Bank lending standards abroad:

Does home-country regulation and supervision matter?

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Research question

- Bank regulation/supervision at home **->** bank behavior abroad?
- In particular: lending standards (risk taking)
- Increasingly relevant question in era of global banking groups

Research hypotheses

- H1: Subsidiary independently capitalized, behavior abroad orthogonal to home-country rules
    - No correlation between strictness of home-country rules and host-country lending standards
- H2: Stricter home-country regulation induce banks to act accordingly and conservatively abroad
    - Formal reasons (branch activity under home-country jurisdiction)
    - Type of business model employed
    - Behavioral reasons (act „as if at home")
        - Positive correlation between strictness of home-country rules and host-country lending standards
- H3: Stricter home-country regulation can push banks to look for risk abroad
    - Make up for lack of risk taking in domestic markets
        - Negative correlation between strictness of home-country rules and host-country lending standards

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Empirical set-up

- Bank lending in emerging Europe
- Bank sector dominated by foreign-owned banks
  - 2/3 of bank assets in the region foreign-owned, up to 99% in some countries
- Entry mode almost exclusively through buying an existing network rather than through greenfielding
- Active internal capital markets across borders
  - Credit growth (de Haas and van Lelyveld, 2010)
  - Transmission of financial distress (Popov and Udell, 2010)

Data and empirical proxies

- Host-country SME data on 9655 firms between 2000 and 2008
  - Size, age, ownership (private / state / foreign), competition, exporter, subsidized, sector
  - Outcome when applying for a loan, reasons for not applying
  - Can distinguish healthy from discouraged non-applicant firms

- Host-country branching network
  - 1976 localities in 16 countries
  - 28 domestic banks and 127 subsidiaries and branches of 23 foreign banks
  - Restrict attention to foreign-dominated localities

- Home-country data on indices of bank regulation and supervision

- Use loan rejections and firm characterisitcs to define bank lending standards
  - Lending to informationally opaque firms

Regulation and supervision data

- Abiad et al. (2008)
  - Regulatory stringency
    - credit controls; interest rate controls; entry barriers; state ownership of banks; restrictions on international capital flows; securities market regulations
    - home-country variation comes from variation in entry barriers and state ownership of banks
  - Supervisory efficiency/independence
    - supervisor independent of executive influence; on-site and off-site examination; coverage of all financial institutions
- Barth et al. (2008)
  - Restrictions on bank activities
    - bank involvement in securities markets, insurance, real estate; ownership of non-financial firms
  - Capital stringency
    - Minimum capital ratio adjusted for market risk; loan, securities, and forex losses deducted from capital; verification of sources of funds classified as capital

Main findings

- Home-country regulation associated with higher barriers to entry by foreign and private banks -> higher lending standards abroad

- Home-country regulation associated with higher restrictions on bank activities and with higher capital requirements -> lower lending standards abroad

- Both results stronger for banks subject to less efficient home-country supervision

- Erosion of profits in home markets associated with higher risk taking abroad

- Regulation/supervision associated with cross-border spillover effects

Literature

- Bank regulation and risk-taking
  - Barth, Caprio, and Levine (*JFI* 2004)
  - Laeven and Levine (*JFE* 2009)

- Bank capital and bank lending
  - Peek and Rosengren (*AER* 2005)
  - Caballero, Hoshi, and Kashyap (*AER* 2008)
  - Khwaja and Mian (*AER* 2008)
  - Jimenez, Ongena, Peydro, and Saurina (2009)

- Cross-border lending in the context of internal capital markets
  - Peek and Rosengren (*AER* 1997)
  - de Haas and van Lelyveld (*JFI* 2010)
  - Popov and Udell (2010)
  - de Haas and van Horen (2011)

