Regulatory Arbitrage and International Bank Flows

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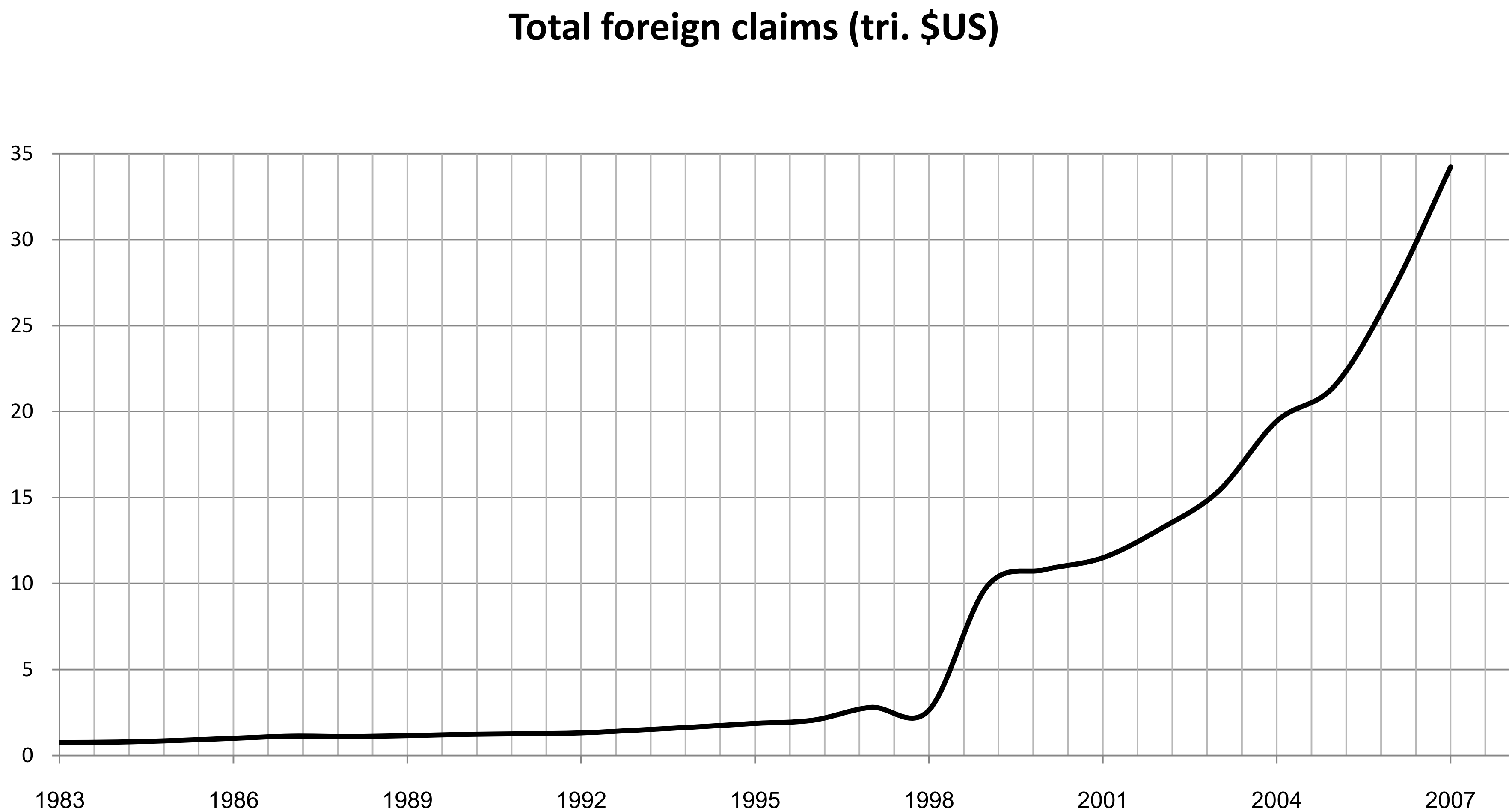
International Bank Flows

- Growth of International Bank Flows
- According to statistics from the Bank for International Settlements (BIS), the total foreign claims (from 26 source countries to 120 recipient host countries) rose from 1.3 trillion dollars in 1990 to close to 34 trillion dollars in 2007.
- International banking system is becoming a more important conduit for the transfer of capital across countries

International Bank Flows



Distance Matters

- Mian (2006) points out that when lending occurs across different markets, distance can be defined in three different ways:
- 1) Geographical or cultural distance between the lending firm and the loan officer in the borrowing firm's market ;
- 2) Hierarchical distance between the various agents within the lending firm – the presumption is that there are more layers within larger banks and within multinational banks;
- 3) Institutional distance which arises when the borrower and lending firms operate under different legal systems and environment.

Regulatory Arbitrage

- Cross-country differences in banking regulations may encourage the flow of bank capital from markets that are heavily regulated to those markets that are less regulated (Barth, Caprio and Levine, 2006).
- In one respect, this cross-country "regulatory competition" may enable banks to effectively evade costly regulations, which improves capital market efficiency and enhances global economic growth.
- On the other hand, there is a fear that this "regulatory competition" should more appropriately be viewed as a form of "regulatory arbitrage" that creates a "race to the bottom" which enables banks to circumvent prudent regulations

Regulatory Arbitrage: IMF's concern

- Dominique Strauss-Kahn, Managing Director, IMF, 2009
- "The crisis has exposed some clear fault lines: inconsistencies in regulatory systems across countries and clear conflicts of interests."
- "One of the lessons of the crisis is that we must avoid *regulatory arbitrage*. Key aspects of prudential regulations must be applied *consistently* across countries and across financial activities. This is especially important today, as the road to a safer future involves strengthened financial regulation and supervision, not only of cross-border institutions but also of cross-border markets. This will only work if all countries sign on and take ownership of the initiative, and resist the temptation to offer loopholes."

Root of the Crisis?

- Acharya, Wachtel and Walter (2009, in *Restoring Financial Stability*, NYU Stern White Papers) succinctly summarize this concern:
- *Complications that could arise from a lack of coordination between national regulators are many. These complications are largely due to regulatory arbitrage across national jurisdictions; that is, if institutions are more strictly regulated in one jurisdiction, they may move (their bases for) financial intermediation services to jurisdictions that are more lightly regulated. But given their interconnected nature, such institutions nevertheless expose all jurisdictions to their risk taking. (p. 365)*

Root of the Crisis?

- *A “beggar-thy-neighbor” competitive approach to regulation in different countries — or even their failure to coordinate without any explicit competitive incentives — will lead to a race to the bottom in regulatory standards. This will end up conferring substantial guarantees to the financial sector, giving rise to excessive leverage- and risk-taking incentives in spite of substantial regulation in each country* (Acharya, Wachtel and Walter, 2009)

Practitioner's View

- *Malcolm Knight, Vice Chairman, Deutsch Bank*
- *There are large regulatory gaps among financial jurisdictions and across different categories of financial institutions and markets.*
- *Until the crisis, many regulators held the view that the market should generally be allowed to function unfettered, since market discipline could be counted on to mitigate excessive risk-taking*
- *During the credit cycle upswing from 2002 to 2007, there was strong incentive for firms to take advantage of these gaps by engaging in regulatory arbitrage, and that made the financial system eventually a lot less robust to shocks*

Question to be Explored

- Does Regulatory Arbitrage Exist?

Main Findings of our Paper

- We test for evidence of regulatory arbitrage by looking at cross-country bank flows from 26 source countries to recipient firms in 120 countries over the past decade (1996-2007).
- We find strong evidence that that banks have transferred capitals from heavily regulated markets to markets with fewer regulations.
- We look into cross country differences in various aspects of regulation:
- (1) Activity Restrictions; (2) Bank Own Non-financial Firms; (3) Capital Regulation Stringency; (4) Strength of External Audit; (5) Financial Statement Transparency; (6) Independence of Supervisory Authority; (7) Official Supervisory Power; (8) Loan Classification Leniency

Main Findings

- We find that a lower level of activities restrictiveness in the recipient country induces more bank inflows while higher level of overall activities restrictiveness in the source country encourages more bank capital outflows.
- Our evidence suggests that capital regulatory stringency is positively associated with bank outflow growth in source countries and negatively associated with bank inflow growth in recipient countries.

Main Findings

- We also find that bank capital flows from countries with higher information disclosure standards and stronger external audit to countries with weak disclosure and audit.
- Bank capital tends to flow from countries with more independent and powerful supervisory authority to countries with less independent and weaker supervisory authority.
- Bank capital tends to flow from countries with stringent loan classification systems to countries with more lenient loan classification systems.

Main Findings of our Paper

- Institution Quality Matters: we find that good information sharing, strong creditor rights and property rights protection in recipient countries attract bank inflows and discourage bank outflows.

Main Findings of our Paper

- We also find that the links between regulation differences and bank flows are significantly stronger if the recipient country is a developed country with strong institutional quality (i.e. strong property rights and creditor rights and good credit information sharing).
- This suggests that while differences in regulations have important influences, that without a strong institutional environment, lax regulations are not enough to encourage massive capital flows.

Main Findings

- Banks headquartered in more restrictive jurisdictions are more likely to establish a branch or subsidiary in the countries with less activity restrictions, lower stringency in capital regulation, weak external audit and disclosure transparency, weak supervisory authority and lenient loan classification criteria.

Main Contributions

- Our results contribute to the literature on international banking regulations by demonstrating the importance that these regulations have on the flow of bank capital across borders.

- Our results add to the literature that has focused on the determinants of global bank activities by demonstrating the important effects that global banking regulations have on capital market flows.

- Our results are also related to the finance and growth literature since foreign credits and capital play a very important roles in alleviating local firms' financial constraints.

Policy Implications

- Our study highlights the need for international regulatory coordination and offers some insights to policy makers and regulators looking to rebuild the global regulatory architecture following the recent crisis.
- the Basel Cross Border Resolution Group recently issued a report and recommendations regarding the need for international coordination of bank regulation. (BIS, 2010).
- the IMF also has issued a proposal entitled, Resolution of Cross Border Banks-a Proposed Framework for Enhanced Coordination" (IMF, 2010).

Other Types of Regulatory Arbitrage

- “Many financial innovations were really directed at regulatory, tax and accounting arbitrage” (Stiglitz, 2010)
- Example: Asset Backed Commercial Paper Conduits
- Acharya et al. (2011) show that regulatory arbitrage was the main motive behind setting up conduits.
- The off-balance-sheet ABCP conduits held assets the banks would have otherwise held on their books. Banks provided liquidity or credit enhancement to these conduits.
- Capital-light, allow five times higher leverage ratio off the balance sheet than on the balance sheet.

Other Types of Regulatory Arbitrage

- Recourse to balance sheet: losses from conduits remained with banks and banks with more exposure to conduits had lower stock returns in crisis (Acharya, et al., 2011)
- Banks can also get capital relief simply switching away from loans into investments in the form of AAA rated tranches of CDOs. As a consequence, 50% of AAA ABS remained within the banking sector (Acharya and Schnabl, 2009)

Other Types of Regulatory Arbitrage

- Regulatory Arbitrage: In 1996, The Fed permitted banks to use CDSs to reduce capital reserves. Regulators treated securities guaranteed by a seller of CDSs as having the risk level of the seller – or more accurately, the counterparty – of the CDS (Levine, 2010).
- Consequently, banks used CDSs to reduce capital and invest in more lucrative and risky assets. A bank with a portfolio of $10 billion of commercial loans could reduce its capital reserves against these assets from about $800 million to under $200 million by purchasing CDSs for a small fee (Levine, 2010).
- By 2007, the largest US commercial banks had purchased $7.9 trillion in CDS protection.

