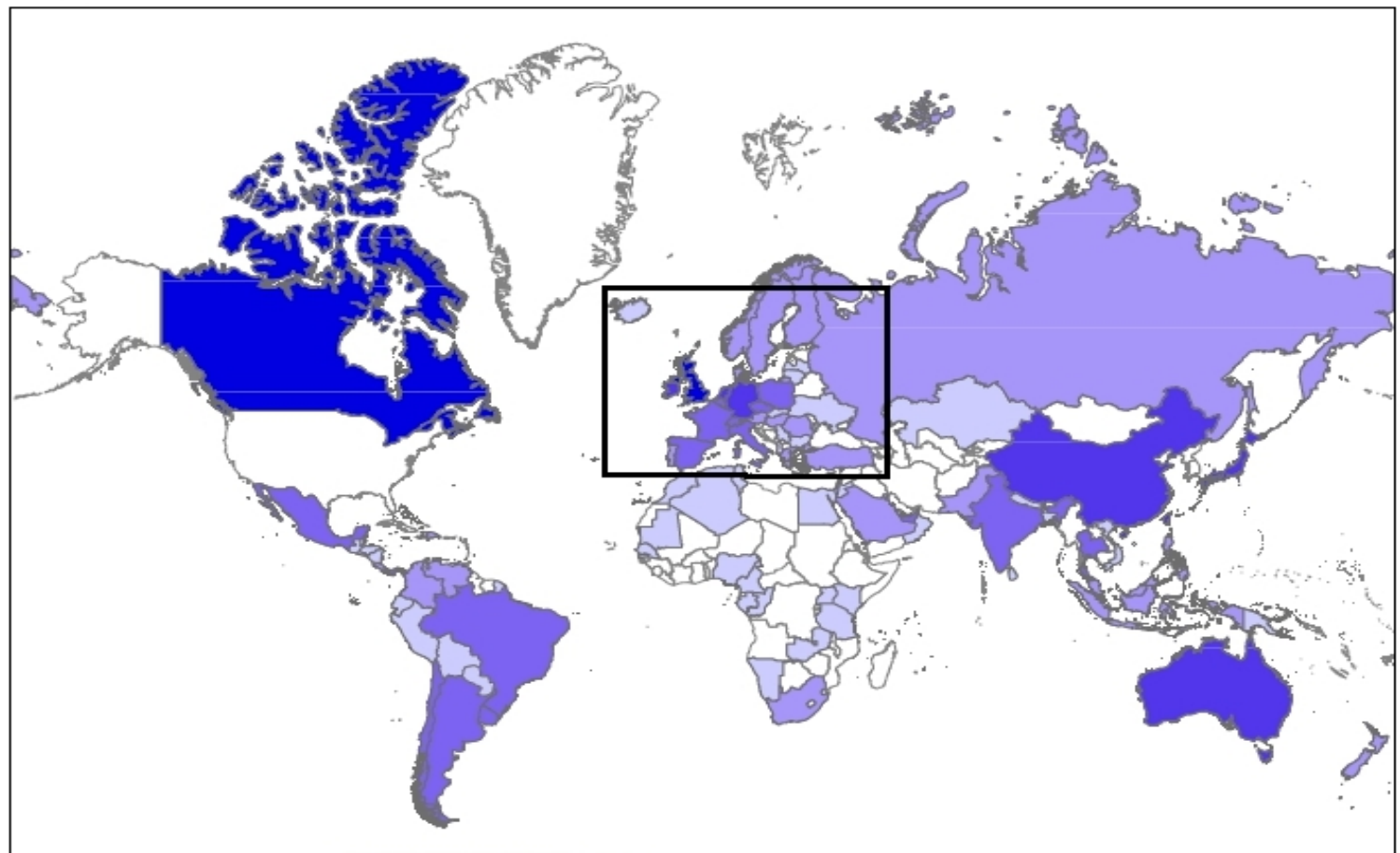
Legend:
- 1-2
- 3-5
- 6-10
- 11-15
- 16-30

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