The Role of Regulatory Arbitrage in U.S. Banks' International Lending Flows

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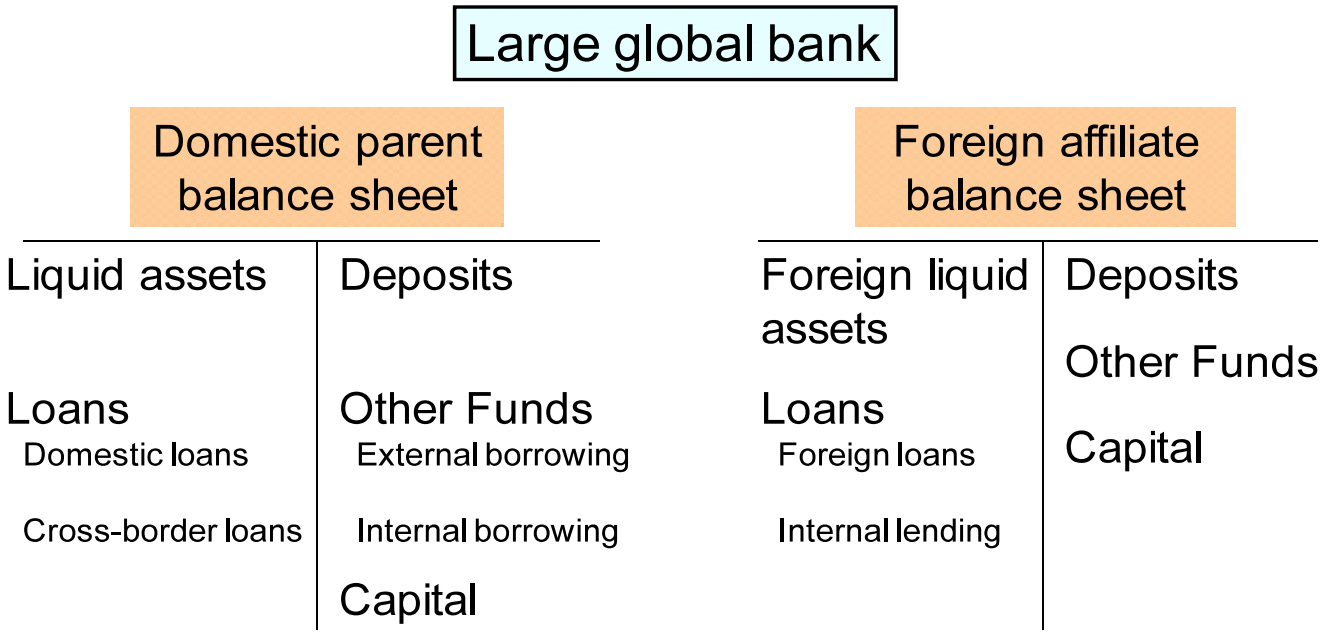
This paper

- Studies how U.S. banks' foreign activities are affected by the stringency of host market bank regulations over the past decade
- Uses bank-level data to analyze foreign market entry, and cross-border and affiliate lending choices



A quick preview: Main points

1. **How prevalent is regulatory arbitrage in U.S. banks' foreign activities?**
   - Prevalent in cross-border lending and market entry; less so in affiliate lending
2. **Which bank characteristics are associated with regulatory arbitrage behavior?**
   - Non-commercial banks with a higher share of foreign ownership and a limited scope of foreign activities are the most engaged in arbitrage
3. **How profitable is arbitrage behavior?**
   - Banks that engage in regulatory arbitrage in their cross-border and market choices are significantly more profitable in their foreign operations

Outline of Presentation

1. Overview of global bank regulatory framework
2. Some facts about U.S. banks' foreign activities
3. Description of data and methodology
4. Results
5. Summary

The Regulation of Global Banking Activities

- Up to 2009: regulated at country level - great variation in standards (activity limits, market structure and discipline, supervision)
- Status quo: bank's home country's rules are applied to global activities - at 'consolidated' level (e.g. capital rules)
- Ample opportunities for global banks to relocate their activities to less regulated jurisdictions (Houston et al, 2012)
- **Regulatory arbitrage (in this context): global banks' strategic choice to move resources across borders so as to increase profits by minimizing the regulatory burden on their activities**

What has enabled arbitrage?