Variables and Data: Bank Flow Data

- BIS provides the international flow of bank loans and portfolio investments from 26 primarily OECD source countries to 120 recipient countries on a quarterly basis since December 1983.

- The BIS Nationality Banking Statistics publish foreign financial claims reported by domestic bank head offices, including the exposures of their foreign affiliates, and are collected on a worldwide consolidated basis with inter-office positions being netted out.

- These claims consist of financial assets such as loans, debt securities, properties, and equities, including equity participations in subsidiaries

Bank Flow Data

- This database provides comprehensive data on banks‘ financial claims extended on residents outside the country in which these banks are headquartered.
- It is important to stress that the bank‘s home country is determined by the reporting bank‘s nationality not its geographic location.

Bank Flow

- Bank flow variable is constructed as 100 times the log difference (i.e. difference in log from t-1 to t) of total foreign financial claims from source country s to recipient country r (scaled by the recipient country's GDP), which is the percentage geometric growth rate of the stock variable (i.e. $100^{*}\Delta \mathit{ln(FCsr)}$)
- Alternative measures: scaled by total private credits, GDP in recipient country
- About 14,000 observations over the sample period 1996-2007.

Bank Regulation

- World-wide surveys on bank regulation and supervision (Barth, Caprio and Levine)

- 1st: 1998-99-2000
  107 countries
  175 questions

- 2nd: 2003
  152 countries
  275 questions

- 3rd: 2006
  142 countries
  300+ questions

Bank Regulation Surveys

…1. Structure, scope, and independence of regulation and supervision

... 2. regulations on bank activities and mixing banking-commerce

... 3. regulations on competition

... 4. regulations on capital adequacy

... 5. deposit insurance system design

... 6. supervisory powers and resources

... 7. regulations fostering private sector monitoring of banks

Measures of Activity Restrictions

(I) The extent to which banks may engage in

- (a) underwriting, brokering and dealing in securities, and all aspects of the mutual fund industry,
- (b) insurance underwriting and selling,
- (c) real estate investment, development, and management.

(II) Bank Own Non-financial Firms, measures the extent to which banks may own and control non financial firms.

Measures of Activity Restrictions

- 1. Unrestricted – A full range of activities in the given category can be conducted directly in the bank.
- 2. Permitted – A full range of activities can be conducted, but all or some must be conducted in subsidiaries.
- 3. Restricted – Less than a full range of activities can be conducted in the bank or subsidiaries.
- 4. Prohibited – The activity cannot be conducted in either the bank or subsidiaries.

What Is a Bank? Regulatory Restrictions on Activities and Mixing of Banking and Commerce

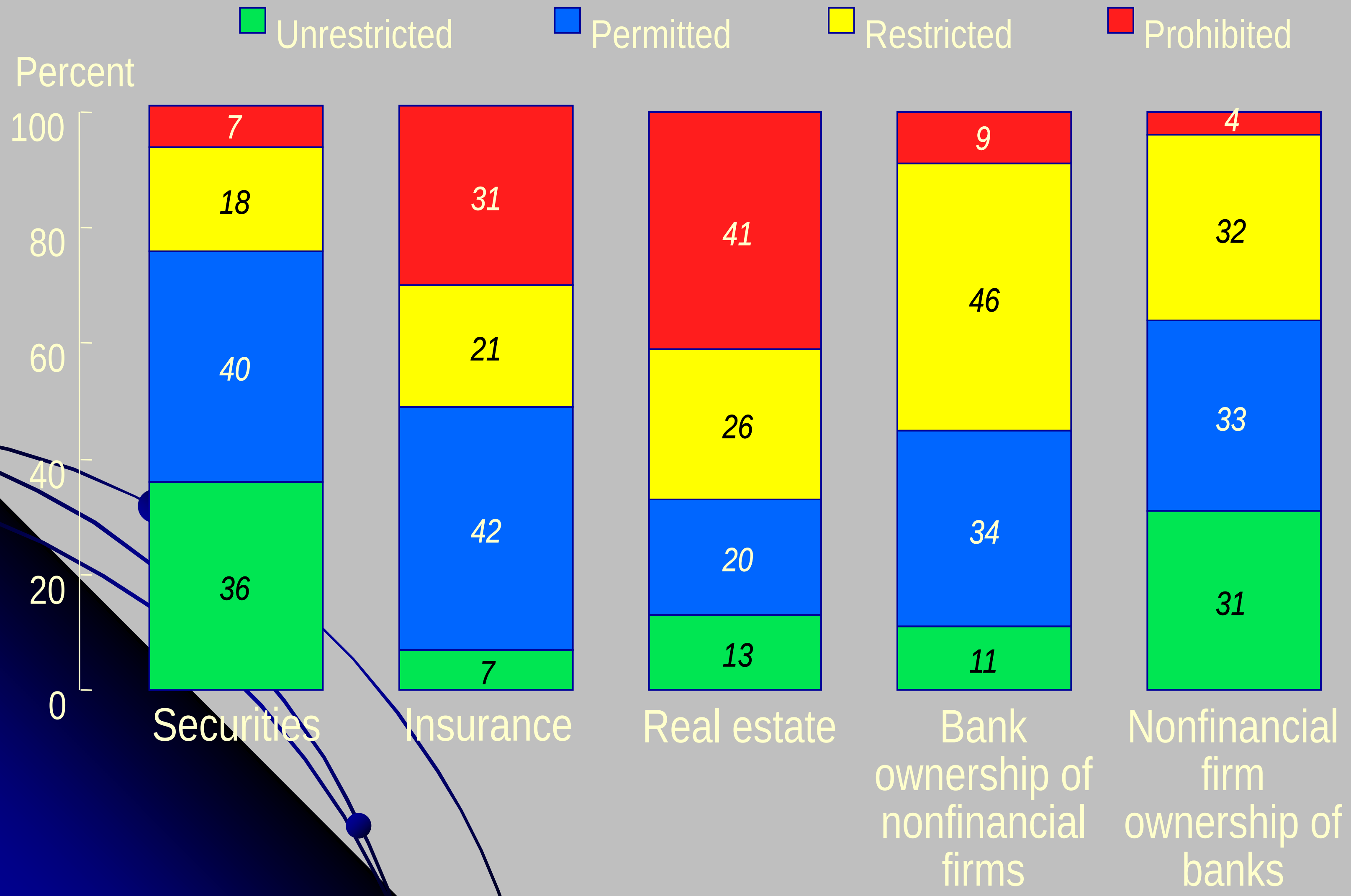
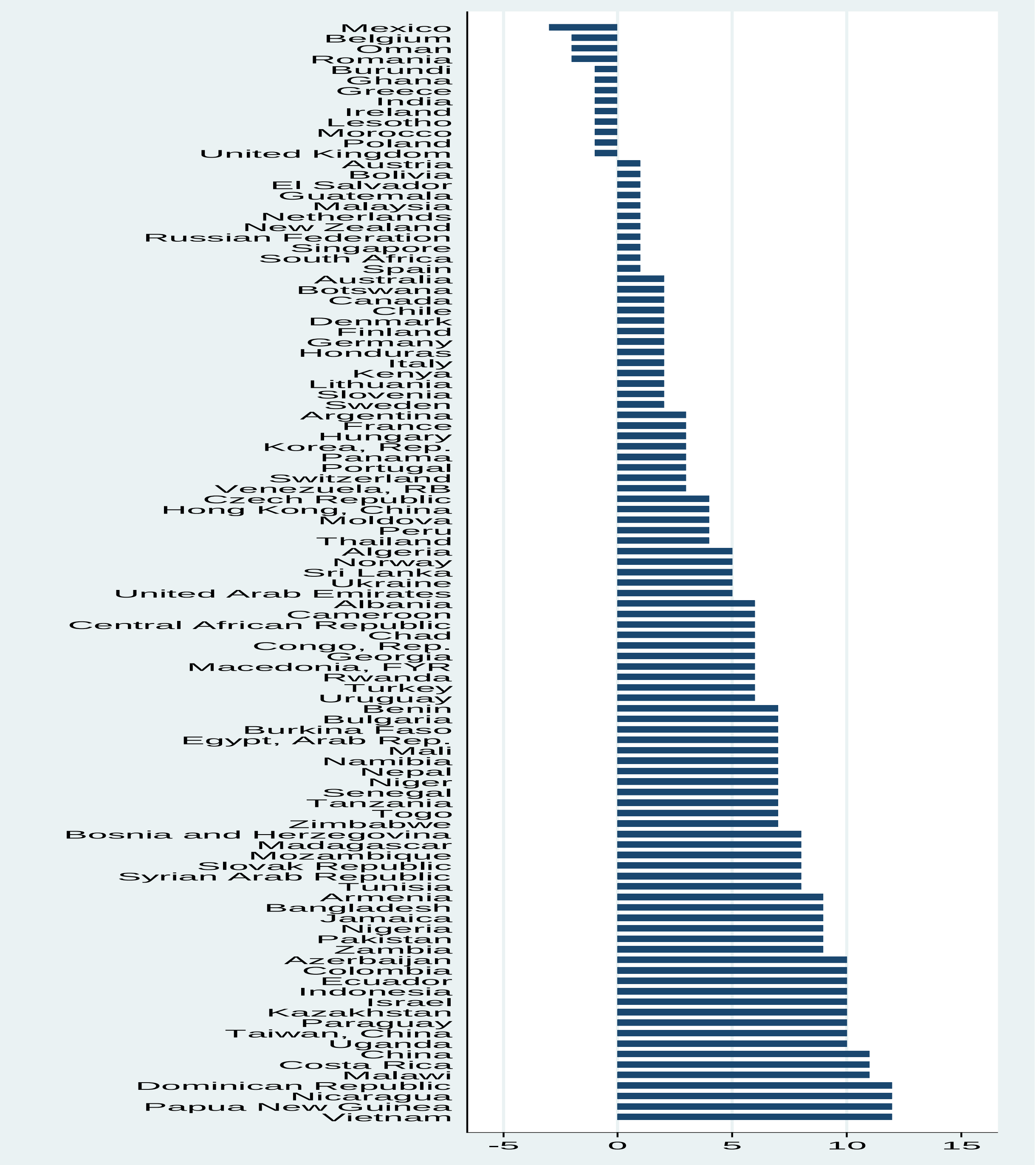


Figure 1: the change of overall activities restrictions across countries (1999 vs. 2006)



