Cross-border banking and the international transmission of financial distress during the crisis of 2007-2008

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Background

- **Large shocks to the balance sheets of west-European banks during the 2007-2008 crisis**
- **Bank sector in central and eastern Europe dominated by subsidiaries of west-European banks**
  - **2/3 of bank assets in the region foreign-owned, up to 99% in some countries**
- **Region‘s corporate landscape dominated by SMEs (bank-dependent)**

- **Ideal laboratory to study impact of crisis through cross-border transmission of financial shocks**

Data and empirical questions

- Survey data on 9,360 firms and balance sheet data on 141 banks in 14 countries in emerging Europe in 2005 and 2008

- Question 1: Did foreign banks transmit the shocks to their balance sheets to the corporate sector in central and eastern Europe?
  - pre-Lehmann
  - pre-Vienna initiative

- Question 2: If yes, did foreign banks react differently to an identical shock to their balance sheets than domestic banks?

- Question 3: Reduction in credit associated with risk-taking or with flight to quality?

Main findings

- Foreign banks did transmit the shocks to their balance sheets to the corporate sector in central and eastern Europe
  - Evidence on new lending only
- Foreign banks transmit a larger portion of identical shocks to an identical population of firms
- Most consistent results found for low (Tier 1) capital
- Reduction in credit most pronounced for firms with fewer collaterizeable assets
  - Flight to quality?

Literature

- **Capital crunch - historical**
  - **Bernanke and Lown (*Brookings* 1991), Berger and Udell (*JMCB* 1994) – U.S.**
  - **Khwaja and Mian (*AER* 2008) – Pakistan**

- **Capital crunch – current crisis**
  - **Ivashina and Scharfstein (2009) – U.S.**
  - **Puri, Rocholl, and Steffen (2009) – Germany**
  - **Albertazzi and Marchetti (2009) - Italy**
  - **Jimenez, Ongena, Peydro, and Saurina (2009) - Spain**

- **Cross-border transmission of financial shocks**
  - **Peek and Rosengren (*AER* 1997) – Japanese banks in US**
  - **Chava and Purnanadam (*JFE* 2009) – Russian crisis and lending to US borrowers**
  - **Schnabl (2009) – Russian crisis and lending to Peruvian borrowers**