- Countries have strong incentives to 'go it alone' in bank regulation:
  - Growth benefits of foreign bank lending (Goldberg, 2007)
  - Competitive advantage (Fidrmuc and Hainz, 2013)
  - Policy effectiveness (Cetorelli and Goldberg, 2012)
- Short-term benefits, but significant long-term costs:
  - Reduced lending standards abroad (Ongena et al, 2013)
  - Regulatory 'race to the bottom': Financial bubbles, overheating, crises (Agur, 2013)

Proposed solution: Regulatory coordination

- 2009-2010: G20's Financial Stability Board's strong push for global regulatory coordination
- Basel III framework: internationally coordinated and harmonized capital and liquidity rules
- European Banking Union
  - *Single rulebook* in Single Supervisory Mechanism for all EMU countries:
    - Capital rules, supervision, transparency and good governance

  Main drawbacks of 'global' coordination:

  - Very slow implementation
  - Lack of conviction

Problems of the coordination approach

- Slow implementation:
  - Banking Union: resolution mechanism complete by 2016; depositor insurance revisited in 2019
  - Basel III: implementation deadline moved from 2015 to 2019

- Lack of conviction
  - U.S. Fed Governor Tarullo: *"...it is not clear that we should aim toward extensive harmonization of national regulatory practices related to foreign banking organizations."*

  - *A. Dombret (DB Exec. Board): "The leitmotif for financial regulation ought to be international consistency, not one-size-fits-all."*

Financial Centers' response to regulatory disharmony

- "Territorial approach": 'ring-fencing'
- Governor Daniel Tarullo (November 2012): *"reforms [that come from the 'global' approach] are primarily directed at the consolidated level, with little attention to vulnerabilities posed by internationally active banks in host markets.... For the foreseeable future, then, our [U.S.] regulatory system must recognize that while internationally active banks live globally, they may well die locally."*
- United States: Dodd-Frank Act of 2010:'enhanced prudential standards' for large foreign banks; U.S. capital and liquidity requirements imposed on parent bank abroad – 'extra-territorial' approach

Others follow suit

- United Kingdom: foreign banks operating in the U.K. must have extra cash on hand, while U.K. banks must limit their exposure to their foreign subsidiaries
- Switzerland: Swiss authorities have explicitly prioritized the domestic systemically important operations of their large, internationally active firms in resolution
- EU Commissioner Michel Barnier's letter to Ben Bernanke (April 2013): *"I now expect the US to come forward with final rules on the implementation of the Basel III agreement, thereby honouring the G20 commitment... We fear that the [U.S. rules] could spark a protectionist reaction from other jurisdictions... [and] end-up with a fragmentation of global banking markets and regulatory frameworks."*
- U.S.: no action is unfair to U.S. banks; U.K. is doing it too

So...what now?

- Barnier foreshadowed protectionism, retaliation and *diverted bank flows* in response to territorial actions
- Lack of coordination (old status quo) raises fears of 'race to the bottom'
- This is where this paper fits in, by addressing the following questions:
  - How significant are these regulatory effects (tightening or loosening) on international bank flows?
  - Which banks are affected, and do they benefit?
  - Arbitrage is prevalent, profitable and more common among large bank holding companies

Data on U.S. banks' foreign activities

- Quarterly bank-level dataset (2003-2013) on U.S. banks' foreign activities from FFIEC Country Exposure Reports: data on 82 banks' lending in appr. 80 foreign countries
- Example: Bank of America's cross-border claims on the financial, non-financial private, and public sectors of Germany, as well as data on claims of BofA's German affiliate, in March 2005

The Types of U.S. Bank Lending Abroad (Cetorelli and Goldberg, 2010)

Large 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
	Other Funds
Loans	Capital
Foreign loans	
Internal lending	

U.S. Banks' Lending Abroad: 2003 to 2013

- Regulated by Regulation K of the Federal Reserve Board
- By bank type: 59 percent are commercial banks, 28 percent are BHC offices, rest are edge corps. and financing offices
- By scale of foreign exposure:
  - Cross-border claims: 7 percent (2003) to 12 percent (2013) of total assets
  - Affiliate claims: 4 percent (2003) to 17 percent (2013) of total assets
  - Ratio of affiliate to C-B claims per country: 28 percent (2003) to 39 percent (2013)

U.S. Banks' Lending Abroad: 2003 to 2013

- By sector of lending: 45 percent to banks; 8 percent to sovereigns; 37 percent to private sector
- Geography of subsidiaries: # of U.S. banks per country
  - Europe: 11-12 banks
  - South America: 5-7 banks
  - Asia: 5-6 banks
  - Mid-East: 2-3 banks

Dependent variables

- Annual cross-border flows: the annual *percent* change in each bank's cross-border claims in each host country's financial, private and public sectors relative to the same quarter of the previous year
- Annual foreign affiliate flows: the annual *percent* change in each bank's claims held through its affiliate in each country
- Foreign affiliate indicator: indicates whether bank maintains an affiliate in the host country