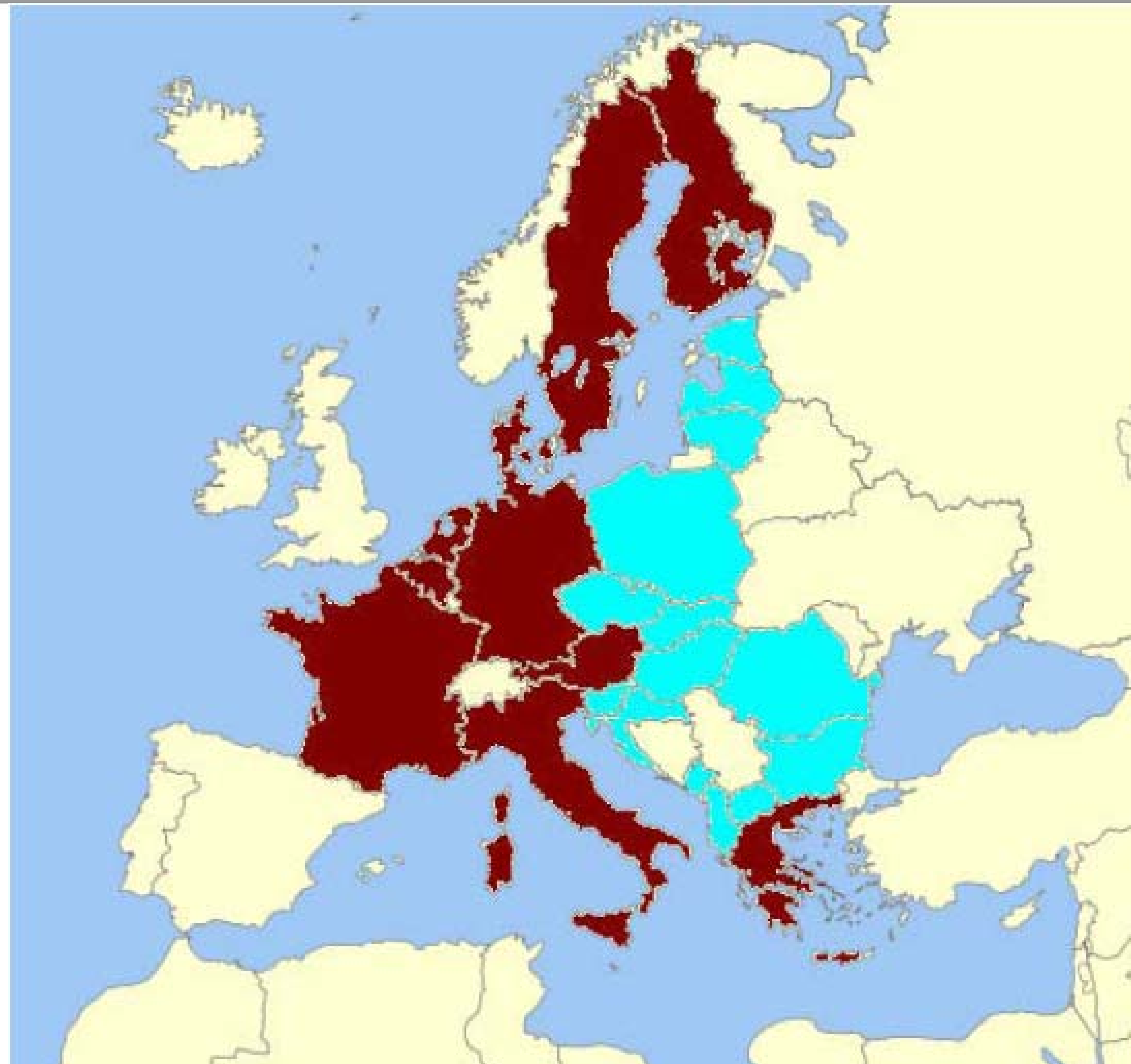
Caveat: Matching firm and bank data

- No match between bank and firm

- Solution: match bank and firm data at the locality unit of observation
  - Theory: banks derive market power from proximity – Degryse and Ongena (2005)
  - Evidence: median distance between a firm and its main bank low (1 to 8 km. in the US (Petersen and Rajan, 2002; Agarwal and Hauswald, 2010), 2.25 km. in Belgium (Degryse and Ongena, 2005)).
  - Used in the literature – Gormley (2009), Popov and Udell (2010)

- Calculate a locality-specific measure of home-country regulation and supervision by weighting home-country regulation and supervision indices for all banks present
  - 1) by number of branches
  - 2) equally
  - 3) by bank assets

