

Post-crisis International Banking: An Analysis with New Regulatory Survey Data

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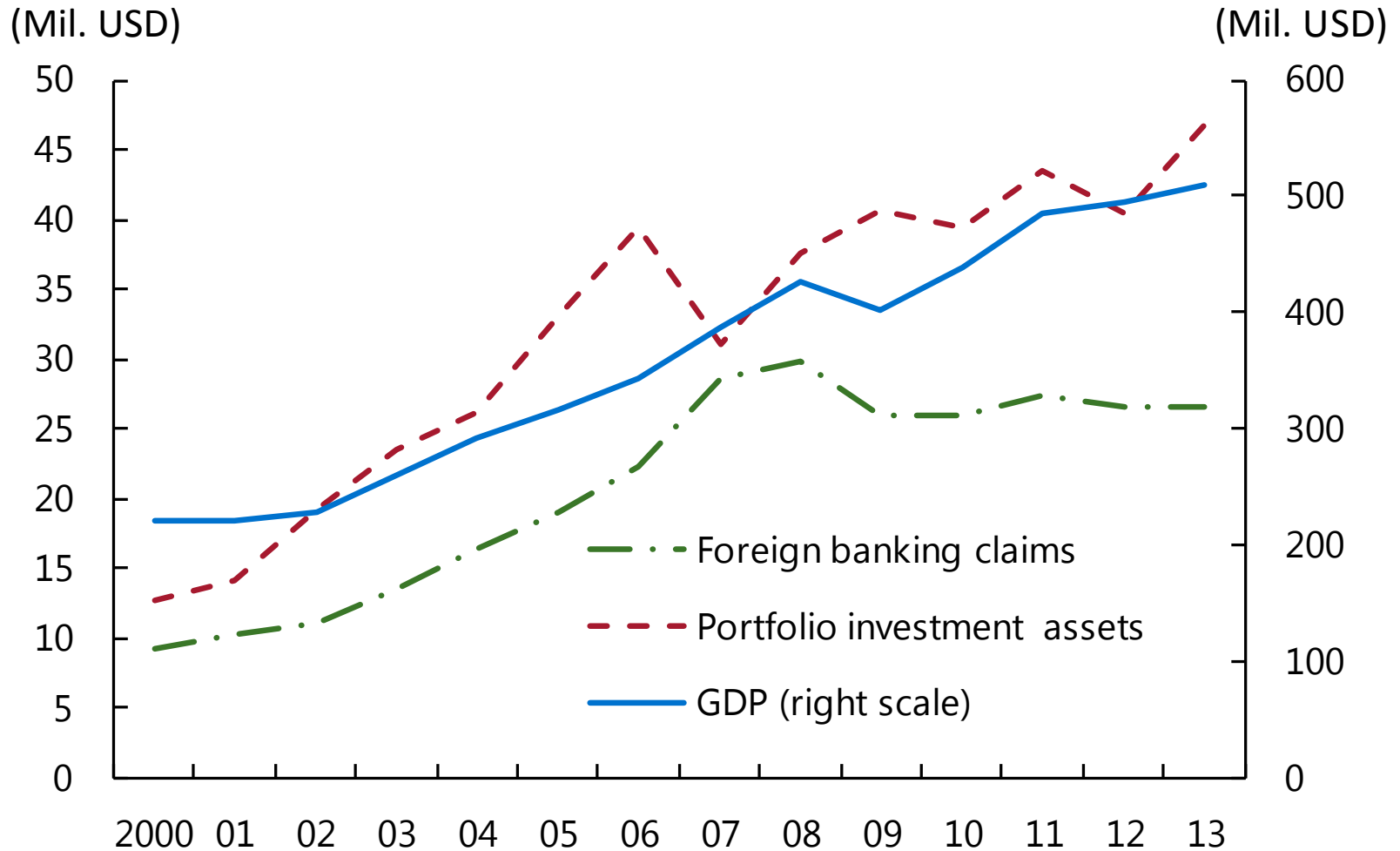
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Prolonged Sluggishness



Sources: BIS CBS (immediate risk); IMF CPIS; World Bank.

Potential Drivers

- Weaknesses in banks' balance sheets
- Too fast pre-crisis growth
- Regulatory changes
 - Potential effects
 - Curtailing bank activities (↓)
 - Regulatory arbitrage (↑)
 - The effects may differ by type of regulations
 - General financial regulations
 - International operations-specific regulations

The Literature

- Related papers
 - A broad literature on the determinants of foreign banks' presence largely ignores regulations.
 - Houston et al. (2012) and Ongena et al. (2013) find evidence for regulatory arbitrage, with data until 2007/08.
 - Bremus and Fratzscher (2015) show the importance of regulatory arbitrage as a driver from 2005-07 to 2010-12.
- But the literature mostly focuses on general financial regulations, mainly using Barth et al.'s (2013) index constructed from a World Bank survey.

What we do and find

- We use novel/relatively unexploited data
 - New survey on regulations on international operations
 - Bilateral claims from BIS CBS on an ultimate risk (UR) basis
- We find:
 - Regulatory changes can account for about a half of the decline in foreign claims/GDP between 2007 and 2013.
 - Home regulations played a more important role than host ones.
 - Cross-border lending has been more affected than local lending.