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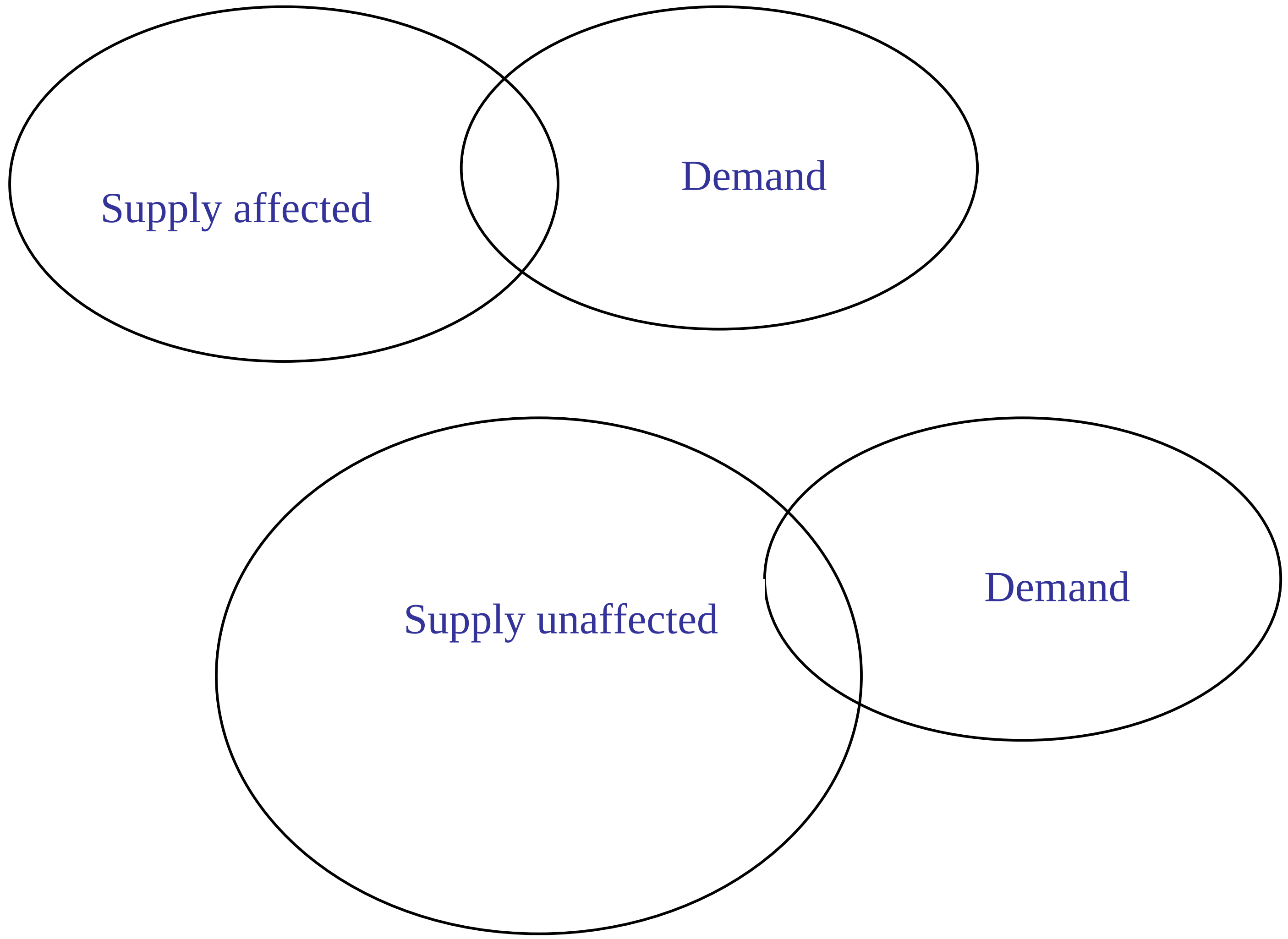
Identifying Demand vs. Supply: micro data



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- Aproach 2: setting a la Puri, Rocholl, and Steffen (2009) – use application data to control for demand
  - **Not applicable**
  - **Many constrained firms „discouraged“ rather than „rejected“**
  - **Discouraged customers „exactly the same“ as rejected customers (Cox and Jappelli, JMCB 1992; Duca and Rosenthal, JFI 1993)**
  - **2/3 of credit constrained firms in CEE (Brown, Ongena, Popov, and Yesin, 2010)**