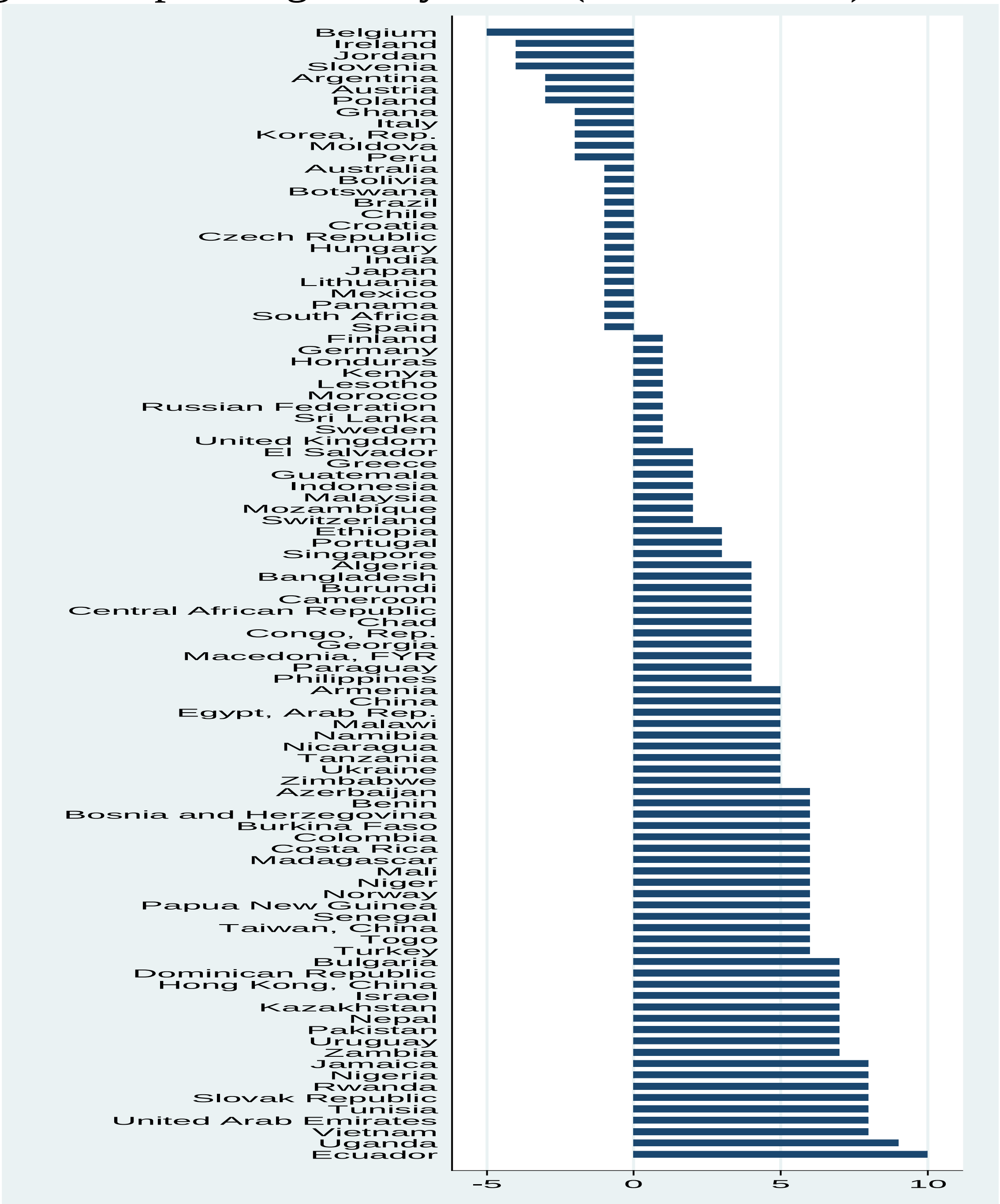
Measure of Capital Stringency

- Summary measure of initial and general capital stringency
- Is the minimum C/A ratio risk weighted in line with Basel
- Capital varies with market risk
- Capital varies with individual bank's credit risk
- Before minimum capital adequacy is determined, which of the following are deducted from the book value of capital:
- a) Market value of loan losses not realized in accounting books;
- b) Unrealized losses in securities portfolios?
- c) Unrealized foreign exchange losses?

Measure of Capital Stringency

- Initial capital stringency measures the whether certain funds may be used to initially capitalize a bank and whether they are officially verified.
- Are the sourced of funds to be used as capital verified by regulatory authorities?
- Can the initial disbursement or subsequent injections of capital be done with assets other than cash or government securities?
- Can initial disbursement of capital be done with borrowed funds?

Figure 2: The changes of capital regulatory index (1999 vs. 2006)



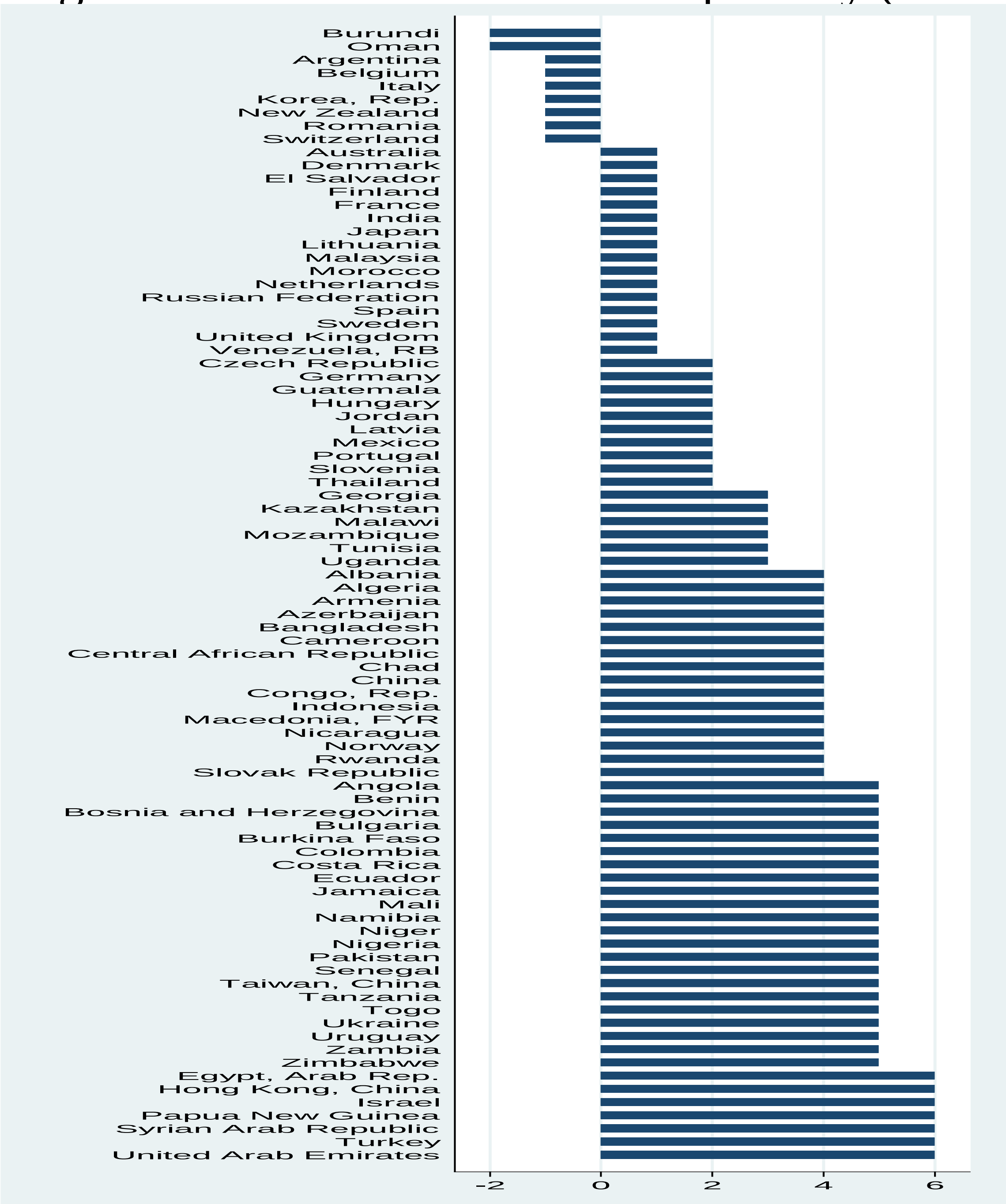
Audit and Information Disclosure

- *Strength of External Audit* :
- 1. Is an external audit a compulsory obligation for banks?
- 2. Are specific requirements for the extent or nature of the audit spelled out?
- 3. Are auditors licensed or certified?
- 4. Do supervisors get a copy of the auditor's report?
- 5. Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank?
- 6. Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse?
- 7. Can supervisors take legal action against external auditors for negligence?

Audit and Information Disclosure

- Bank financial statements transparency:
- whether accrued, though unpaid, interest/principal enter the income statement;
- whether financial institutions are required to produce consolidated accounts covering all bank and any non-bank financial subsidiaries;
- whether off-balance sheet items are disclosed to the public;
- whether banks are required to disclose their risk management procedures to the public;
- whether bank directors are legally liable if information disclosed is erroneous or misleading.

Figure 3: The changes of financial statement transparency (1999 vs. 2006)



Measures of Supervision

- Independence of Supervisory Authority:
- Are the supervisory bodies responsible or accountable to a) Prime Minister, b) the Finance Minister or other cabinet level official, c) a legislative body, such as parliament of congress?
- Are the supervisors legally liable for their actions (i.e. if a supervisor takes actions against a bank, the supervisor cannot be sued)?
- Does the head of the supervisory agency (and other directors) have a fixed term and how long? (=1 if the term>=4).

Supervisory Power

- Power to take legal action against auditors, director, officers
- Force bank to provision, change organizational structure
- Power to suspend dividends, bonuses, management fees
- Legal power to declare insolvency
- Power to supersede shareholder rights, remove/replace managers, directors
- Forbearance discretion

Supervisory Power

- Does the supervisory agency have the right to meet with external auditors without the approval of the bank?
- Are auditors required by law to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in elicit activities, fraud, or insider abuse?
- Can supervisors take legal action against external auditors for negligence?
- Can the supervisory authority force a bank to change its internal organizational structure?
- Are off-balance sheet items disclosed to supervisors?
- Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses?

Supervisory Power

- Can the supervisory agency suspend the directors' decision to distribute: a) Dividends? b) Bonuses? c) Management fees?
- Can the supervisory agency legally declare such that this declaration supersedes the rights of bank shareholders-that a bank is insolvent?
- Does the Banking Law give authority to the supervisory agency to intervene that is, suspend some or all ownership rights-a problem bank?
- Regarding bank restructuring and reorganization, can the supervisory agency do the following: a) Supersede shareholder rights? b) Remove and replace management? c) Remove and replace directors?

What Powers Do Supervisors Possess?