Outline

- I. Introduction
- II. New Regulatory Survey Data
- III. Baseline Specifications
- IV. Baseline Results
- V. Robustness Checks
- VI. Analysis by Subcategories of Claims and Counterparty Sectors
- VII. Conclusion

II. NEW REGULATORY SURVEY DATA

The Survey

- Confidentially collected by the IMF from supervisors in 40 countries (among the top recipients of foreign banking claims).
- 31 questions about changes in regulations on international operations between 2006 and 2014 from the home and host perspectives.
 - Eg1: are domestic banks prohibited from acquiring foreign banks?
 - Eg2: is foreign ownership of domestically incorporated banks prohibited?
- Answers are generally restricted to three alternatives, such as “prohibition introduced,” “no change,” and “prohibition removed.”
 - We code each answer to tightened, no change, or loosened.

Questions from Home Perspective

Presence	<p>Are domestic banks prohibited from acquiring foreign banks?</p> <p>Do domestic banks need their domestic supervisor's approval to acquire a foreign bank?</p> <p>Are domestic banks prohibited from establishing branches overseas?</p> <p>Do domestic banks need their domestic supervisor's approval to establish a branch overseas?</p> <p>Are domestic banks prohibited from establishing subsidiaries overseas?</p> <p>Do domestic banks need their domestic supervisor's approval to establish a subsidiary overseas?</p> <p>Are the requirements to obtain permission to establish a branch stricter than those applicable to subsidiaries?</p>
Activity	<p>Are domestic banks prohibited from making cross-border loans?</p> <p>Are domestic banks prohibited from purchasing foreign securities?</p> <p>Are there restrictions on the type of activities (for example, corporate and retail lending, residential mortgage, trade finance, long-term infrastructure finance, investment banking) that domestic banks can conduct overseas that do not apply to domestic operations?</p> <p>Are there additional regulatory requirements for domestic banks operating outside their home country beyond what would be required for similar operations conducted domestically?</p>
Depositor Insurance	<p>Are foreign depositors covered by deposit insurance?</p>
Information	<p>Do banking secrecy laws in your country limit your ability to share information about banks' operations and balance sheets with foreign supervisors?</p>
Supervisory Discretion	<p>Can the supervisor limit the range of activities a consolidated group may conduct and/or the locations in which activities can be conducted (including the closing of foreign offices) in specific circumstances (as per Basel Core Principle 12.6)?</p>
Other	<p>Did the authorities introduce other structural measures (such as Volcker reform, Vickers proposals, and others) which could weigh on the decision of some banks to expand internationally?</p>

Questions from Host Perspective

Presence	<p>Is foreign ownership of domestically incorporated banks prohibited?</p> <p>Do foreign banks need the host country supervisor's authorization to acquire a domestic bank?</p> <p>What is the maximum percentage of foreign ownership of a domestic bank legally allowed?</p> <p>Are foreign banks prohibited from operating in the form of branches?</p> <p>Are the requirements for establishing a branch stricter for foreign banks than for domestic banks?</p> <p>Are there additional and/or different regulatory requirements for foreign-owned banks versus domestic banks?</p>
Activity	<p>Are there restrictions on the type of activities (for example, corporate and retail lending, residential mortgage, trade finance, long-term infrastructure finance, investment banking) that foreign banks can conduct domestically and that do not apply to domestic banks?</p> <p>Are there restrictions on domestic currency cross-border borrowing by banks?</p> <p>Are there restrictions on foreign currency cross-border borrowing by banks?</p> <p>Are banks required to fund part or all of their domestic operations with local deposits?</p> <p>Are there restrictions on the share of funding a domestically incorporated bank can obtain from a foreign parent?</p> <p>Are there restrictions on lending by domestically incorporated banks to a foreign parent?</p>
Supervisory Discretion	<p>Can the supervisory authorities impose ring-fencing measures in a discretionary way?</p>
Information	<p>Do banking secrecy laws in your country limit your ability to share information about banks' operations and balance sheets with foreign supervisors?</p>
Resolution	<p>Does the resolution authority have resolution powers over local branches of foreign firms and the capacity to use its powers either to support a resolution carried out by a foreign home authority or, in exceptional cases, to take measures on its own initiative (as per Key Attribute 7.3)?</p>
Other	<p>Did the authorities introduce other structural measures (such as Volcker reform, Vickers proposals, and the others) that could weigh on the decision of some banks to retrench from your country?</p>