Key Explanatory Variables

- Country-level measures of bank regulatory stringency from World Bank 'Bank Regulation and Supervision' Surveys
- Global survey of national central banks every four years on the stringency and scope of bank regulation
- Central banks report on the stringency of capital rules, activity restrictions, foreign banking limits, disclosure requirements
- Indices a la Barth et al (2008): 2003, 2007 and 2011 surveys are used ▸ Sample
- Variables chosen to reflect FSB and EC concerns

Key regulatory variables - Scale and Scope of Activities

- Overall Capital stringency: extent to which banks are allowed to use certain assets and valuation gains to count towards regulatory capital and to recapitalize the bank
- Overall Activity Restrictions: extent to which banks are allowed to engage in the underwriting and dealing of securities and insurance, and the development and management of real estate
- Overall Supervisory Power: extent to which supervisors can take regulatory actions against banks
- Factors mitigating moral hazard: measure of actions taken to mitigate moral hazard

Key regulatory variables - Market Structure and Discipline

- Limits on Foreign Bank Ownership/Entry: whether foreign banks may enter the country and whether they are allowed to own domestic banks
- Bank Concentration: share of banking sector controlled by top five banks
- Private Monitoring Index: extent to which banks in host country must disclose their risk management practices and report on activities to the public
- Government-owned Banks: share of banking sector owned by the public sector

Addressing the first question: How prevalent is regulatory arbitrage?

Entry | Lending Flows

- Examine the intensity of various foreign activities at the bank-host country level as functions of a range of host country bank regulatory measures

- Main results:
  1. Higher bank concentration in host markets significantly discourages all kinds of U.S. bank activity there - stronger effect on affiliate activity
  2. Stricter capital rules in the host market discourage cross-border lending and foreign affiliate entry, but no significant effect on affiliate lending conditional on entry
  3. Stricter private monitoring (market discipline) in host market strongly encourages affiliate activity (entry and lending) relative to cross-border lending

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How prevalent is regulatory arbitrage? Summary

Standardized coefficients

Regulatory Variable	cross-border lending flows ▸ Full table	affiliate presence prob. ▸ Full table	foreign affiliate lending flows ▸ Full table	ratio of affil. to C-B flows ▸ Full table
capreg	-0.079	-0.010	-0.020	-0.023
	[0.0199]***	[0.006]*	[0.119]	[0.081]
limitforeignbank	-0.295	-0.394		
	[0.214]	[0.211]*		
privatemonitoring	-0.030	0.022		0.315
	[0.008]***	[0.006]***		[0.0505]***
moralhazard	-0.049	-0.067		0.005
	[0.031]	[0.039]*		[0.0263]
bankconcentration	-0.064	-0.078	-0.271	-0.350
	[0.0293]**	[0.0313]**	[0954]***	[0.0627]***
actrestrict	-0.061	-0.002	-0.357	0.018
	[0.0521]	[0.001]	[0.0604]	[0.038]
suppower			0.024	
			[0.117]	
governmentbanks			0.628	
			[0.310]**	
R-squared	0.0404	0.671	0.205	0.190
Observations	5269	2620	437	432

All regressions contain host and time fixed effects & host and macro controls

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Q #2: Which bank traits characterize arbitrage behavior?

▸ Second stage

- Repeat first stage bank by bank: estimate bank-specific average regulatory aversion measures (betas)

- Main Results:
- Banks with more intense regulatory aversion behavior have:

1. Bank Holding Company (non-commercial bank) status
2. Greater foreign (non-U.S.) ownership share
3. Fewer lending partners

Q #2: Which bank traits characterize arbitrage behavior?

Bank-specific average response to host regulation: Standardized coefficients (median:-0.11)

Regulatory Variables	[1]	[2]	[3]	[4]	[5]
scope	0.333	0.484	0.472	0.472	0.58
	[0.037]***	[0.041]***	[0.043]***	[0.043]***	[0.041]***
foreign owner percent		-1.202	-1.205	-1.205	-1.311
		[0.078]***	[0.080]***	[0.080]***	[0.067]***
CAR			-0.0229	-0.0229	-0.141
			[0.107]	[0.107]	[0.090]
Bank Type: Bank				-1.366	-5.775
Holding Company				[0.285]***	[0.228]***
Regulatory District					Yes
Controls					
R-squared	0.498	0.683	0.684	0.684	0.805
Observations	4,200	2,856	2,814	2,808	2,115

All regressions contain bank and time fixed effects

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Q #3: How profitable is arbitrage behavior?