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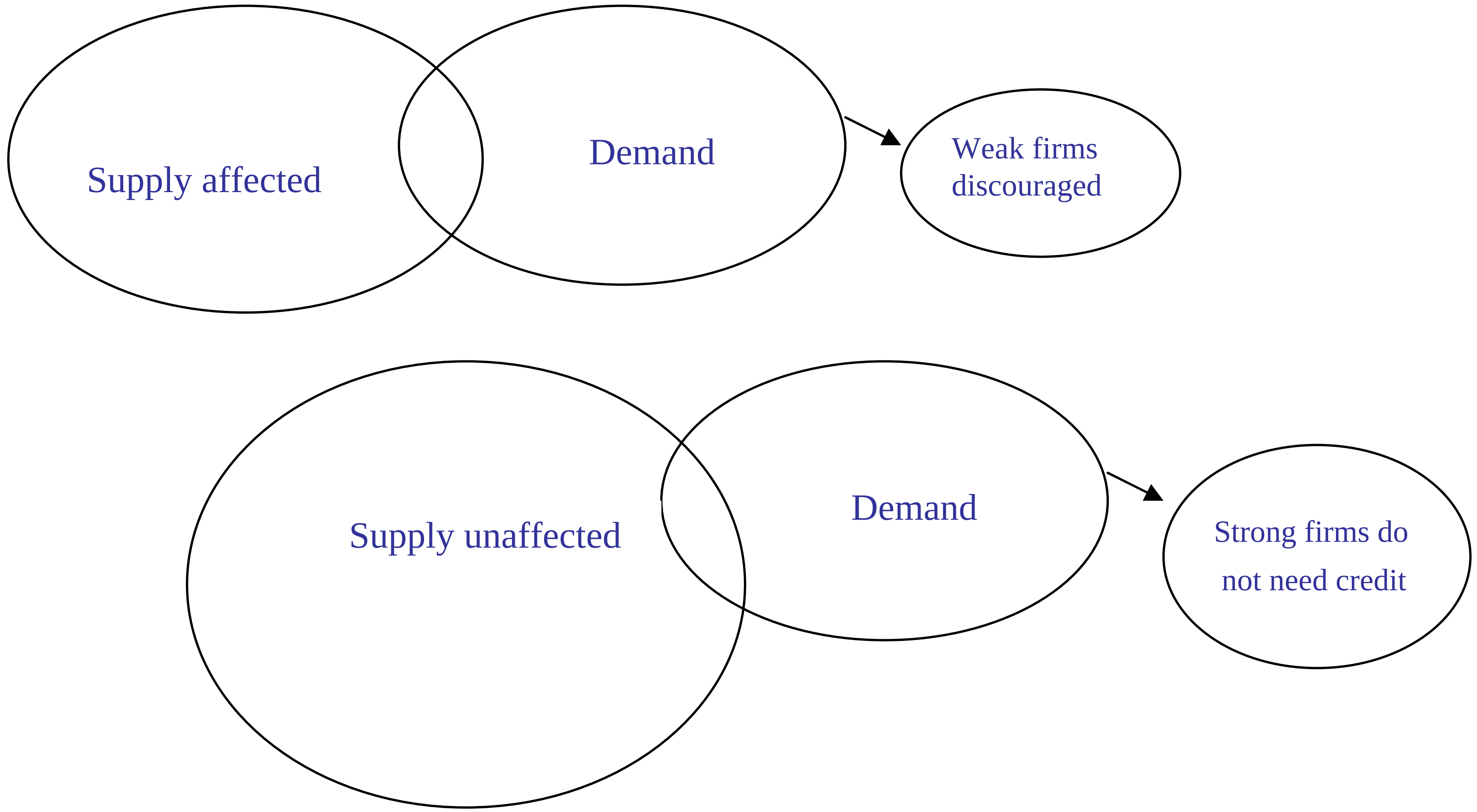


- **Demand decreases at the same rate => all change in loan rejection due to supply**
- **But… Why do applications decrease?**
  - **Strong firms do not need credit?**
  - **Weak firms discouraged?**

Identification strategy

- **Need balance sheet data on „*affected*" and „*non-affected*" *banks***

- **Account for *changes in level and composition of demand* by incorporating info on *applicant firms***

- **Construct *proper proxy for credit constraint* by incorporating info on *non-applicant firms***

- **Use difference-in-differences to compare transmission over time and by *foreign vs. domestic banks***

- **Eliminate *common industry factors* and *local macro factors***

Firm data

- 2005 and 2008 BEEPS by the World Bank and the EBRD.
- 2008 wave interviewed in April 2008, asked about experience with banks during "fiscal year 2007"
  - For all countries, firms extend fiscal year to end March
  - 3 crisis quarters (bias goes against finding anything)
- 9,360 firms from 14 central and eastern European countries
  - Albania, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Slovakia, and Slovenia
- 1,803 localities
- Firm level characteristics
  - Size (74% <100 workers, 3% >500 workers), age, ownership (private / state / foreign), competition, exporter, subsidized, audited, sector
- Survey questions on loan application: yes / no / why not?
  - Distinguish healthy from discouraged non-applicant firms