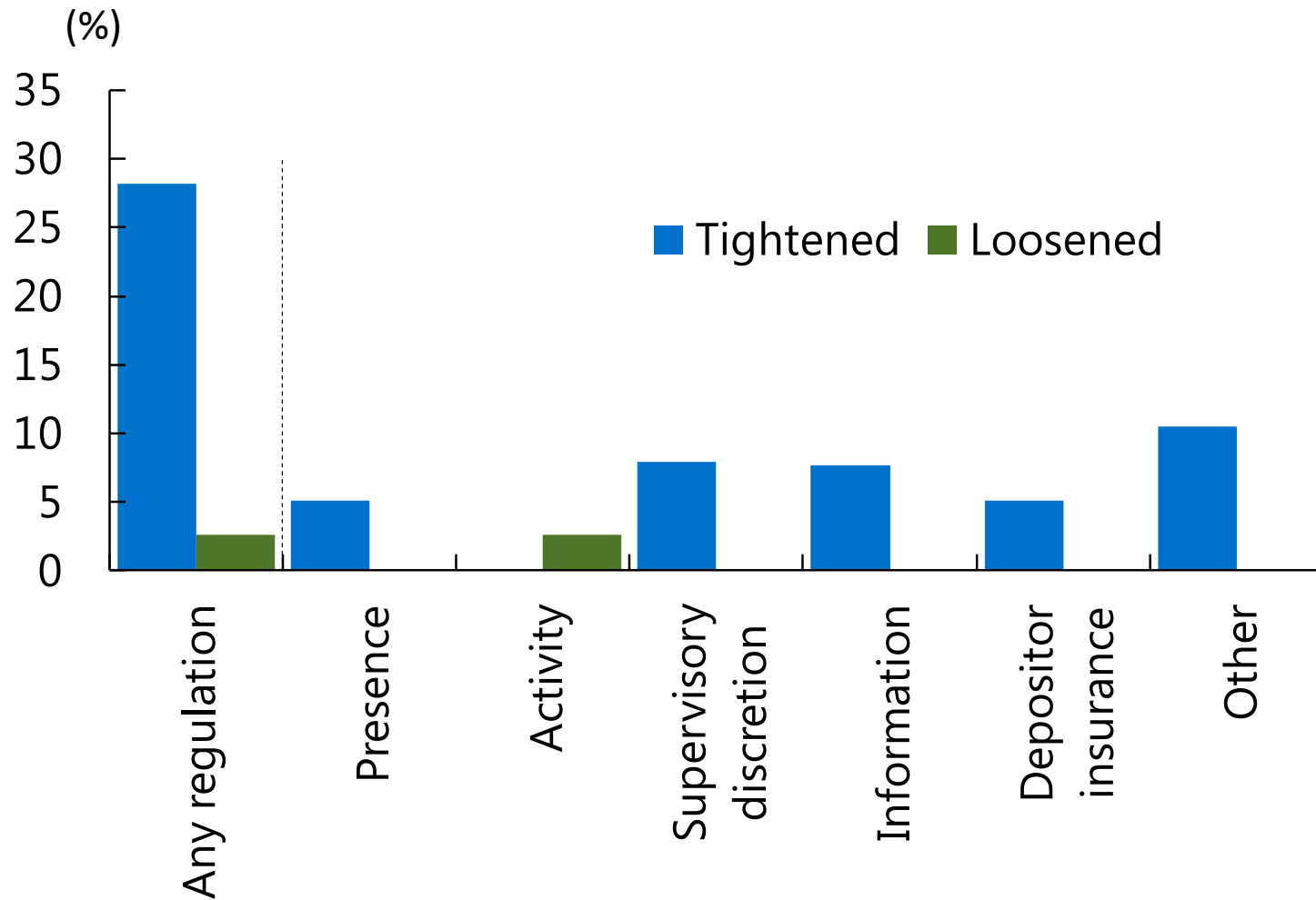
Indices of Changes in Regulations on International Operations

- For each country-category pair:

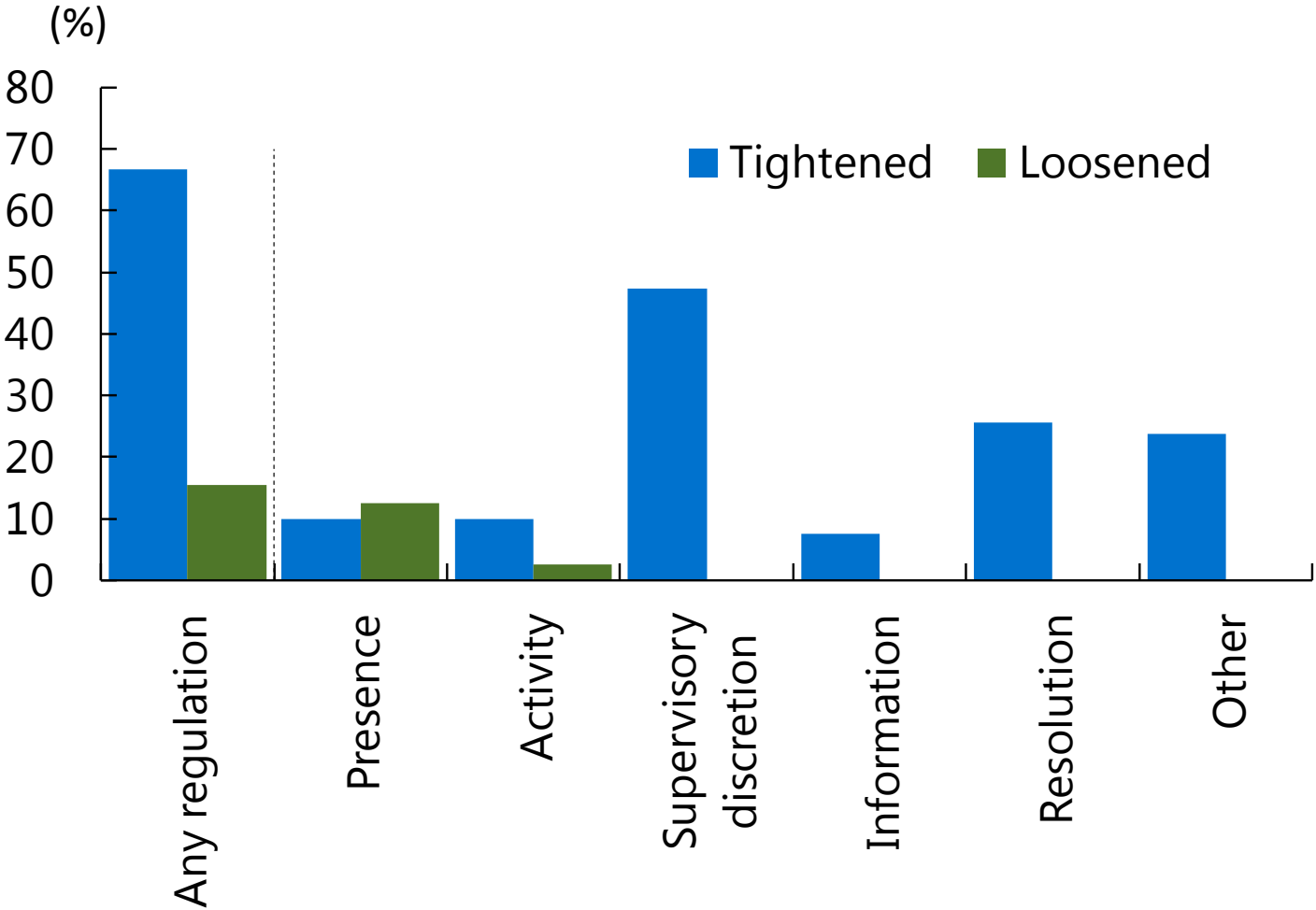
$$\begin{array}{l} 1 \qquad \qquad \qquad > \\ 0 \quad \text{if} \quad \#A \text{ of tightening} = \#A \text{ of loosening} \\ -1 \qquad \qquad \qquad < \end{array}$$