Home countries and host countries



Firm stats, by country

Country	# firms	Small firm	Big firm	Public company	Private company	Sole pro-prietorship	Priva-tized	Exporter	Opaque	Firm age	Innova-tive	Subsi-dized	Competition
Albania	258	0.90	0.03	0.01	0.76	0.74	0.06	0.31	0.26	10.43	1.62	0.04	0.74
Bulgaria	581	0.84	0.03	0.05	0.68	0.51	0.12	0.24	0.58	15.89	1.62	0.06	0.62
Croatia	340	0.79	0.05	0.06	0.71	0.44	0.23	0.36	0.53	23.06	1.51	0.18	0.79
Czech Republic	593	0.79	0.04	0.04	0.60	0.41	0.08	0.35	0.57	13.10	1.63	0.16	0.82
Estonia	492	0.79	0.03	0.13	0.73	0.27	0.11	0.34	0.2	14.79	1.52	0.14	0.77
Hungary	901	0.80	0.04	0.01	0.85	0.63	0.12	0.36	0.26	14.84	1.67	0.22	0.88
Latvia	476	0.72	0.04	0.01	0.92	0.36	0.12	0.31	0.31	14.47	1.49	0.11	0.78
Lithuania	481	0.77	0.02	0.02	0.78	0.24	0.16	0.37	0.60	14.29	1.40	0.15	0.78
Macedonia	566	0.81	0.03	0.05	0.67	0.32	0.16	0.39	0.46	17.41	1.48	0.04	0.84
Poland	1,430	0.83	0.02	0.05	0.31	0.78	0.09	0.26	0.63	17.96	1.58	0.13	0.84
Romania	1,141	0.73	0.04	0.04	0.61	0.17	0.13	0.2	0.63	14.43	1.61	0.09	0.71
Slovakia	495	0.74	0.05	0.06	0.11	0.54	0.11	0.34	0.45	14.54	1.56	0.13	0.79
Slovenia	499	0.74	0.05	0.08	0.82	0.29	0.21	0.56	0.57	23.02	1.52	0.22	0.79
Total	8,253	0.79	0.04	0.05	0.63	0.46	0.12	0.32	0.49	16.08	1.57	0.13	0.79

Bank regulation and supervision: Home countries

Country	Regulatory stringency	Prudential supervision	Regulatory restrictions	Capital stringency
Austria	1.5	2.5	5	5
Belgium	0	2.5	9	4
Denmark	0	3	8	2
Finland	2	1	7	4
France	0	3	6	2
Germany	2	3	5	1
Greece	2.5	2	9	3
Ireland	0	3	8	1
Italy	0.5	2	10	4
Netherlands	0	2.75	6	3
Sweden	0	2	9	3
United States	0	3	12	4
Total	0.7	2.4	7.8	3

Bank regulation and supervision: Host countries

Country	Regulatory stringency	Prudential supervision	Regulatory restrictions	Capital stringency
Albania	1.910	2.117	7.474	3.977
Bulgaria	1.784	2.171	8.350	3.328
Croatia	0.856	2.187	8.171	4.124
Czech Republic	0.610	2.623	6.781	3.804
Estonia	0.332	2.016	8.486	2.984
Hungary	1.033	2.288	7.345	4.062
Latvia	0.478	2.000	4.535	1.512
Lithuania	0.156	2.159	7.390	2.536
Macedonia	1.625	2.368	7.825	2.561
Poland	0.349	2.464	8.753	2.848
Romania	1.210	2.483	6.668	3.693
Slovakia	0.920	2.418	7.141	4.534
Slovenia	0.198	2.621	8.190	3.649
Total	0.851	2.340	7.541	3.324

Home-country regulation and supervision and host-country lending standards

- Empirical model

$$Constrained_{ijklt} = \beta_1 Firm_{ijklt} + \beta_2 \operatorname{Re} g_{jkt} \times Risk_{ijklt} + \beta_3 D_k + \beta_4 D_l + \beta_5 D_t + \beta_6 Mills + \varepsilon_{ijklt}$$

  - Firm *i*
  - Locality *j*
  - Country *k*
  - Industry *l*
  - Time *t*
  - Ex-ante 'Risk' defined in terms of informational opacity

- Effect of host-country regulation subsumed in country-time dummies
  - Common to all firms in a country
  - Identification through cross-locality within-country variation
  - Incorporate information on firm demand for loans to account for self-selection

First stage: Probability of positive demand for credit

	(1)	(2)	(3)
	Branch-weighted	Equally-weighted	Asset-weighted
Regulatory stringency	-0.182	-0.195	-0.124
	(0.095)**	(0.111)*	(0.082)
Prudential supervision	-0.142	-0.102	-0.113
	(0.131)	(0.143)	(0.132)
Restrictions on bank activities	-0.026	-0.027	-0.045
	(0.035)	(0.042)	(0.035)
Capital stringency	0.015	0.026	0.070
	(0.067)	(0.083)	(0.058)
Opaque	-0.096	-0.094	-0.069
	(0.037)***	(0.035)***	(0.034)**
Small firm	-0.148	-0.130	-0.153
	(0.056)***	(0.053)**	(0.053)**
Big firm	0.145	0.156	0.172
	(0.091)*	(0.094)*	(0.089)**
Public company	-0.017	0.033	0.016
	(0.070)	(0.070)	(0.069)
Sole proprietorship	0.192	0.175	0.148
	(0.045)***	(0.044)***	(0.043)***
Privatized	0.102	0.147	0.107
	(0.056)*	(0.056)***	(0.054)**
Non-exporter	-0.179	-0.147	-0.164
	(0.049)***	(0.048)***	(0.048)***
Firm age	-0.036	-0.069	-0.068
	(0.111)	(0.107)	(0.103)
Innovative	0.205	0.203	0.201
	(0.044)***	(0.043)***	(0.042)***
Competition	0.138	0.143	0.164
	(0.036)***	(0.036)***	(0.035)***
Subsidized	0.320	0.327	0.325
	(0.062)***	(0.060)***	(0.058)***
Number of observations	7,040	7,379	7,651
Pseudo R-squared	0.05	0.05	0.05