Bank data

- **Balance data from Bankscope for 2005-2008, at the level of the parent**
  - 1) Equity capital / total assets ratio
  - 2) Total capital ratio and Tier 1 capital ratio
  - 3) Gain (loss) on financial assets
- **141 banks present in the 1,803 localities**
  - 26 domestic, 115 subsidiaries and branches of foreign banks
  - 421 localities with more than 1 firms
- **No match between bank and firm (unit of observation: locality)**
  - Theory: banks derive market power from proximity – Degryse and Ongena (2005)
  - Facts: median distance between a firm and its main bank in the US is 5 miles – Petersen and Rajan (2002) and 2 km in Italy – Albertazzi and Marchetti (2010)
  - Used in the literature – Gormley (*JFI* 2009)
- **Calculate a locality-specific measure of "financial distress" by weighting balance sheet data for all banks present**
  - 1) equally and 2) by number of branches

Empirical model

- **Express probability of constraint as a two-equation Tobit scheme**

$$Y^*_{ijkl} = \overline{\alpha} X_{ijkl} + \overline{\beta} Z_{jk} + u_{ijkl}$$

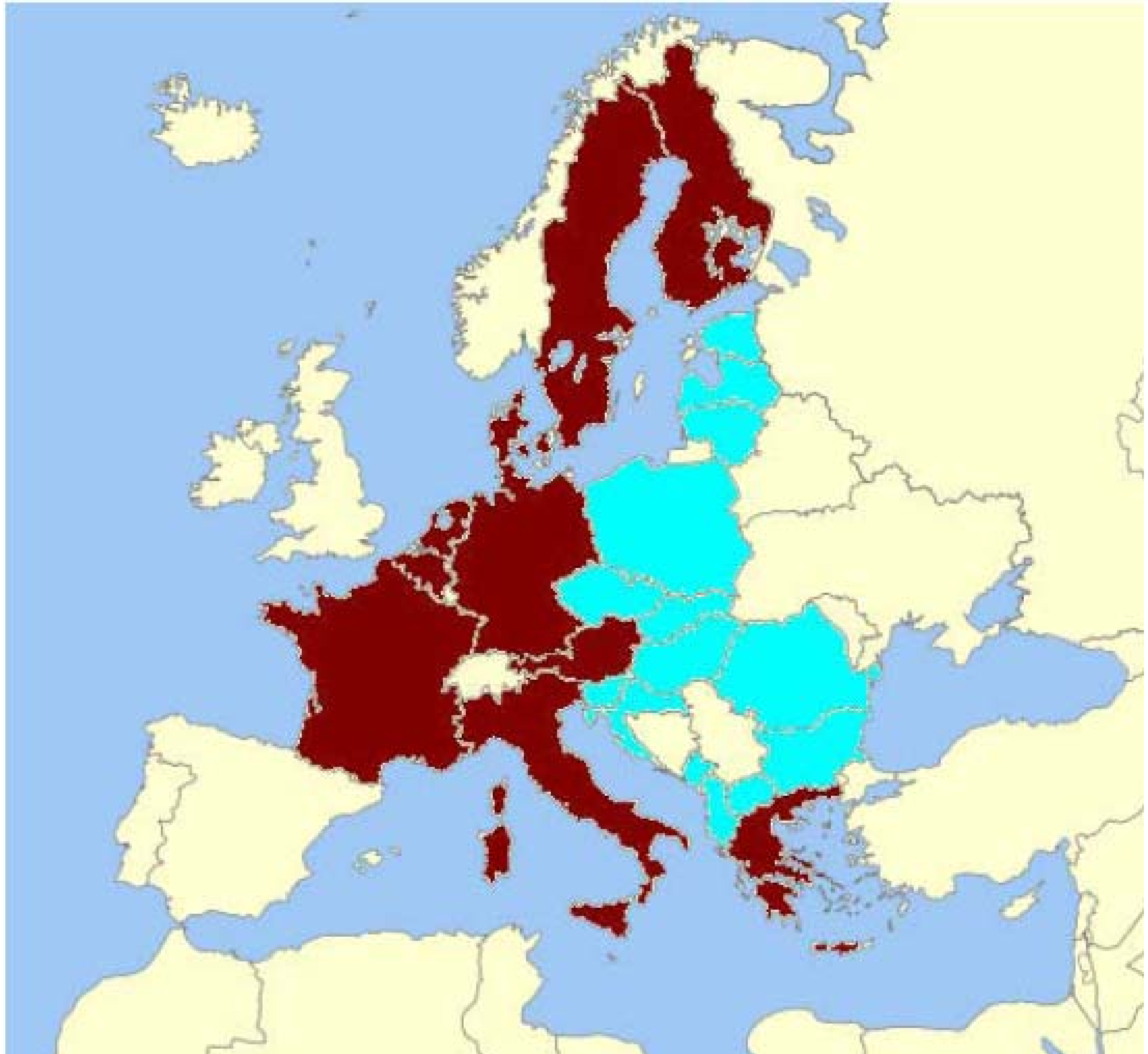
  where X_{ijkl} is a vector of firm-specific variables and Z_{jk} is a vector of locality-specific bank distress variables.