- The index is calculated as the average of the six categories.

Share of Home Countries That Changed Regulations between 2006 and 2014

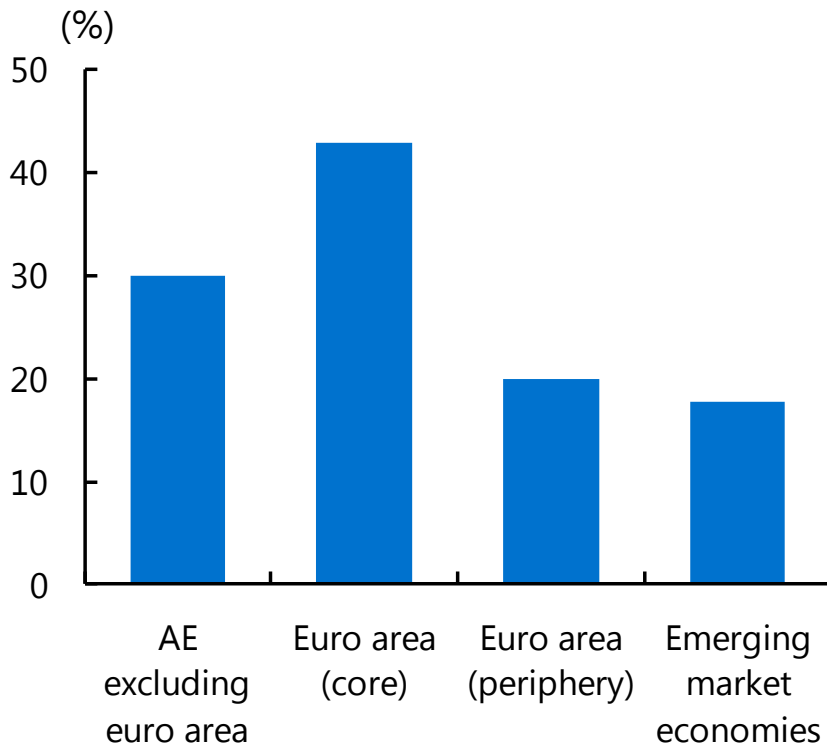


Share of Host Countries That Changed Regulations between 2006 and 2014

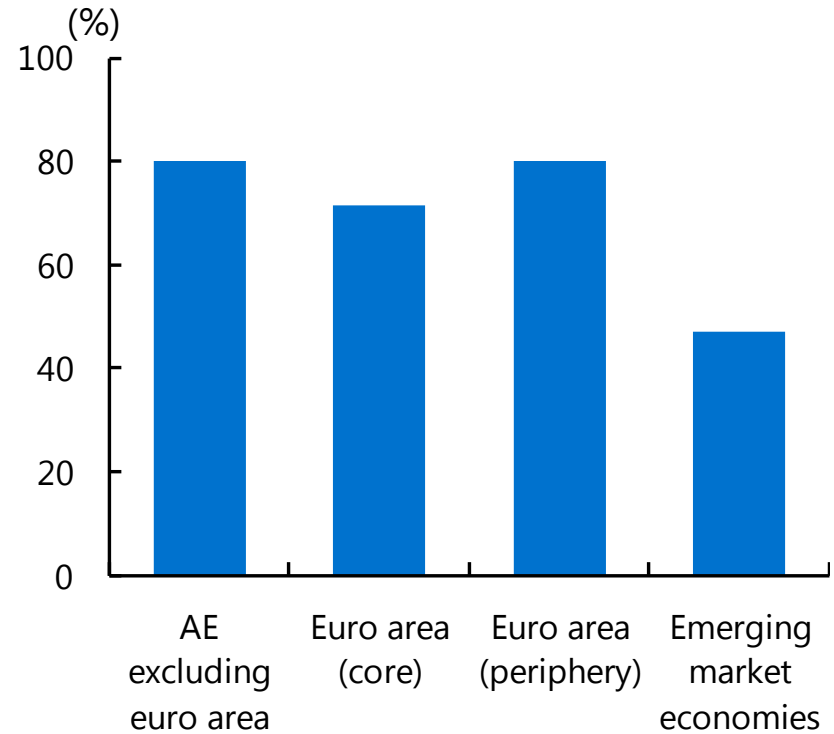


Share of Overall Tightening by Region (Countries with a Positive Index)

Home



Host



III. BASELINE SPECIFICATIONS

BIS Data (1)

- BIS CBS on an immediate risk (IR) basis is popular, in part due to its long time-series.
 - Cetorelli and Goldberg (2011), Houston et al. (2012), Bremus and Fratzscher (2015)
- But IR data don't reflect risk transfers and have limitations in capturing bilateral exposures.
- We use UR data.
 - Annual averages from quarterly data for 2005Q2-2013Q3.
 - The short time series is OK for us, since we are interested in the post-crisis period.