Second stage: Home-country regulation and supervision and host-country lending standards

	(1)	(2)	(3)	(4)	(5)	(6)
Regulatory stringency × Opaque	0.228				0.232	0.233
	(0.070)***				(0.080)***	(0.080)***
Prudential supervision × Opaque		-0.131			-0.051	-0.043
		(0.151)			(0.149)	(0.149)
Restrictions on bank activities × Opaque			-0.099		-0.086	-0.089
			(0.036)***		(0.037)**	(0.037)**
Capital stringency × Opaque				-0.040	-0.057	-0.061
				(0.050)	(0.054)	(0.054)
Regulatory stringency	-0.163				-0.230	-0.280
	(0.107)				(0.133)*	(0.138)**
Prudential supervision		0.154			0.134	0.090
		(0.157)			(0.182)	(0.186)
Restrictions on bank activities			0.044		0.024	0.015
			(0.040)		(0.049)	(0.050)
Capital stringency				0.120	0.169	0.176
				(0.091)	(0.098)*	(0.098)*
Opaque	0.095	0.625	1.058	0.463	1.060	1.040
	(0.092)	(0.352)*	(0.270)***	(0.180)**	(0.377)***	(0.381)***
Inverse Mills' ratio						-0.097
						(0.062)*
Number of observations	4,537	4,537	4,537	4,537	4,537	4,519
Pseudo R-squared	0.10	0.10	0.10	0.10	0.10	0.10

Interaction between home-country regulation and supervision and host-country lending standards

	(1)	(2)	(3)	(4)	(5)	(6)
	Branch-weighted		Equally-weighted		Asset-weighted	
	Low supervision	High supervision	Low supervision	High supervision	Low supervision	High supervision
Regulatory stringency × Opaque	0.452	0.027	0.042	0.158	0.289	0.322
	(0.100)***	(0.119)	(0.076)	(0.088)*	(0.080)***	(0.130)**
Restrictions on bank activities × Opaque	-0.100	-0.048	-0.118	0.097	-0.102	0.048
	(0.049)**	(0.081)	(0.098)	(0.088)	(0.080)	(0.074)
Capital stringency × Opaque	-0.167	0.025	-0.649	-0.060	-0.265	0.054
	(0.072)**	(0.086)	(0.212)***	(0.197)	(0.104)**	(0.108)
Regulatory stringency	-0.642	-0.091	-0.171	-0.101	-0.065	-0.318
	(0.185)***	(0.176)	(0.100)*	(0.082)	(0.185)	(0.212)
Restrictions on bank activities	-0.066	0.031	-0.253	0.185	0.193	-0.048
	(0.071)	(0.071)	(0.169)	(0.142)	(0.089)**	(0.082)
Capital stringency	0.179	0.200	-0.042	0.158	-0.365	0.072
	(0.178)	(0.134)	(0.076)	(0.088)*	(0.194)*	(0.134)
Opaque	1.184	0.501	0.668	-1.483	1.888	-0.436
	(0.263)***	(0.833)	(0.591)	(0.882)*	(0.718)***	(0.723)
Number of observations	2,527	1,992	2,449	2,278	2,581	2,319
Pseudo R-squared	0.11	0.11	0.11	0.11	0.11	0.11

Conclusion

- Ex-ante riskier firms in host-country localities dominated by banks facing anti-competitive regulation at home -> higher probability of being constrained in terms of new credit
- Ex-ante riskier firms in host-country localities dominated by banks facing higher activity restrictions and capital standards -> lower probability of being constrained in terms of new credit
- All effects hold
  - After accounting for non-applicant firms (discouraged vs. healthy)
  - After eliminating common sector and business cycle unobservables
  - After accounting for host-country regulation
- Policy implications
  - Eroding profits abroad lead to lower lending standards abroad
  - Risk-taking?
  - Domestic regulation associated with cross-border spillovers
  - Harmonization of regulation