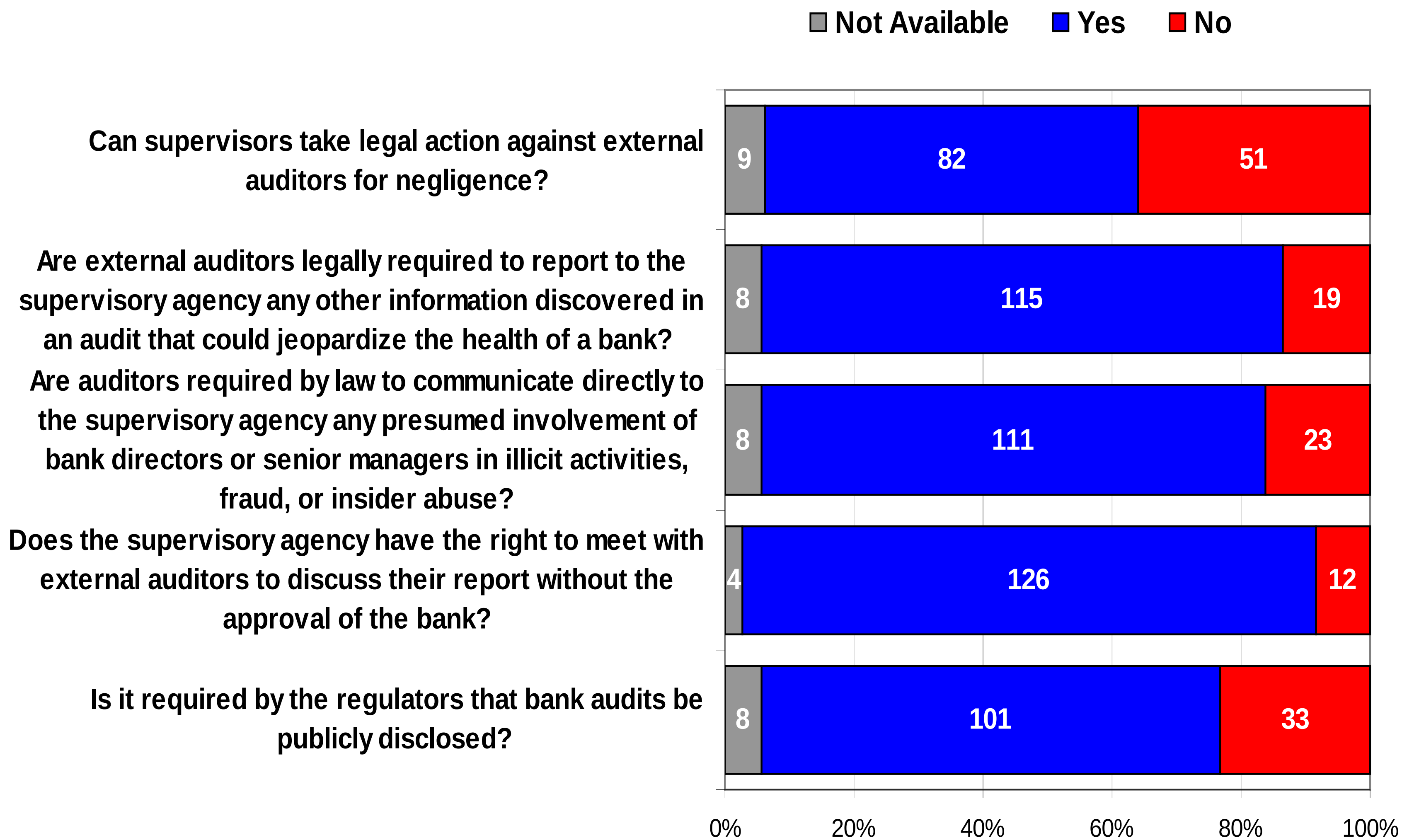
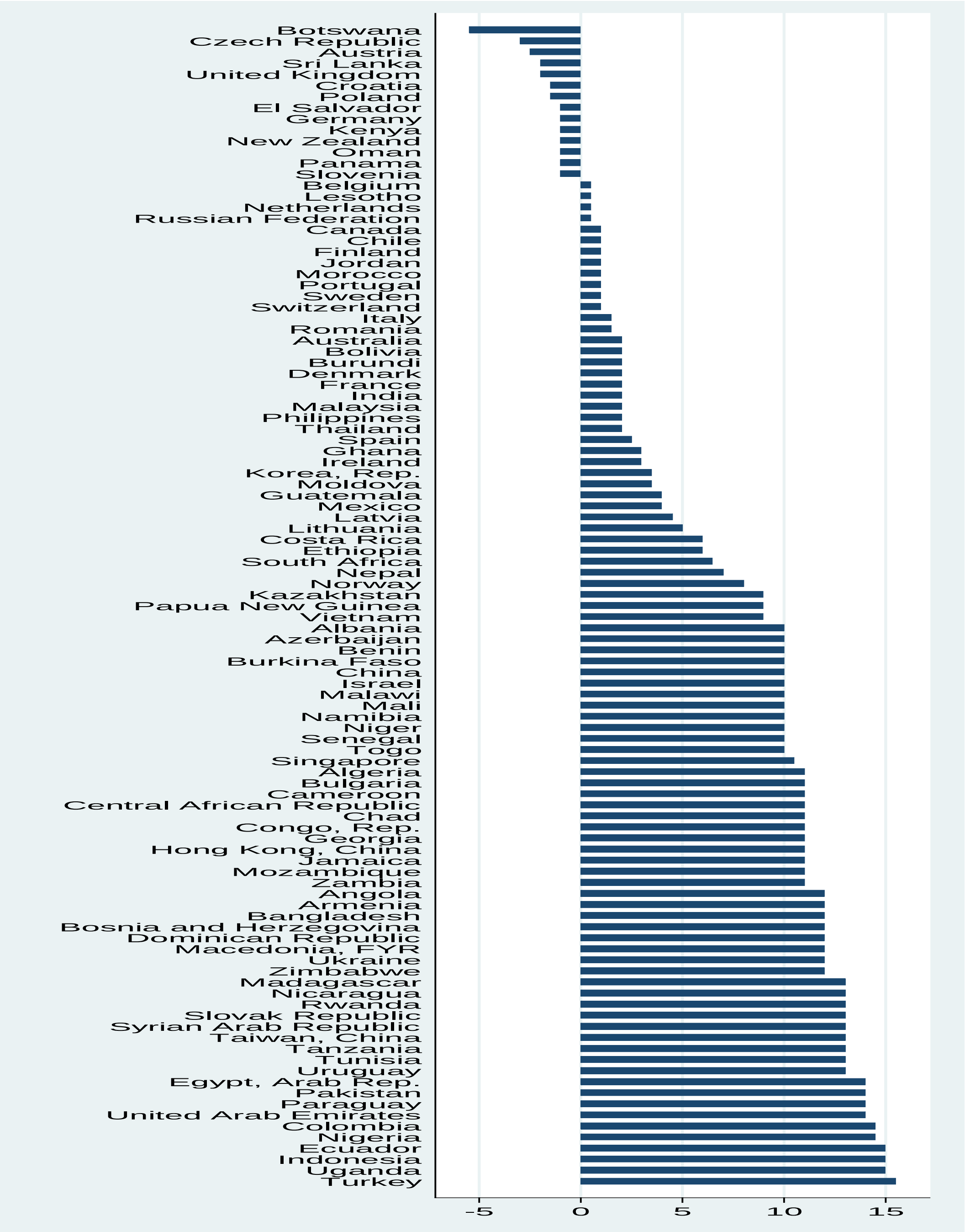


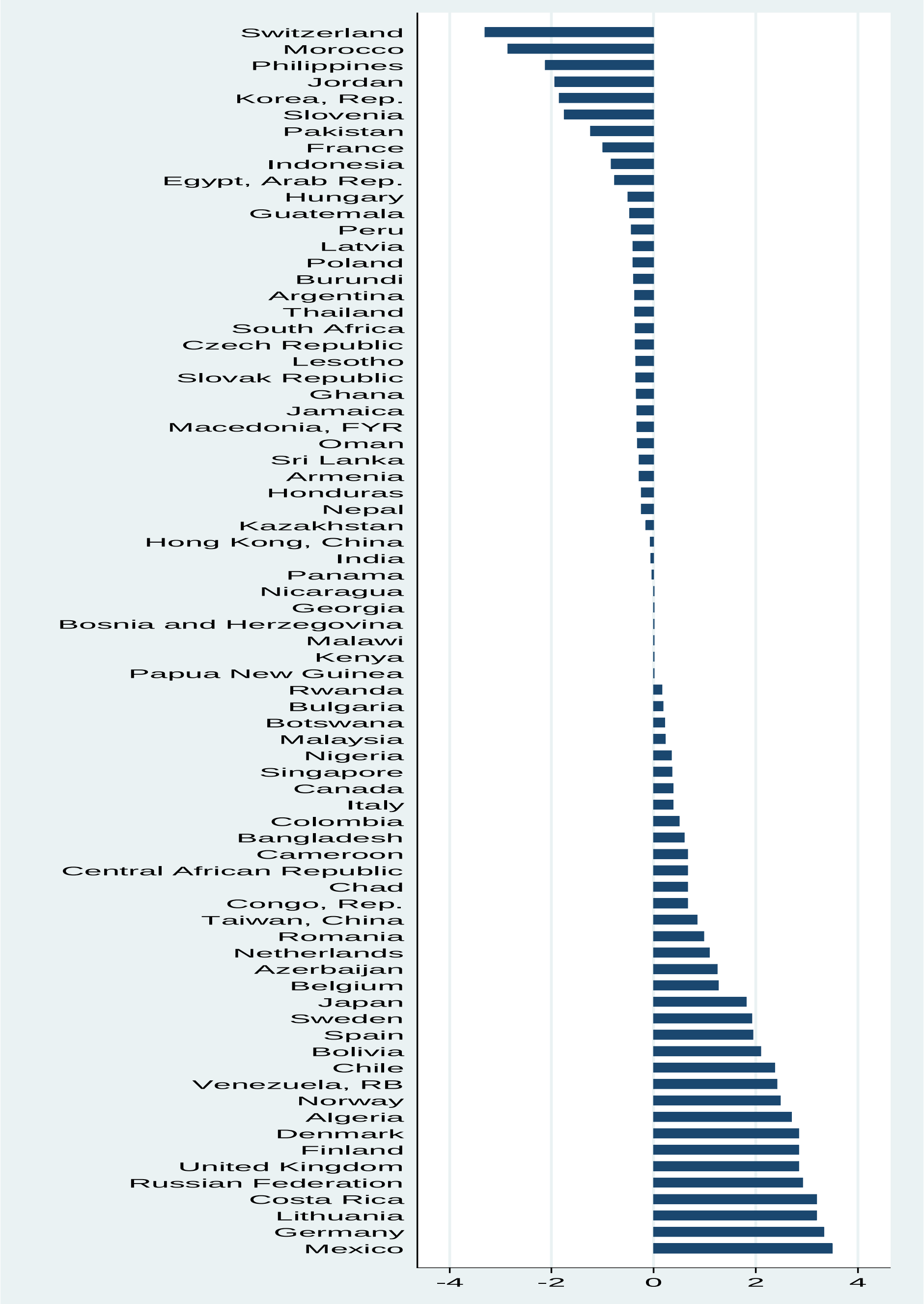
Figure 4: The changes of Official Supervisory Power (1999 vs. 2006)



Loan Classification Stringency

- The Loan Classification Lenience measures the stringency of classifying loans in arrears such as substandard, doubtful, and loss. It is calculated as the sum of the actual minimum number of days beyond which a loan in arrears must be classified as substandard, doubtful and finally loss.