BIS Data (2)

- BIS data have two problems rarely tackled.
 - We adjust statistical breaks due to technical reasons (e.g., improvements in reporting practices), following Cerutti (2013).
 - BIS data are denominated in USD and can change due to exchange rates; we deal with this issue by controlling for exchange rates.
- Some papers use bank-level data, which raise other issues.
 - Popular DBs have very limited coverage of branches.
 - Over time, tracing ownership information has become more complicated with more banks raising equity through public capital markets offerings (Classens and van Horen 2014).

The Spec

$$\Delta claims_{ij} = \alpha + \beta \cdot \mathbf{home}_i + \gamma \cdot \mathbf{host}_j + \delta \cdot \mathbf{bilateral}_{ij} + \varepsilon_{ij}$$

<i>Δclaims</i>	Claim growth from home <i>i</i> to host <i>j</i> over 2007-13; Calculated as (claims13-claims07)/[(claims13+claims07)/2]
home	Home country variables: International operations regulatory index; Change in capital regulation index over 2006-11 (Barth et al. 2013); Exchange rate appreciation against USD over 2007-13; GDP growth over 2007-13; Bank capital/total assets in 2007
host	Host country variables (same as home, except for bank capital ratio)
bilateral	Bilateral variables: Log distance (Gleditsch and Ward 2001); Common language dummy (Rose 2004); Host's (home's) share of claims from home (on host) in 2007; Claim growth over 2005-07

IV. BASELINE RESULTS

Baseline Results

	(1)		(2)	
International operations regulatory index (home, change)	-177.60***	(0.00)	-190.54***	(0.00)
International operations regulatory index (host, change)	-35.23**	(0.04)	-43.52**	(0.02)
Capital regulatory index (home, change)			-82.94***	(0.00)
Capital regulatory index (host, change)			7.93	(0.57)
Exchange rate (home, % appreciation)	1.09***	(0.00)	0.83**	(0.03)
Exchange rate (host, % appreciation)	0.21	(0.41)	0.13	(0.67)
GDP (home, % change)	0.98***	(0.00)	1.05***	(0.00)
GDP (host, % change)	0.99***	(0.00)	0.96***	(0.00)
Bank capital to total assets (home, % in 2007)	4.85***	(0.00)	3.15**	(0.04)
Distance (log, km)	-4.03	(0.23)	-4.19	(0.27)
Common language dummy	-8.40	(0.37)	-4.25	(0.65)
Host country's share of claims from home (% in 2007)	0.73	(0.10)	0.81*	(0.09)
Home country's share of claims on host (% in 2007)	1.40***	(0.00)	0.90***	(0.01)
Claims (% change from 2005 to 2007)	-0.17**	(0.02)	-0.14*	(0.09)
Observations	726		597	
R-squared	0.172		0.202	

Robust pval in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Baseline Results

(with Standardized RHS Variables)

	(1)	(2)
International operations regulatory index (home, change)	-17.17*** (0.00)	-19.08*** (0.00)
International operations regulatory index (host, change)	-7.09** (0.04)	-8.91** (0.02)
Capital regulatory index (home, change)		-21.78*** (0.00)
Capital regulatory index (host, change)		2.15 (0.57)
Exchange rate (home, % appreciation)	14.14*** (0.00)	10.53** (0.03)
Exchange rate (host, % appreciation)	3.29 (0.41)	2.05 (0.67)
GDP (home, % change)	17.67*** (0.00)	19.85*** (0.00)
GDP (host, % change)	24.93*** (0.00)	24.32*** (0.00)
Bank capital to total assets (home, % in 2007)	11.09*** (0.00)	7.50** (0.04)
Distance (log, km)	-4.45 (0.23)	-4.74 (0.27)
Common language dummy	-2.67 (0.37)	-1.45 (0.65)
Host country's share of claims from home (% in 2007)	4.02 (0.10)	4.58* (0.09)
Home country's share of claims on host (% in 2007)	12.26*** (0.00)	8.00*** (0.01)
Claims (% change from 2005 to 2007)	-10.50** (0.02)	-8.60* (0.09)
Observations	726	597
R-squared	0.172	0.202

Robust pval in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Contributions to Claims/GDP Growth

$$\overline{\Delta claims_{ij}} - \overline{\Delta gdp_j}$$

$$= \hat{\alpha} + \hat{\beta} \cdot \overline{\mathbf{home}_i} + \hat{\gamma} \cdot \overline{\mathbf{host}_j} + \hat{\delta} \cdot \overline{\mathbf{bilateral}_{ij}} - \overline{\Delta gdp_j}$$

	(%)	
	(1)	(2)
Foreign claims/GDP	-43.7	-47.5
Regulatory changes	-16.9	-27.7
International operations regulatory index (home, change)	-10.5	-12.7
International operations regulatory index (host, change)	-6.4	-8.4
Capital regulatory index (home, change)		-7.2
Capital regulatory index (host, change)		0.5
Other drivers	-26.8	-19.7