- **Y^*_{ijkl} is only observed if demand for loans is positive (firm desires credit)**
- **Constraint is observed conditional on positive demand:**
  - **Let Q=1 if the firm desires positive debt, Q=0 otherwise. Then, Q=1 if q>0 and Q=0 if q<=0, where**

$$q_{ijkl} = \zeta \cdot W_{ijkl} + \varepsilon_{ijkl}$$

  - **where W_{ijkl} contains a vector of firm-specific characteristics and locality-specific bank distress characteritics**
  - **Exclusion restriction: probit equation contains at least 1 more variable than main model**

Home countries and host countries



Firm stats, by country

Country	# firms	Small firm	Big firm	Public company	Private company	Sole proprietorship	Privatized	Exporter	Audited	Subsidized	Competition
Albania	260	0.90	0.03	0.01	0.19	0.74	0.06	0.31	0.74	0.04	0.74
Bulgaria	609	0.84	0.03	0.05	0.38	0.51	0.12	0.24	0.42	0.06	0.62
Croatia	372	0.79	0.05	0.06	0.41	0.44	0.23	0.36	0.47	0.18	0.79
Czech Republic	670	0.79	0.04	0.04	0.48	0.41	0.08	0.35	0.43	0.16	0.82
Estonia	557	0.79	0.03	0.13	0.55	0.27	0.11	0.34	0.80	0.14	0.77
Hungary	992	0.80	0.04	0.01	0.32	0.63	0.12	0.36	0.74	0.22	0.88
Latvia	529	0.73	0.04	0.01	0.56	0.36	0.13	0.31	0.68	0.12	0.79
Lithuania	544	0.77	0.02	0.02	0.68	0.24	0.16	0.37	0.40	0.15	0.78
Macedonia	611	0.81	0.03	0.05	0.48	0.32	0.16	0.39	0.54	0.04	0.84
Montenegro	151	0.86	0.01	0.04	0.25	0.71	0.12	0.15	0.48	0.04	0.69
Poland	1,592	0.83	0.02	0.05	0.12	0.78	0.09	0.26	0.37	0.13	0.84
Romania	1,247	0.73	0.04	0.04	0.73	0.17	0.13	0.20	0.37	0.09	0.71
Slovakia	610	0.74	0.05	0.06	0.29	0.54	0.11	0.34	0.55	0.13	0.79
Slovenia	616	0.74	0.05	0.08	0.50	0.29	0.21	0.56	0.43	0.22	0.79
Total	9,360	0.79	0.03	0.05	0.42	0.46	0.12	0.32	0.51	0.13	0.79