Figure 5: The changes of Loan classification leniency (log) (1999 vs. 2006)



Measures of Institutional Environment

- Creditor Rights (Panel since 1978, Djankov, McLiesh, and Schleifer, 2007, JFE) :

(1) whether there are restrictions imposed, such as creditors' consent or minimum dividend, when a debtor files for reorganization (*Restrictions on Reorganization*);

(2) whether secured creditors are able to gain possession of assets after the petition for reorganization is approved, that is, whether there is no automatic stay or asset freeze imposed by the court on creditor's ability to seize collateral (*No Automatic Stay*);

(3) whether secured creditors are ranked first in the distribution of proceeds of liquidating a bankrupt firm as opposed to other creditors such as government or workers (*Secured Creditor Paid First*);

(4) whether the incumbent management does not stay in control of the firm during the reorganization (*No Management Stay*)

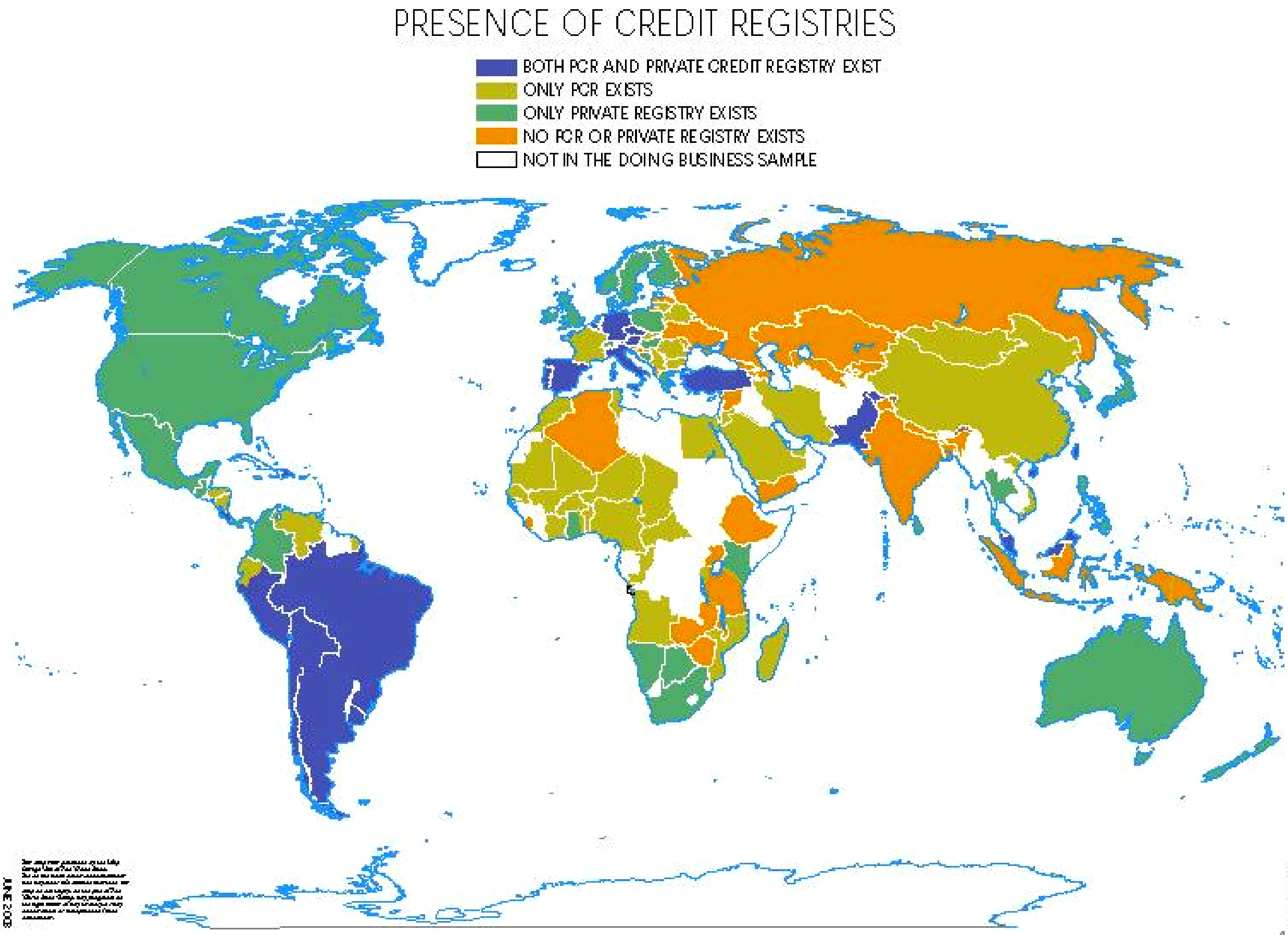
Credit Information Sharing

- Information sharing registries are becoming crucial institutional elements necessary to support a well-functioning banking system.

- A public (public registry) or private (private bureau) commercial firm that maintains a database on the credit worthiness of borrowers, and its primary role is to facilitate the exchange of information among banks and other financial institutions (Panel data since 1978).

- According to Djankov, McLiesh and Shleifer (2007), 54 countries in their survey of 129 countries set up some types of information sharing agencies in the past two decades.

Information Sharing Registries around the World (Miller 2004)



Property Rights

- Legal Structure and Security of Property Rights index from the World Economics Freedom report
- Economic freedom in 141 nations since 1970s
- This index measures property rights in a broad sense and includes various aspects such as judicial independence, impartial courts, protection of property rights, military interference in rule of law and the political process, integrity of the legal system, legal enforcement of contracts and regulatory restrictions on the sale of real property.

Empirical Tests: Aggregate Bank Inflows

$$Bank\ Inflow_{r,t} = \alpha_0 + \alpha_1 Regulation_{r,t} + \ \beta_1\ Institutional\ Quality_{r,t} + \ \gamma_1 X_{r,t} + \varphi_r + \mu_t + \varepsilon_{r,t} \qquad (1)$$

- where *r* and *t* respectively indicate the recipient country and time (year). The dependent variable *Bank Flow* is defined as 100 times the log-difference (from t-1 to t) of the aggregate total foreign claims (*FCsr*) from the 26 source countries to recipient country *r.*

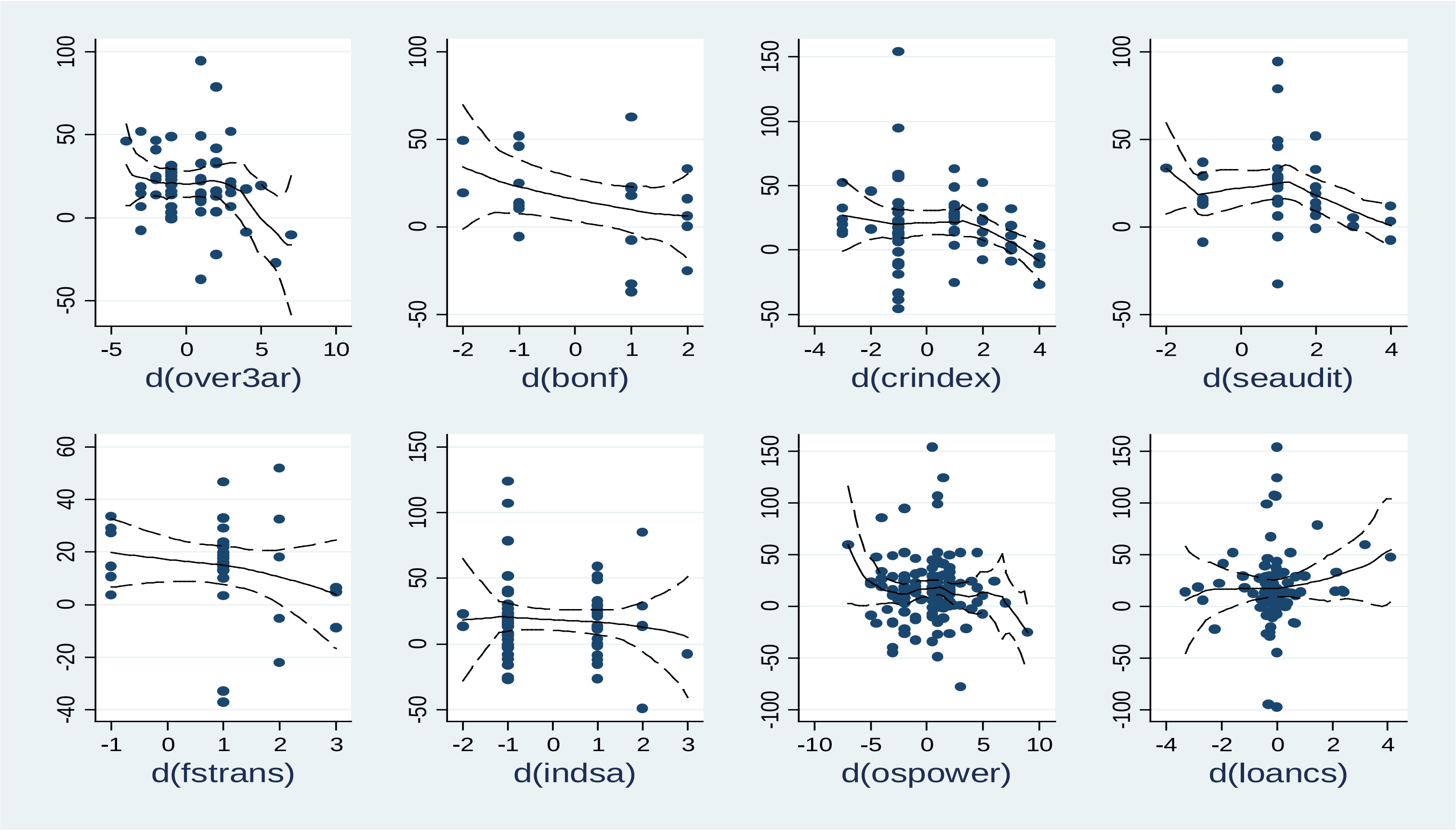
Table 3A: Aggregate Bank Inflows

	1	2	3	4	5	6	7	8
Overall activities restrictions (recipient)		-0.29				-0.39	-0.55	-0.71
		[0.015]**				[0.035]**	[0.021]**	[0.014]**
Restriction on banks own nonfin firms (recipient)		-0.86				-0.88	-1.26	-1.70
		[0.029]**				[0.171]	[0.281]	[0.216]
capital regulatory index (recipient)			-0.20			-0.27	-0.31	-0.38
			[0.086]*			[0.020]**	[0.073]*	[0.058]*
strength of external audit (recipient)				-0.83		-1.48	-1.81	-2.32
				[0.054]*		[0.033]**	[0.014]**	[0.009]***
fin statement transparency (recipient)				-1.27		-0.95	-1.63	-1.98
				[0.025]**		[0.073]*	[0.057]*	[0.045]**
Independence of Supervisory Authority (recipient)					-1.25	-1.33	-1.10	-0.85
					[0.035]**	[0.032]**	[0.029]**	[0.032]**
Official Supervisory Power (recipient)					-0.24	-0.23	-0.36	-0.47
					[0.184]	[0.074]*	[0.025]**	[0.020]**
Loan classification leniency (recipient)						0.69	0.59	0.51
						[0.022]**	[0.016]**	[0.012]**
Creditor rights (recipient)	5.83	6.11	6.22	5.96	5.98	6.93	7.03	7.89
	[0.063]*	[0.033]**	[0.032]**	[0.073]*	[0.034]**	[0.027]**	[0.032]**	[0.025]**
Info sharing (recipient)	2.42	2.30	2.45	2.19	2.20	2.16	2.72	1.58
	[0.028]**	[0.081]*	[0.026]**	[0.091]*	[0.032]**	[0.085]*	[0.067]*	[0.088]*
No. of days to enforce contracts (recipient)						-0.11	-0.12	-0.10
						[0.026]**	[0.038]**	[0.044]**
Property rights (recipient)	3.54	3.66	3.76	3.31	3.39	3.66	2.34	2.81
	[0.014]**	[0.027]**	[0.022]**	[0.052]*	[0.064]*	[0.033]**	[0.028]**	[0.021]**
Log income (recipient)	2.92	3.10	2.77	3.15	3.10	2.35	3.90	4.77
	[0.082]*	[0.018]**	[0.063]*	[0.012]**	[0.024]**	[0.089]*	[0.075]*	[0.056]*
Log population (recipient)	2.23	3.01	2.35	2.38	3.13	3.40	3.66	4.52
	[0.303]	[0.256]	[0.239]	[0.277]	[0.239]	[0.043]**	[0.047]**	[0.036]**
Fin liberalization (recipient)							0.81	0.97
							[0.039]**	[0.034]**
Growth opportunity (recipient)							1.76	2.06
							[0.017]**	[0.016]**