V. ROBUSTNESS CHECKS

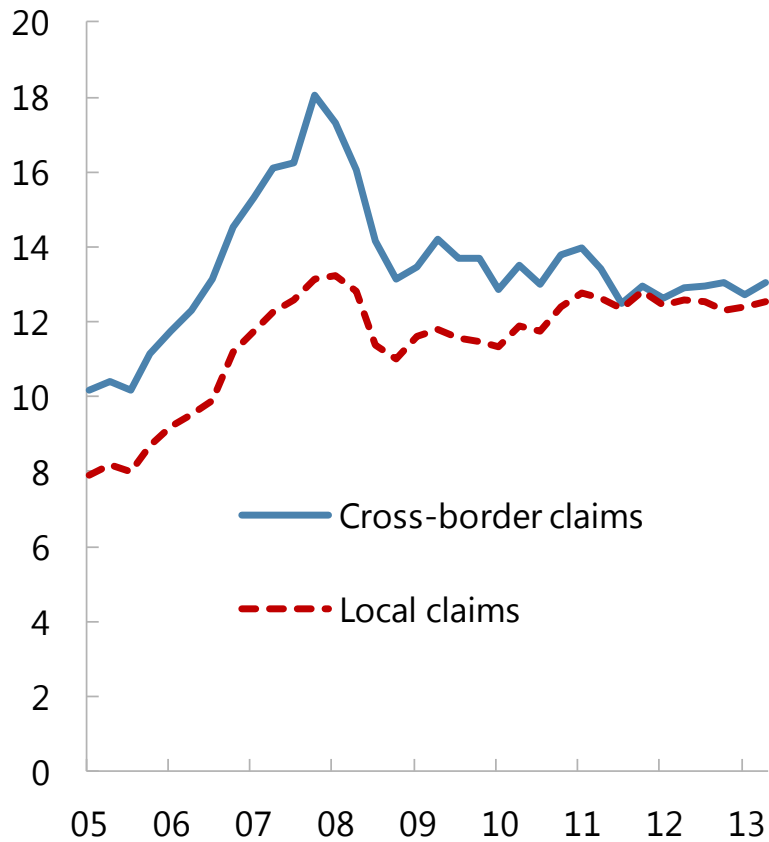
A List

- Alternative general financial regulations (Barth et al. 2013)
 - Official supervisory power, financial statement transparency, restrictions on activities (securities trading, insurance, and real estate), or an average of four regulatory indexes
- Instruments
 - Using the four general regulatory indexes in 2003 and 2006, instead of index of changes in regulations after the crisis
- Excluding claims from the euro area
- Additional Controls
 - Banking crisis dummy (home only; Laeven and Valencia 2012)
 - Sovereign rating index (home only; changes in notch; “+” = improve)
 - Real short-/long-term interest rates (using 1Y consensus)
 - Financial openness (Chinn and Ito 2006)
 - Government-owned banks (Barth et al. 2013)

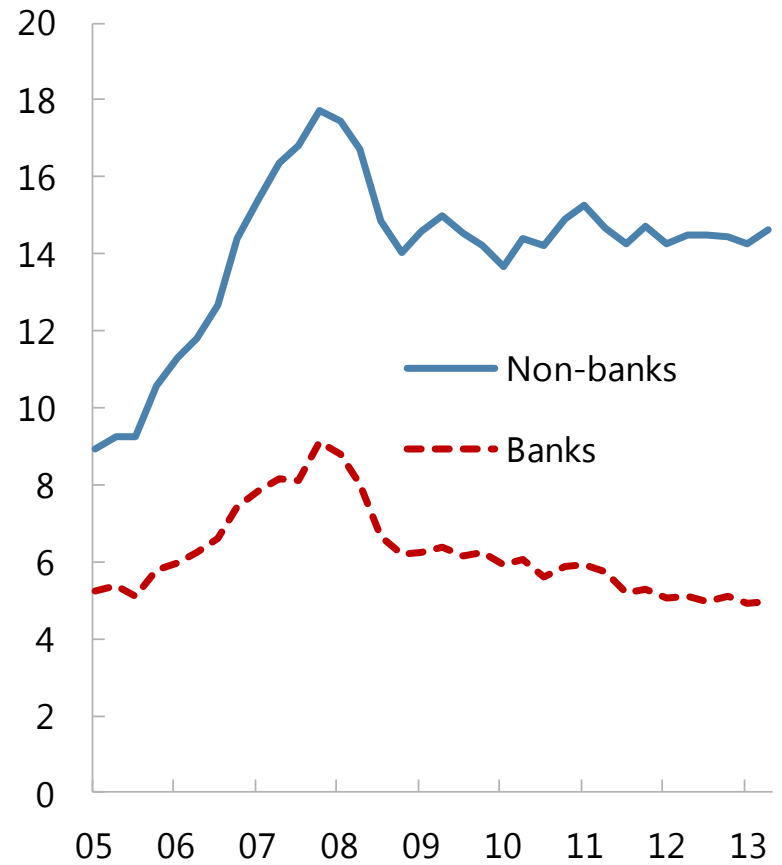
V. SUBCATEGORY ANALYSIS

Different Trends

By Claim Type



By Counterparty Sector



By Claim Type

	(1)	(2)	(1)	(2)
	Cross-border	Cross-border	Local	Local
International operations regulatory index (home, change)	-189.15***	-251.54***	26.07	-133.89
International operations regulatory index (host, change)	-23.76	-34.03	12.17	-10.81
Capital regulatory index (home, change)		-64.78***		-79.98***
Capital regulatory index (host, change)		15.11		-15.30
Exchange rate (home, % appreciation)	0.90**	0.87*	1.88***	1.25*
Exchange rate (host, % appreciation)	0.45*	0.33	0.57	0.82*
GDP (home, % change)	1.24***	1.25***	-0.21	0.75
GDP (host, % change)	1.02***	0.92***	1.33***	1.37***
Bank capital to total assets (home, % in 2007)	1.18	1.88	4.07*	0.60
Distance (log, km)	-5.02	-3.68	-16.91***	-19.09***
Common language dummy	-1.67	2.35	24.22*	17.80
Host country's share of claims from home (% in 2007)	0.29	0.32	0.77**	0.48
Home country's share of claims on host (% in 2007)	0.47	0.36	0.84***	0.72**
Claims (% change from 2005 to 2007)	-0.20**	-0.16*	-0.10	-0.21**
Observations	608	488	429	340
R-squared	0.176	0.180	0.136	0.173