▸ Third stage

- Examine impact of arbitrage behavior on each bank's Net Return on Foreign Assets
- Main Results: Banks earn significantly higher Net Return on Assets if they are engaged in arbitrage behavior in their
  1. Cross-border lending
  2. Foreign affiliate entry choice

Q #3: How profitable is arbitrage behavior?

VARIABLES	[1] roa_foreign	[2] roa_foreign	[3] roa_foreign	[4] roa_foreign
Bank-specific average regulation aversion in C-B lending	-0.154***	-0.468***		
	[0.0305]	[0.100]		
Bank-specific average regulation aversion in Affil. presence			-0.260***	-0.225***
			[0.0550]	[0.0830]
Observations	1743	1542	276	277
R-squared	0.835	0.872	0.817	0.869
Beta Run on Time FE	No	Yes	No	Yes
All regressions contain Bank & Time FEs & Bank Controls				

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Additional Results

- By sector of lending: capital stringency and activity restrictions strongly hinder lending to banks and private sector; public sector results are substantially weaker as expected
- By maturity: Private monitoring and activity restrictions are strongest deterrents of short-term lending; short-term results are substantially stronger as expected
- Role of demand-side controls: Host, sector and time fixed effects enter highly significantly

Summary and Conclusion

- Used bank-level bilateral lending data to examine three questions related to the role of bank regulation in U.S. banks' foreign lending flows

  1. The prevalence of arbitrage: Important roles of capital rules, and market structure and discipline (confirms previous lit.)
  2. The correlates of arbitrage behavior: Important roles of ownership, scope and bank type (new)
  3. The profitability of arbitrage behavior: Strong positive relationship with foreign profits (new)

Policy context and implications

- Context: It's happening. Cross-border regulatory arbitrage appears prevalent and profitable
- Implication: two emergent (short-term) consequences of lack of regulatory coordination can have substantial effects on the global allocation of bank lending
- Deregulation: short-term growth benefits -> 'race to the bottom'; long-term dangers of overheating, crisis
- 'Ring-fencing': stricter host rules imposed on foreign banks can substantially reduce and divert cross-border inflows
- If feasible, global regulatory coordination may be the long-term solution -> eliminate distortionary effects of regulatory differences in the presence of banks' arbitrage behavior

Full Cross-border lending flow results

Back

	[1]	[2]	[3]	[4]	[5]	[6]
VARIABLES						
bankconcentration	-0.038	-0.057	-0.057	-0.037	-0.063	-0.064
	[0.0214]*	[0.0242]**	[0.0242]**	[0.0285]	[0.0317]**	[0.0293]**
capreg		-0.064	-0.064	-0.068	-0.071	-0.079
		[0.0303]**	[0.0303]**	[0.0297]**	[0.0209]***	[0.0199]***
limitforeignbank			-0.149	-0.175	-0.256	-0.295
			[0.289]	[0.283]	[0.234]	[0.214]
privatemonitoring				-0.055	-0.039	-0.030
				[0.0101]***	[0.0164]**	[0.00764]***
moralhazard					-0.046	-0.049
					[0.0393]	[0.031]
actrestrict						-0.061
						[0.0521]
R-squared	0.0357	0.0362	0.0362	0.0374	0.0396	0.0404
Observations	5914	5435	5435	5435	5269	5269

All specifications include host & time FEs, bank & host macro controls

Full Affiliate Presence Prob. results

Back

VARIABLES	[1]	[2]	[3]	[4]	[5]	[6]
bankconcentration	-0.059	-0.065	-0.065	-0.069	-0.078	-0.078
	[0.0300]**	[0.0319]**	[0.0319]**	[0.0255]***	[0.0312]**	[0.0313]**
capreg		-0.018	-0.018	-0.017	-0.010	-0.010
		[0.001]***	[0.001]***	[0.001]***	[0.006]	[0.006]*
limitforeignbank			-0.545	-0.542	-0.393	-0.394
			[0.289]*	[0.296]*	[0.210]*	[0.211]*
privatemonitoring				0.009	0.022	0.022
				[0.0140]	[0.00586]***	[0.00564]***
moralhazard					-0.066	-0.067
					[0.0391]*	[0.0393]*
actrestrict						-0.002
						[0.00116]
R-squared	0.673	0.670	0.670	0.670	0.671	0.671
Observations	2829	2620	2620	2620	2620	2620