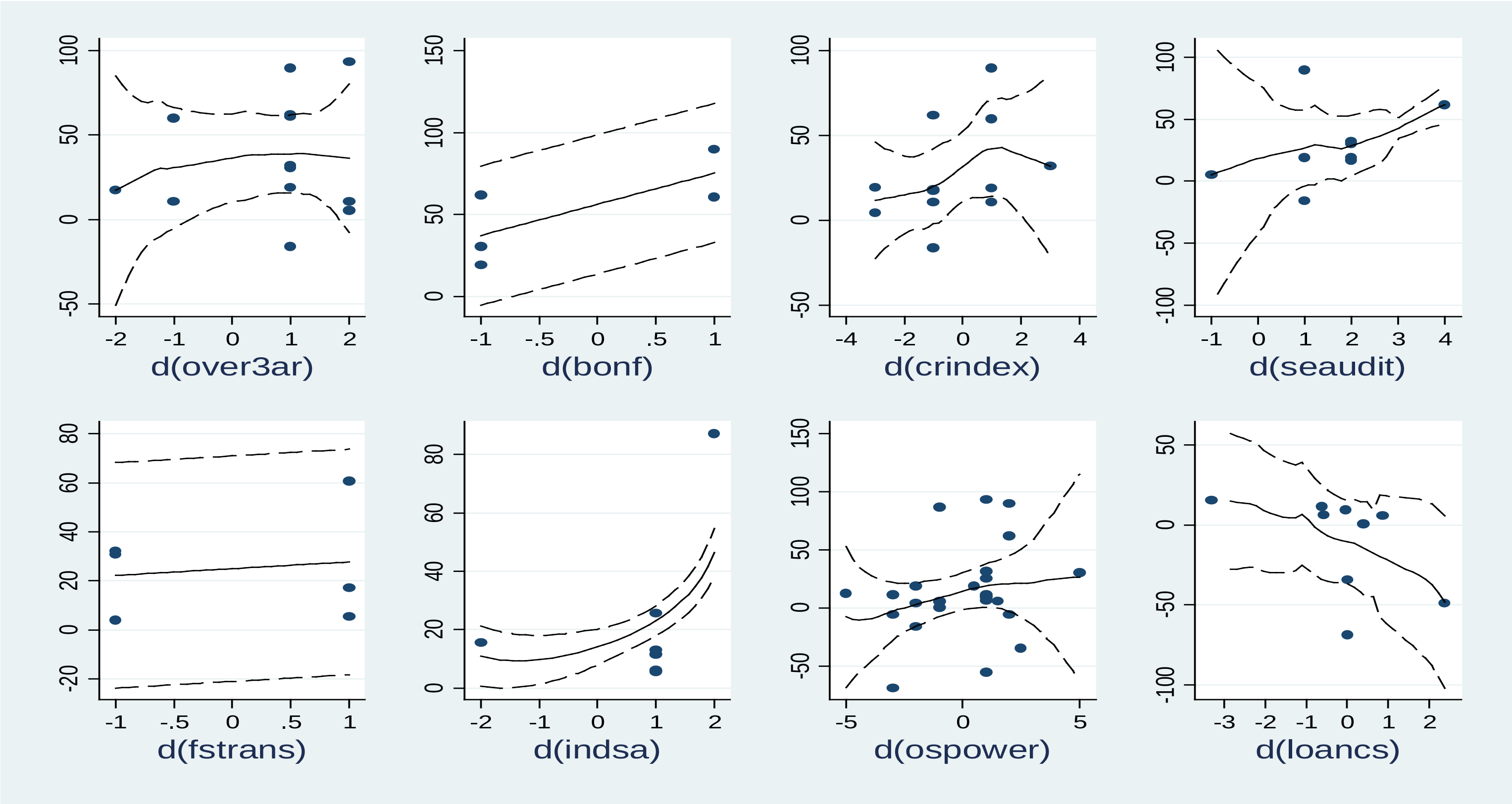
Table 3B: Aggregate Bank Outflows

	1	2	3	4	5	6	7	8
Overall activities restrictions (source)		0.53				0.92	1.06	1.16
		[0.025]**				[0.024]**	[0.017]**	[0.012]**
Restriction on banks own nonfin firms (source)		2.33				2.28	2.19	1.50
		[0.087]*				[0.017]**	[0.014]**	[0.017]**
capital regulatory index (source)			0.28			0.41	0.65	0.78
			[0.038]**			[0.097]*	[0.076]*	[0.057]*
strength of external audit (source)				0.85		0.74	1.27	1.72
				[0.032]**		[0.218]	[0.139]	[0.113]
fin statement transparency (source)				2.62		2.74	2.45	2.91
				[0.026]**		[0.030]**	[0.026]**	[0.021]**
Independence of Supervisory Authority (source)					1.05	1.41	1.89	1.26
					[0.083]*	[0.542]	[0.389]	[0.446]
Official Supervisory Power (source)					1.83	1.76	1.28	0.78
					[0.131]	[0.041]**	[0.037]**	[0.059]*
Loan classification leniency (source)						-0.44	-0.32	-0.25
						[0.013]**	[0.018]**	[0.025]**
Creditor rights (source)	-3.24	-3.86	-3.31	-2.95	-2.90	-2.89	-2.77	-3.09
	[0.016]**	[0.022]**	[0.052]*	[0.141]	[0.113]	[0.024]**	[0.034]**	[0.026]**
Info sharing (source)	-1.55	-1.18	-1.56	-1.08	-0.84	-0.76	-0.97	-0.70
	[0.028]**	[0.030]**	[0.028]**	[0.030]**	[0.173]	[0.003]***	[0.015]**	[0.0061]***
No. of days to enforce contracts (source)						0.21	0.19	0.22
						[0.014]**	[0.017]**	[0.016]**
Property rights (source)	-4.61	-4.26	-4.62	-4.36	-5.70	-4.79	-5.17	-6.51
	[0.035]**	[0.063]*	[0.058]*	[0.062]*	[0.037]**	[0.035]**	[0.024]**	[0.018]**
Log income (source)	-1.02	-1.70	-1.56	-1.65	-1.74	-1.31	-1.82	-2.09
	[0.333]	[0.032]**	[0.330]	[0.281]	[0.036]**	[0.277]	[0.145]	[0.108]
Log population (source)	-2.01	-2.68	-2.13	-1.85	-2.53	-2.73	-2.98	-1.71
	[0.122]	[0.031]**	[0.120]	[0.124]	[0.081]*	[0.146]	[0.123]	[0.149]
Fin liberalization (source)							0.42	0.34
							[0.176]	[0.228]
Growth opportunity (source)							-1.49	-1.26
							[0.025]**	[0.030]**
Sample period	1996-2007						1996-2005	
Source country fixed effect	yes	yes	yes	yes	yes	yes	yes	yes
Time fixed effect	yes	yes	yes	yes	yes	yes	yes	yes
Observations	238	238	238	238	238	238	181	181
Adj. R-squared	0.30	0.31	0.32	0.30	0.32	0.36	0.37	0.41
No. of source countries	26	26	26	26	26	26	23	23

Changes of regulation and changes of credit inflows in recipient countries



Changes of regulation and changes of credit outflows from source countries



Regulatory Arbitrage and Bank Flow: Gravity Equation

$$Bank\ Flow_{s,r,t} = \alpha_0 + \alpha_1 Regulation_{s,t} + \alpha_2 Regulation_{r,t} +$$

$$\beta_1 Institutional\ Quality_{s,t} + \beta_2\ Institutional\ Quality_{r,t} + \gamma_1 X_{s,t} + \gamma_2 X_{r,t} +$$

$$\theta_1\ ln\left(Distance_{s,r}\right) + \theta_2 Common\ Language_{s,r} + \eta_s + \varphi_r + \mu_t + \varepsilon_{s,r,t} \qquad (2)$$

- Sample period 1996-2007, Source countries: 26, Recipient countries: 120
- Sample size 14,430
- values of regulatory variables for the period of 1996 to 1999 are taken from the first survey recorded in 1998/1999.
- The values of regulatory variables for 2000 to 2003 are taken from the second survey that assesses the state of regulation as of the end of 2002.
- The regulatory measures for 2004 to 2007 are taken from the third survey that was recorded in 2005/2006

Regulatory Arbitrage and Bank Flow: Gravity Equation

	1	2	3	4	5	6	7	8
Overall activities restrictions (source)		0.39				0.30	0.36	0.29
		[0.014]**				[0.005]***	[0.005]***	[0.007]***
Overall activities restrictions (recipient)		-0.25				-0.32	-0.33	-0.27
		[0.013]**				[0.013]**	[0.011]**	[0.014]**
Restriction on banks own nonfin firms (source)		1.30				1.56	1.52	1.22
		[0.071]*				[0.021]**	[0.020]**	[0.022]**
Restriction on banks own nonfin firms (recipient)		-1.97				-1.41	-1.42	-1.75
		[0.014]**				[0.149]	[0.143]	[0.116]
capital regulatory index (source)			0.59			0.25	0.23	0.18
			[0.027]**			[0.081]*	[0.078]*	[0.103]
capital regulatory index (recipient)			-0.43			-0.35	-0.34	-0.25
			[0.072]*			[0.033]**	[0.026]**	[0.031]**
strength of external audit (source)				0.72		0.52	0.70	0.61
				[0.028]**		[0.158]	[0.153]	[0.169]
strength of external audit (recipient)				-0.26		-0.47	-0.65	-0.53
				[0.058]*		[0.030]**	[0.021]**	[0.029]**
fin statement transparency (source)				1.60		1.28	1.85	1.40
				[0.035]**		[0.027]**	[0.020]**	[0.026]**
fin statement transparency (recipient)				-0.96		-0.59	-0.56	-0.75
				[0.022]**		[0.064]*	[0.062]*	[0.036]**

Regulatory Arbitrage and Bank Flow: Gravity Equation

Independence of Supervisory Authority (source)					0.94	1.29	1.05	0.87
					[0.060]*	[0.140]	[0.199]	[0.254]
Independence of Supervisory Authority (recipient)					-0.71	-0.55	-0.83	-0.68
					[0.040]**	[0.040]**	[0.030]**	[0.034]**
Official Supervisory Power (source)					0.46	0.61	0.66	0.57
					[0.036]**	[0.056]*	[0.052]*	[0.070]*
Official Supervisory Power (recipient)					-0.39	-0.35	-0.52	-0.65
					[0.065]*	[0.031]**	[0.021]**	[0.016]**
Loan classification leniency (source)						-0.26	-0.27	-0.22
						[0.002]***	[0.004]***	[0.005]***
Loan classification leniency (recipient)						0.43	0.41	0.33
						[0.037]**	[0.033]**	[0.039]**
Creditor rights (source)	-3.68	-3.74	-3.03	-2.74	-3.31	-2.68	-2.40	-1.83
	[0.019]**	[0.014]**	[0.016]**	[0.059]*	[0.096]*	[0.026]**	[0.024]**	[0.034]**
Creditor rights (recipient)	4.69	4.56	3.94	4.18	4.59	3.39	3.65	2.94
	[0.018]**	[0.020]**	[0.070]*	[0.036]**	[0.048]**	[0.018]**	[0.019]**	[0.024]**
Info sharing (source)	-0.66	-0.67	-0.39	-0.74	-0.72	-0.46	-0.68	-0.55
	[0.011]**	[0.018]**	[0.061]*	[0.008]***	[0.011]**	[0.045]**	[0.040]**	[0.063]*
Info sharing (recipient)	0.85	1.11	1.01	1.15	0.93	1.12	1.17	1.26
	[0.074]*	[0.021]**	[0.027]**	[0.020]**	[0.063]*	[0.062]*	[0.062]*	[0.034]**
No. of days to enforce contracts (recipient)						0.08	0.10	0.08
						[0.030]**	[0.040]**	[0.057]*
No. of days to enforce contracts (source)						-0.14	-0.15	-0.12
						[0.014]**	[0.020]**	[0.024]**