By Recipient Sector

	(1)	(2)	(1)	(2)
	Non-banks	Non-banks	Banks	Banks
International operations regulatory index (home, change)	-178.57***	-278.17***	40.70	36.02
International operations regulatory index (host, change)	20.46	26.67	-44.46**	-56.75**
Capital regulatory index (home, change)		-89.64***		-39.78**
Capital regulatory index (host, change)		19.45		-9.47
Exchange rate (home, % appreciation)	-0.04	-0.11	0.88**	0.56
Exchange rate (host, % appreciation)	0.27	0.04	0.14	0.06
GDP (home, % change)	1.53***	1.66***	0.80***	0.83**
GDP (host, % change)	0.80***	0.85***	1.38***	1.25***
Bank capital to total assets (home, % in 2007)	3.92**	4.28**	3.69*	3.21
Distance (log, km)	-7.25*	-9.99**	-1.94	-0.28
Common language dummy	-0.83	9.29	-3.57	1.54
Host country's share of claims from home (% in 2007)	-0.54	-0.60	1.85***	1.69***
Home country's share of claims on host (% in 2007)	0.40	-0.03	0.75	0.22
Claims (% change from 2005 to 2007)	-0.20***	-0.17**	-0.14*	-0.11
Observations	584	466	590	472
R-squared	0.151	0.212	0.164	0.154

VI. CONCLUSION

Findings and Policy Implications

- We find:
 - Regulatory changes can account for about a half of the decline in foreign claims/GDP between 2007 and 2013.
 - Home regulations played a more important role than host ones.
 - Cross-border lending has been more affected than local lending.
- Policy Implications:
 - IMF (2015) finds that local lending is less sensitive to global shocks than cross-border lending.
 - The shift toward more local lending could positively affect financial stability in host countries.

ANNEX

Alternative General Financial Regulations

	(2)	(2)	(2)	(2)
International operations regulatory index (home, change)	-125.44***	-133.37***	-295.15***	-286.72***
International operations regulatory index (host, change)	-40.69**	-46.51**	-54.71**	-46.90**
Official Supervisory Power (home, change)	35.60**			
Official Supervisory Power (host, change)	-4.14			
Financial Statement Transparency (home, change)		-79.08***		
Financial Statement Transparency (host, change)		-0.82		
Overall Restrictions (home, change)			-2.86	
Overall Restrictions (host, change)			3.59	
Average of general financial regulations (home, change)				-175.40***
Average of general financial regulations (host, change)				37.75
Exchange rate (home, % appreciation)	2.02***	0.98**	1.29***	2.28***
Exchange rate (host, % appreciation)	0.30	0.15	0.12	0.21
GDP (home, % change)	0.89***	1.07***	0.94***	1.10***
GDP (host, % change)	1.06***	0.97***	0.84***	0.87***
Bank capital to total assets (home, % in 2007)	8.78***	4.05**	6.35***	7.91***
Distance (log, km)	-9.74**	-4.28	-4.62	-6.89
Common language dummy	-12.64	-2.38	-2.15	-2.88
Host country's share of claims from home (% in 2007)	0.67	0.72	0.76	0.76
Home country's share of claims on host (% in 2007)	0.46	1.20***	1.45***	0.95**
Claims (% change from 2005 to 2007)	-0.14*	-0.15*	-0.11	-0.12
Observations	544	597	527	477
R-squared	0.182	0.168	0.155	0.210

Instruments

	(1)	(2)
International operations regulatory index (home, change)	-157.99***	-291.57***
International operations regulatory index (host, change)	31.95	28.92
Capital regulatory index (home, change)		-113.71***
Capital regulatory index (host, change)		-2.33
Exchange rate (home, % appreciation)	1.07***	0.96**
Exchange rate (host, % appreciation)	-0.07	-0.14
GDP (home, % change)	0.97***	1.11***
GDP (host, % change)	0.97***	0.95***
Bank capital to total assets (home, % in 2007)	5.24***	2.77*
Distance (log, km)	-3.85	-5.07
Common language dummy	-7.58	-4.09
Host country's share of claims from home (% in 2007)	0.02	-0.01
Home country's share of claims on host (% in 2007)	1.42***	1.12***
Claims (% change from 2005 to 2007)	-0.16**	-0.12
Observations	690	565
R-squared	0.134	0.142

Without Euro Area as Home Countries

	(1)	(2)
International operations regulatory index (home, change)	-261.51***	-1,037.60***
International operations regulatory index (host, change)	-20.51	-28.53
Capital regulatory index (home, change)		-76.57
Capital regulatory index (host, change)		7.11
Exchange rate (home, % appreciation)	0.90**	6.35***
Exchange rate (host, % appreciation)	0.57	0.38
GDP (home, % change)	0.04	-2.84***
GDP (host, % change)	1.15***	1.23***
Bank capital to total assets (home, % in 2007)	0.02	23.11**
Distance (log, km)	6.26	0.50
Common language dummy	1.74	0.64
Host country's share of claims from home (% in 2007)	0.97*	1.02**
Home country's share of claims on host (% in 2007)	0.46	-0.66
Claims (% change from 2005 to 2007)	-0.25**	-0.18
Observations	328	230
R-squared	0.227	0.245