All specifications include host & time FEs, bank & host macro controls

Full Affiliate lending flow results

Back

VARIABLES	[1]	[2]	[3]	[4]	[5]
bankconcentration	-0.228	-0.216	-0.211	-0.194	-0.271
	[0.0968]**	[0.0928]**	[0.0972]**	[0.104]*	[0.0954]***
actrestrict		-0.0265	-0.027	-0.0343	-0.0357
		[0.0481]	[0.0534]	[0.0585]	[0.0604]
capreg			-0.0762	-0.0769	-0.0204
			[0.0942]	[0.0858]	[0.119]
suppower				-0.0187	0.0241
				[0.137]	[0.117]
governmentbanks					0.628
					[0.31]**
R-squared	0.188	0.189	0.194	0.195	0.205
Observations	489	489	447	437	437

All specifications include host & time FEs, bank & host macro controls

Full Ratio of Affiliate to CB lending flows

Back

VARIABLES	[1]	[2]	[3]	[4]	[5]
bankconcentration	-0.133	-0.102	-0.349	-0.347	-0.350
	[0.0831]	[0.0703]	[0.0655]***	[0.0661]***	[0.0627]***
capreg		0.018	-0.023	-0.028	-0.023
		[0.0975]	[0.0851]	[0.0843]	[0.081]
privatemonitoring			0.326	0.323	0.315
			[0.0443]***	[0.0456]***	[0.0505]***
moralhazard				0.007	0.005
				[0.0281]	[0.0263]
actrestrict					0.018
					[0.038]
R-squared	0.138	0.162	0.190	0.190	0.190
Observations	472	432	432	432	432

All specifications include host & time FEs, bank & host macro controls

Market entry

Back

$$\begin{cases} \text{Observe } P^i_{j,t} = 1 & \text{if } \Omega^i_{j,t} \geq 0 \\ \text{Observe } P^i_{j,t} = 0 & \text{otherwise.} \end{cases} \tag{0.1}$$

where

$$\Omega^i_{j,t} = \beta^P_1 + \beta^P_2 \cdot \Xi^{P,i}_{t-4} + \beta^P_3 \cdot B_{j,t-4} + \beta^P_4 \cdot H^i_{t-4} + \beta^P_5 \cdot P^i_{j,t-4} + \epsilon^{P,i}_{j,t} \tag{0.2}$$

$$\text{Prob}\left(P^i_{j,t} = 1\right) = \text{Prob}\left(\Omega^i_{j,t} \geq 0\right) = \Phi\left(\Omega^i_{j,t}\right) \tag{0.3}$$

Lending flows

Back

$$CB^i_{j,t} = \beta^{CB}_1 + \beta^{CB}_2 \cdot \Xi^{CB,i}_{t-4} + \beta^{CB}_3 \cdot B_{j,t-4} + \beta^{CB}_4 \cdot H^i_{t-4} + \epsilon^{CB,i}_{j,t} \tag{0.4}$$

$$A^i_{j,t} = \beta^{A}_1 + \beta^{A}_2 \cdot \Xi^{A,i}_{t-4} + \beta^{A}_3 \cdot B_{j,t-4} + \beta^{A}_4 \cdot H^i_{t-4} + \beta^{A}_5 \cdot M^i_{t-4} + \epsilon^{A,i}_{j,t} \tag{0.5}$$

$$R^i_{j,t} = \beta^{R}_1 + \beta^{R}_2 \cdot \Xi^{R,i}_{t-4} + \beta^{R}_3 \cdot B_{j,t-4} + \beta^{R}_4 \cdot H^i_{t-4} + \beta^{R}_5 \cdot M^i_{t-4} + \epsilon^{R,i}_{j,t} \tag{0.6}$$

Second stage

▸ Back to 2nd ▸ Back to 3rd

$$\bar{\tilde{\beta}}_{2j,t} = \alpha_1 + \alpha_2 \cdot B_{j,t-1} + \alpha_3 \cdot F^j_{t-1} + \mu_{j,t} \tag{0.7}$$

$$ROA^{foreign}_{j,t} = \gamma_1 + \gamma_2 \cdot \bar{\tilde{\beta}}_{2j,t-1} + \gamma_3 \cdot F^j_{t-1} + \mu_{j,t} \tag{0.8}$$

Sample of Regulatory Survey - Capital

Back

- Is it risk-weighted in line with Basle guidelines?
- Does the ratio vary with a bank's credit risk?
- Does the ratio vary with market risk?
- Before minimum capital adequacy is determined, what items are deducted from capital
- What fraction of revaluation gains is allowed as part of capital?
- Are the sources of funds to be used as capital verified by authorities?
- Can assets other than cash/govt. securities be used to increase capital?
- Can borrowed funds be used? from Barth et al (2008)