Regulatory Arbitrage and Bank Flow: Gravity Equation

Top 5 bank concentration (recipient)						-2.60	-3.64	-2.96
						[0.092]*	[0.062]*	[0.075]*
Government bank ownership (recipient)						-1.09	-1.67	-1.37
						[0.035]**	[0.030]**	[0.038]**
Property rights (source)	-2.34	-2.52	-2.55	-3.22	-2.29	-1.98	-2.44	-2.07
	[0.035]**	[0.068]*	[0.063]*	[0.024]**	[0.114]	[0.035]**	[0.031]**	[0.042]**
Property rights (recipient)	1.68	1.91	1.96	1.95	2.22	2.50	1.86	1.65
	[0.031]**	[0.103]	[0.040]**	[0.108]	[0.067]*	[0.021]**	[0.030]**	[0.037]**
Log income (source)	-1.54	-1.09	-1.07	-1.72	-0.98	-1.27	-1.16	-0.93
	[0.017]**	[0.216]	[0.170]	[0.045]**	[0.261]	[0.252]	[0.219]	[0.294]
Log income (recipient)	2.63	1.88	1.82	1.82	1.21	2.09	2.11	1.50
	[0.050]*	[0.027]**	[0.030]**	[0.031]**	[0.079]*	[0.051]*	[0.071]*	[0.091]*
Log population (source)	3.75	2.80	2.20	2.48	2.16	1.34	1.60	1.29
	[0.039]**	[0.064]*	[0.269]	[0.041]**	[0.108]	[0.155]	[0.193]	[0.240]
Log population (recipient)	2.01	1.67	1.79	1.42	1.35	2.83	2.48	2.03
	[0.481]	[0.104]	[0.220]	[0.318]	[0.170]	[0.030]**	[0.032]**	[0.040]**
Common language	2.51	3.94	3.99	4.05	4.06	4.05	5.40	4.30
	[0.061]*	[0.068]*	[0.079]*	[0.179]	[0.039]**	[0.005]***	[0.007]***	[0.008]***
Log distance	-1.56	-1.48	-1.85	-1.71	-1.66	-1.64	-1.38	-1.74
	[0.072]*	[0.122]	[0.017]**	[0.111]	[0.012]**	[0.184]	[0.263]	[0.258]
Fin liberalization (source)							0.37	0.29
							[0.162]	[0.221]
Fin liberalization (recipient)							0.52	0.42
							[0.011]**	[0.013]**
Growth opportunity (source)							-1.22	-1.41
							[0.027]**	[0.037]**
Growth opportunity (recipient)							1.67	1.16
							[0.029]**	[0.035]**
Sample period				1996-2007			1996-2005	
Source country fixed effect	yes	yes	yes	yes	yes	yes	yes	yes
Recipient country fixed effect	yes	yes	yes	yes	yes	yes	yes	yes
Time fixed effect	yes	yes	yes	yes	yes	yes	yes	yes
Observations	14,430	13,738	13,790	13,467	13,601	12,936	7,923	7,923
No. of source countries	26	26	26	26	26	26	23	23
No. of recipient countries	120	111	111	108	109	102	70	70

Regulation and institutional gaps and bank flows

As a robustness test, we also calculate the regulatory gaps between each source and recipient country, and use these as alternative explanatory variables. Specifically, we estimate the following alternative empirical model:

$$Bank\ Flow_{s,r,t} = \alpha_0 + \ \alpha\ Reg\ Gap_{s,r,t} + \beta\ Institutional\ Gap_{s,r,t} + \gamma \Delta X_{s,r,t}$$
$$+\theta_1\ ln\left(Distance_{s,r}\right) + \theta_2 Common\ Language_{s,r} + \eta_s + \varphi_r + \mu_t + \varepsilon_{s,r,t} \qquad (4)$$

where,

$\Delta X_{s,r,t} = X_{s,t} - X_{r,t},$

$Reg\ Gap_{s,r,t} = Regulation_{s,t} - Regulation_{r,t}$

$Institutional\ Gap_{s,r,t} = Institutional\ Quality_{s,t} - Institutional\ Quality_{r,t}$

Regulatory gaps and bank inflows

	1	2	3	4	5	6
Overall activities restrictions (gap)	0.38				0.50	0.57
	[0.033]**				[0.023]**	[0.018]**
Restriction on banks own nonfin firms (gap)	0.48				0.50	0.36
	[0.017]**				[0.011]**	[0.014]**
capital regulatory index (gap)		0.89			0.75	0.85
		[0.067]*			[0.032]**	[0.035]**
strength of external audit (gap)			0.46		0.35	0.36
			[0.017]**		[0.066]*	[0.077]*
fin statement transparency (gap)			0.81		0.78	0.92
			[0.031]**		[0.033]**	[0.028]**
Independence of Supervisory Authority - Overall (gap)				0.92	0.58	0.63
				[0.033]**	[0.047]**	[0.032]**
Official Supervisory Power (gap)				0.29	0.30	0.24
				[0.033]**	[0.034]**	[0.044]**
Loan classification leniency (gap)					-0.51	-0.67
					[0.029]**	[0.025]**
Creditor rights (gap)	-4.53	-4.46	-4.37	-4.28	-4.41	-5.36
	[0.046]**	[0.012]**	[0.006]***	[0.004]***	[0.004]***	[0.003]***
Info share (gap)	-1.14	-1.12	-1.14	-1.11	-1.19	-1.48
	[0.024]**	[0.065]*	[0.026]**	[0.027]**	[0.023]**	[0.040]**
Property rights (gap)	-1.67	-1.83	-1.93	-2.11	-1.60	-1.74
	[0.064]*	[0.062]*	[0.053]*	[0.028]**	[0.039]**	[0.043]**
Fin liberalization (gap)						0.49
						[0.189]
Growth opportunity (gap)						-1.46
						[0.038]**

Instrumental Variable Analysis

- The endowment theory, focuses on the roles of geography and the disease environment in shaping the political and financial institutional development (Acemoglu et al., 2001, Beck et al., 2003).
- Latitude, Ethnic Fractionalization (endowment)

- Following Beck et al. (2006), we also include the percentage of years that the country has been independent since 1776 as an additional IV because countries that gained their independence earlier had more chance to adopt regulations more valuable to economic development.

Instrumental Variable Analysis

- “Regulation contagion” : policymakers and regulators are influenced by the choices of policymakers in other countries. As the policy or regulation become more widespread, it becomes enshrined as fort of “universal best practice”, and countries are more likely to adopt it.
- Use the sample mean of the financial regulation measures at a specific year as additional instruments to capture the dynamic trend of regulatory changes.

Instrumental Variable Analysis

- Central Bank as Bank Regulator: As argued by Goodhart (2000), central banks care more about macro-economic monetary and price stability, which rests on the basis of maintaining the micro-level financial stability in the banking system. Therefore, central banks as the bank regulators are more likely to adopt prudential regulations that will keep the systemic stability .
- Average experiences of a professional bank supervisor
- Gini coefficients as a measure of income inequality: As pointed out by Beck, Levine and Levkov (2010), "an influential political economy literature stresses that income distributional considerations, rather than efficiency considerations, frequently exert the dominant influence on bank regulation".

Instrumental Variable Analysis

- Other IVs considered: Press Freedom, Oil Reserve.
- All these instruments pass the test of the over-identifying restrictions and 1st stage F test.
- The IV results are highly robust. the IV coefficients are somewhat larger than the OLS coefficients, indicating the existence of potential measurement error in the original results, which would tend to “attenuate” the coefficient estimate toward zero (Rajan and Subramanian, 2008; Barth et al., 2009).

Regulation Changes on Bank Flow Changes: First Differencing Results

- Substantial regulatory changes over time
- Instead of using the full ten years of data, we focus on the three survey years (1999, 2002, 2005) to measure the regulatory changes. Also helps alleviate the endogeneity concern .
- To capture the potential lagged effects of regulatory changes, we use bank flow data in years 2001, 2003, and 2007 data.

$$\Delta\left(Bank\ Flow_{s,r,t}\right) = \alpha_0 + \alpha\ \Delta Reg\ Gap_{s,r,t} + \beta\ \Delta Institutional\ Gap_{s,r,t} + \gamma_1 \Delta Income\ Gap_{s,r,t} + \gamma_2 \Delta Population\ Gap_{s,r,t} + \mu_t + \varepsilon_{s,r,t}\ , \quad \text{for } t = 2 \text{ and } 3 \qquad (6)$$

	1	2	3	4	5	6
⊿ Overall activities restrictions (gap)	0.46				0.43	0.51
	[0.031]**				[0.035]**	[0.031]**
⊿ Restriction on banks own nonfin firms (gap)	0.75				0.62	0.48
	[0.045]**				[0.041]**	[0.053]*
⊿ capital regulatory index (gap)		3.68			3.53	3.24
		[0.015]**			[0.018]**	[0.016]**
⊿ strength of external audit (gap)			0.98		0.81	0.59
			[0.034]**		[0.039]**	[0.047]**
⊿ fin statement transparency (gap)			1.12		1.10	1.15
			[0.029]**		[0.037]**	[0.052]*
⊿ Independence of Supervisory Authority - Overall (gap)				2.78	2.81	3.00
				[0.060]*	[0.062]*	[0.059]*
⊿ Official Supervisory Power (gap)				0.15	0.34	0.46
				[0.022]**	[0.016]**	[0.015]**
⊿ Loan classification leniency (gap)					-0.36	-0.47
					[0.028]**	[0.016]**
⊿ Creditor rights (gap)	-3.08	-3.14	-3.02	-3.27	-2.81	-3.52
	[0.013]**	[0.019]**	[0.075]*	[0.020]**	[0.026]**	[0.020]**
⊿ Info share (gap)	-1.82	-2.04	-1.51	-2.42	-1.63	-1.49
	[0.034]**	[0.026]**	[0.040]**	[0.018]**	[0.039]**	[0.052]*
⊿ Property rights (gap)	-2.09	-2.06	-2.23	-2.06	-2.11	-1.53
	[0.130]	[0.039]**	[0.053]*	[0.044]**	[0.038]**	[0.047]**
⊿ Log income (gap)	-2.73	-2.73	-2.82	-2.60	-2.73	-3.14
	[0.038]**	[0.046]**	[0.201]	[0.083]*	[0.075]*	[0.063]*
⊿ Log population (gap)	3.65	3.28	4.50	3.74	4.41	5.31
	[0.143]	[0.230]	[0.111]	[0.064]*	[0.062]*	[0.036]**
⊿ Fin liberalization (gap)						0.15
						[0.347]
⊿ Growth opportunity (gap)						-0.34
						[0.039]**
Observations	1,731	1,701	1,673	1,673	1,639	1,081
Adj. R-squared	0.19	0.16	0.16	0.17	0.14	0.18

Regulatory Arbitrage: Does Institutional Quality Matter?