Banking Crisis Dummy

	(1)	(2)
International operations regulatory index (home, change)	-185.09***	-191.96***
International operations regulatory index (host, change)	-35.27**	-43.38**
Capital regulatory index (home, change)		-78.59***
Capital regulatory index (host, change)		7.88
Exchange rate (home, % appreciation)	1.25***	0.89**
Exchange rate (host, % appreciation)	0.22	0.13
GDP (home, % change)	1.05***	1.07***
GDP (host, % change)	1.05***	0.98***
Bank capital to total assets (home, % in 2007)	3.80**	2.76*
Distance (log, km)	-6.45*	-5.19
Common language dummy	-12.12	-5.91
Host country's share of claims from home (% in 2007)	0.98**	0.90*
Home country's share of claims on host (% in 2007)	0.82***	0.69**
Claims (% change from 2005 to 2007)	-0.17**	-0.14*
Banking crisis dummy (home, change)	-37.67***	-14.76
Observations	726	597
R-squared	0.182	0.204

Sovereign Rating Index

	(1)	(2)
International operations regulatory index (home, change)	-180.51***	-195.46***
International operations regulatory index (host, change)	-41.06**	-43.91**
Capital regulatory index (home, change)		-86.13***
Capital regulatory index (host, change)		7.68
Exchange rate (home, % appreciation)	1.41***	1.40**
Exchange rate (host, % appreciation)	0.18	0.12
GDP (home, % change)	0.56	0.41
GDP (host, % change)	0.97***	0.94***
Bank capital to total assets (home, % in 2007)	5.78***	4.74**
Distance (log, km)	-4.03	-3.45
Common language dummy	-6.76	-2.92
Host country's share of claims from home (% in 2007)	0.76	0.88*
Home country's share of claims on host (% in 2007)	1.26***	0.67**
Claims (% change from 2005 to 2007)	-0.17**	-0.13
Sovereign rating index (home, change)	2.42	3.28
Observations	687	597
R-squared	0.175	0.206

Real Interest Rates

	(1)	(2)	(1)	(2)
International operations regulatory index (home, change)	-176.56***	-188.83***	-184.23***	-160.37***
International operations regulatory index (host, change)	-37.84**	-43.63**	-35.47	-29.26
Capital regulatory index (home, change)		-76.80***		-44.35***
Capital regulatory index (host, change)		7.23		7.40
Exchange rate (home, % appreciation)	0.08	0.12	-0.21	-0.92
Exchange rate (host, % appreciation)	0.22	0.10	-0.50	-0.65
GDP (home, % change)	1.44***	1.38***	1.61***	1.84***
GDP (host, % change)	1.12***	1.08***	1.25***	1.11***
Bank capital to total assets (home, % in 2007)	6.33***	4.57**	10.53***	8.98***
Distance (log, km)	-4.72	-5.26	-5.02	-7.46*
Common language dummy	-10.34	-5.91	-21.25**	-15.05
Host country's share of claims from home (% in 2007)	0.36	0.47	0.63	0.48
Home country's share of claims on host (% in 2007)	1.63***	1.15***	1.13***	0.84**
Claims (% change from 2005 to 2007)	-0.16**	-0.14*	-0.26***	-0.22**
Real short-term interest rate (home, % points)	6.85**	5.08		
Real short-term interest rate (host, % points)	-4.82***	-4.63***		
Real long-term interest rate (home, % points)			-1.05	0.25
Real long-term interest rate (host, % points)			-4.84***	-4.55***
Observations	674	566	441	359
R-squared	0.208	0.228	0.268	0.255

Financial Openness

	(1)	(2)
International operations regulatory index (home, change)	-174.15***	-187.99***
International operations regulatory index (host, change)	-30.62*	-42.75**
Capital regulatory index (home, change)		-79.45***
Capital regulatory index (host, change)		1.54
Exchange rate (home, % appreciation)	0.79**	0.67
Exchange rate (host, % appreciation)	0.22	0.19
GDP (home, % change)	1.01***	1.06***
GDP (host, % change)	1.14***	1.10***
Bank capital to total assets (home, % in 2007)	5.41***	3.18*
Distance (log, km)	-1.50	-1.43
Common language dummy	-7.38	-3.71
Host country's share of claims from home (% in 2007)	0.71	0.83*
Home country's share of claims on host (% in 2007)	1.41***	0.96***
Claims (% change from 2005 to 2007)	-0.20***	-0.17**
Chinn-Ito index (home, change)	-22.81*	-7.56
Chinn-Ito index (host, change)	32.15***	30.55***
Observations	707	580
R-squared	0.202	0.224

Government-owned Banks

	(1)	(2)
International operations regulatory index (home, change)	-246.73***	-244.55***
International operations regulatory index (host, change)	-41.11**	-43.07**
Capital regulatory index (home, change)		-44.45***
Capital regulatory index (host, change)		17.78
Exchange rate (home, % appreciation)	1.34***	1.13***
Exchange rate (host, % appreciation)	0.25	0.12
GDP (home, % change)	0.32	0.51*
GDP (host, % change)	0.84***	0.84***
Bank capital to total assets (home, % in 2007)	2.89*	2.25
Distance (log, km)	-1.86	-2.60
Common language dummy	8.35	4.14
Host country's share of claims from home (% in 2007)	0.65	0.60
Home country's share of claims on host (% in 2007)	0.94***	0.79**
Claims (% change from 2005 to 2007)	-0.13*	-0.12
Government-owned bank share (home, % in 2006)	0.70*	0.40
Government-owned bank share (host, % in 2006)	0.08	-0.03
Observations	613	545
R-squared	0.141	0.158