- There are countervailing reasons why bank capital would not necessarily flow to low regulated markets, particularly if these countries do not have strong institutional and legal environments.
- There are reasons to believe that in some circumstances strong regulations may actually signal quality and stability.
- To further disentangle these effects and to better understand the economic context of regulatory arbitrage activities, we conduct a series of additional tests.

Regulatory Arbitrage: Does Institutional Quality Matter?

	1	2	3	4	5	6	7	8	9	10	11	12
	Split sample over time		Bank flow from adv. to adv. economies	Bank flow from adv. to emerging/dev. economies	Bank flow to high creditor rights economies	Bank flow to low creditor rights economies	Bank flow to high infoshare economies	Bank flow to low infoshare economies	Bank flow to high property rights economies	Bank flow to low property rights economies	Bank flow to high quality institution economies	Bank flow to low quality institution economies
Sample period	1996-2001	2002-2007	1996-2007									
Overall activities restrictions (gap)	0.61	0.70	1.13	0.27	1.03	0.61	0.76	0.25	2.12	0.15	1.31	0.12
	[0.029]**	[0.018]**	[0.008]***	[0.052]*	[0.005]***	[0.249]	[0.025]**	[0.037]**	[0.000]***	[0.262]	[0.000]***	[0.140]
Restriction on banks own nonfin firms (gap)	1.41	1.48	1.91	0.96	1.83	0.43	0.54	0.43	1.63	0.62	1.93	0.92
	[0.031]**	[0.024]**	[0.012]**	[0.039]**	[0.019]**	[0.069]*	[0.027]**	[0.038]**	[0.024]**	[0.031]**	[0.004]***	[0.018]**
capital regulatory index (gap)	0.38	0.56	0.32	0.28	0.50	0.14	0.61	0.34	0.67	0.12	0.38	0.21
	[0.031]**	[0.011]**	[0.034]**	[0.039]**	[0.012]**	[0.035]**	[0.023]**	[0.088]*	[0.002]***	[0.031]**	[0.009]***	[0.034]**
strength of external audit (gap)	0.93	1.73	2.06	0.12	1.24	0.32	1.54	0.63	2.05	0.23	1.62	0.22
	[0.084]*	[0.021]**	[0.008]***	[0.216]	[0.029]**	[0.236]	[0.020]**	[0.298]	[0.002]***	[0.222]	[0.014]**	[0.232]
fin statement transparency (gap)	1.39	1.77	0.69	0.27	0.49	0.40	0.71	0.61	0.24	0.11	0.43	0.32
	[0.033]**	[0.006]***	[0.025]**	[0.039]**	[0.033]**	[0.042]**	[0.030]**	[0.040]**	[0.029]**	[0.081]*	[0.029]**	[0.034]**
Independence of Supervisory Authority - Overall (gap)	0.77	1.33	0.86	0.44	0.54	0.35	0.65	0.25	1.92	1.40	0.54	0.23
	[0.036]**	[0.028]**	[0.037]**	[0.066]*	[0.027]**	[0.031]**	[0.038]**	[0.061]*	[0.011]**	[0.011]**	[0.026]**	[0.056]*
Official Supervisory Power (gap)	0.18	1.28	0.39	0.30	0.23	0.15	0.39	0.12	0.31	0.28	0.25	0.14
	[0.163]	[0.001]***	[0.014]**	[0.041]**	[0.035]**	[0.071]*	[0.026]**	[0.073]*	[0.028]**	[0.051]*	[0.012]**	[0.077]*
Loan classification leniency (gap)	-0.63	-1.26	-2.19	-0.93	-0.23	-0.21	-1.62	-0.64	-0.60	-0.58	-1.34	-0.92
	[0.059]*	[0.035]**	[0.006]***	[0.028]**	[0.028]**	[0.083]*	[0.020]**	[0.045]**	[0.034]**	[0.058]*	[0.019]**	[0.022]**
Creditor rights (gap)	-2.99	-3.93	-2.10	-2.49	-0.33	-2.23	-0.52	-3.64	-0.87	-3.45	-0.13	-5.07
	[0.029]**	[0.014]**	[0.037]**	[0.036]**	[0.089]*	[0.034]**	[0.072]*	[0.026]**	[0.152]	[0.024]**	[0.192]	[0.012]**
Info share (gap)	-0.94	-1.49	-0.85	-1.87	-0.54	-1.24	-1.01	-1.24	-0.13	-2.90	-0.52	-1.75
	[0.052]*	[0.026]**	[0.073]*	[0.003]***	[0.097]*	[0.013]**	[0.038]**	[0.018]**	[0.090]*	[0.000]***	[0.086]*	[0.002]***

More Robustness Checks

- We consider separately how our key variables influence the current account, a proxy for aggregate capital outflows.
- By doing so, we also examine the effect of bank regulation on aggregate capital flows as higher bank flows may simply crowd out other forms of foreign direct investment that may otherwise have taken place.
- The empirical results are highly robust (Table 9).

Regulatory Arbitrage and International Bank Expansion

- More direct Exploration
- Bank level data including information on the bank foreign affiliates from Bankscope,
- We compiled an original database on the operations of 301 large banks (total assets> $25 billion USD) with headquarters in one of the 26 source countries covered in the BIS statistics, focusing on their foreign presence (i.e. branch or subsidiary) in 120 countries (i.e. the recipient countries in the BIS statistics) around the world. Information on branches and foreign subsidiaries refers to year 2008.

Regulatory Arbitrage and International Bank Expansion

$$\Pr(Y_{i,s,r} = 1) = f(\mathit{Regulation}_s, \mathit{Regulation}_r, \mathit{Institutional\ Quality}_s, \mathit{Institutional\ Quality}_r, \mathit{Bank\ Chracteristics}_i, \mathit{Country\ Control}_s, \mathit{Country\ Control}_r, \mathit{Distance}_{s,r}, \mathit{Common\ Language}_{s,r}) \tag{6}$$

$Y_{i,s,r} = 1$ when the bank i of country s has foreign affiliates (subsidiaries or branches) in country r, and zero otherwise (*Foreign Presence*). Alternatively, we define $Y_{i,s,r} = 1$ when the bank i of country s has foreign subsidiaries in country r, and zero otherwise (*Foreign Subsidiary*). The foreign subsidiaries are locally charted and independently capitalized so that it is clear that they only need to operate under the host country's regulation.

	1	2	3	4	5	6	7
Overall activities restrictions (source)	0.029				0.028	0.030	0.043
	[0.067]*				[0.031]**	[0.012]**	[0.023]**
Overall activities restrictions (recipient)	-0.018				-0.012	-0.014	-0.042
	[0.027]**				[0.019]**	[0.023]**	[0.014]**
Restriction on banks own nonfin firms (source)	0.063				0.064	0.065	0.069
	[0.024]**				[0.037]**	[0.074]*	[0.031]**
Restriction on banks own nonfin firms (recipient)	-0.049				-0.041	-0.036	-0.049
	[0.029]**				[0.020]**	[0.017]**	[0.028]**
Capital regulatory index (source)		0.027			0.027	0.021	0.049
		[0.018]**			[0.015]**	[0.021]**	[0.026]**
Capital regulatory index (recipient)		-0.011			-0.012	-0.014	-0.027
		[0.014]**			[0.016]**	[0.029]**	[0.012]**
Strength of external audit (source)			0.040		0.044	0.053	0.056
			[0.032]**		[0.038]**	[0.079] *	[0.013]**
Strength of external audit (recipient)			-0.032		-0.031	-0.047	-0.048
			[0.128]		[0.025]**	[0.031]**	[0.026]**
Fin statement transparency (source)			0.035		0.033	0.030	0.020
			[0.011]**		[0.030]**	[0.029]**	[0.015]**
Fin statement transparency (recipient)			-0.018		-0.024	-0.016	-0.032
			[0.019]**		[0.024]**	[0.019]**	[0.028]**
Independence of supervisory authority (source)				0.057	0.046	0.051	0.049
				[0.017]**	[0.012]**	[0.033]**	[0.009]***
Independence of supervisory authority (recipient)				-0.023	-0.025	-0.027	-0.029
				[0.015]**	[0.031]**	[0.029]**	[0.023]**
Official supervisory power (source)				0.036	0.037	0.038	0.039
				[0.011]**	[0.019]**	[0.053]*	[0.011]**
Official supervisory power (recipient)				-0.028	-0.025	-0.020	-0.049
				[0.051]*	[0.016]**	[0.014]**	[0.031]**
Loan classification leniency (source)					-0.044	-0.041	-0.057
					[0.060]*	[0.035]**	[0.038]**
Loan classification leniency (recipient)					0.025	0.024	0.021
					[0.030]**	[0.058]*	[0.013]**

Government bank ownership (recipient)					-0.361	-0.376	-0.355
					[0.037]**	[0.034]**	[0.034]**
Top 5 bank concentration (all banks) (recipient)					-0.208		-0.234
					[0.016]**		[0.035]**
Top 5 bank concentration (excl. foreign banks) (recipient)						-0.287	
						[0.016]**	
Bank size	0.016	0.015	0.014	0.016	0.017	0.018	0.016
	[0.130]	[0.178]	[0.118]	[0.133]	[0.042]**	[0.168]	[0.041]**
Bank net income	0.036	0.031	0.030	0.023	0.039	0.038	0.057
	[0.033]**	[0.089]*	[0.060]*	[0.113]	[0.171]	[0.047]**	[0.186]
Creditor rights (source)	-0.039	-0.034	-0.035	-0.032	-0.029	-0.038	-0.039
	[0.090]*	[0.058]*	[0.069]*	[0.022]**	[0.026]**	[0.036]**	[0.029]**
Creditor rights (recipient)	0.024	0.026	0.024	0.026	0.018	0.023	0.025
	[0.083]*	[0.060]*	[0.057]*	[0.046]**	[0.095]*	[0.063]*	[0.069]*
Info sharing (source)	-0.031	-0.032	-0.032	-0.031	-0.034	-0.038	-0.030
	[0.044]**	[0.024]**	[0.036]**	[0.078]*	[0.021]**	[0.069]*	[0.020]**
Info sharing (recipient)	0.015	0.016	0.021	0.014	0.019	0.024	0.032
	[0.087]*	[0.008]***	[0.006]***	[0.086]*	[0.069]*	[0.037]**	[0.011]**
Property rights (source)	-0.024	-0.025	-0.020	-0.028	-0.037	-0.037	-0.027
	[0.053]*	[0.043]**	[0.008]***	[0.051]*	[0.084]*	[0.003]***	[0.078]*
Property rights (recipient)	0.019	0.022	0.015	0.024	0.029	0.021	0.026
	[0.062]*	[0.036]**	[0.029]**	[0.093]*	[0.043]**	[0.068]*	[0.019]**

Conclusion

- Important —push and pull effects
- Bank capital is more likely to flow into countries that have strong creditor rights, strong property right and a high degree of information sharing among creditors (*Institutional Distance*).
- Bank capital is more likely to flow from markets with restrictive regulations to those markets that have fewer and more relaxed restrictions on bank capital and bank investment opportunities (*Regulatory Arbitrage*).
- In a positive sense, this form of cross-country competition may help put the brakes on any over- regulation of the global financial sector.
- More negatively, these results lend support to the concerns raised by Acharya et. al. (2009) regarding a global —race to the bottom where capital flows to the least regulated environment.
- International Coordination of Financial Regulation