Bank ownership and balance sheet data, by country

Country	2005	2008	2005	2008	2005	2008	2005	2008
	% foreign owned bank assets		Equity/assets		Tier 1 capital ratio		Gain on financial assets	
Albania	0.92	0.94	0.065	0.053	8.39	7.88	0.016	-0.067
Bulgaria	0.75	0.82	0.069	0.064	10.10	8.89	0.049	-0.044
Croatia	0.91	0.90	0.067	0.061	7.33	7.59	0.039	-0.027
Czech Republic	0.82	0.86	0.041	0.042	7.74	8.29	0.120	-0.117
Estonia	0.99	0.99	0.047	0.038	8.88	8.71	0.051	-0.029
Hungary	0.83	0.64	0.068	0.065	8.89	8.51	0.021	-0.081
Latvia	0.58	0.64	0.076	0.049	7.98	6.55	-0.004	-0.057
Lithuania	0.92	0.92	0.058	0.054	8.14	8.19	0.041	-0.035
Macedonia	0.51	0.86	0.076	0.071	10.37	8.60	0.052	-0.012
Montenegro	0.88	0.79	0.144	0.094	16.91	9.45	0.197	-0.030
Poland	0.74	0.76	0.082	0.081	10.32	9.39	0.015	-0.041
Romania	0.59	0.87	0.059	0.053	8.31	7.81	0.075	-0.049
Slovakia	0.97	0.99	0.058	0.055	7.93	8.12	0.018	-0.083
Slovenia	0.23	0.29	0.058	0.050	8.83	8.81	0.063	-0.158

Loan demand and supply

	BEEPS 2008		BEEPS 2005	
Country	Need loan	Constrained	Need loan	Constrained
Albania	0.29	0.47	0.68	0.30
Bulgaria	0.58	0.52	0.65	0.36
Croatia	0.59	0.42	0.78	0.14
Czech Republic	0.53	0.32	0.56	0.41
Estonia	0.54	0.27	0.60	0.23
Hungary	0.41	0.31	0.78	0.28
Latvia	0.59	0.48	0.70	0.27
Lithuania	0.60	0.23	0.71	0.30
Macedonia	0.59	0.50	0.68	0.56
Montenegro	0.78	0.48	---	---
Poland	0.53	0.41	0.68	0.45
Romania	0.61	0.33	0.72	0.32
Slovakia	0.53	0.40	0.62	0.21
Slovenia	0.64	0.15	0.72	0.12
Total	0.57	0.37	0.69	0.33

Desirability of bank credit

	Finance = Equity/assets		Finance = Tier 1 capital ratio		Finance = Gains on fin assets	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Finance	-0.027	-0.022	-0.029	-0.003	-0.011	-0.003
	(0.020)	(0.020)	(0.025)	(0.025)	(0.005)**	(0.004)
Small firm	-0.147	-0.147	-0.149	-0.149	-0.145	-0.145
	(0.046)***	(0.046)***	(0.047)***	(0.046)***	(0.046)***	(0.046)***
Big firm	0.100	0.099	0.102	0.099	0.087	0.088
	(0.095)	(0.095)	(0.096)	(0.096)	(0.096)	(0.096)
Public company	-0.047	-0.045	-0.045	-0.045	-0.057	-0.053
	(0.091)	(0.081)	(0.081)	(0.081)	(0.082)	(0.082)
Sole proprietorship	0.165	0.167	0.168	0.167	0.159	0.160
	(0.038)***	(0.038)***	(0.038)***	(0.039)***	(0.038)***	(0.039)***
Privatized	0.113	0.113	0.115	0.114	0.122	0.121
	(0.052)**	(0.052)**	(0.052)**	(0.052)**	(0.053)**	(0.053)**
Exporter	0.191	0.191	0.191	0.190	0.187	0.189
	(0.036)***	(0.036)***	(0.036)***	(0.036)***	(0.036)***	(0.036)***
Audited	0.113	0.112	0.111	0.111	0.107	0.108
	(0.035)***	(0.035)***	(0.035)***	(0.035)***	(0.036)***	(0.036)***
Competition	0.176	0.176	0.176	0.176	0.174	0.175
	(0.039)***	(0.039)***	(0.038)***	(0.038)***	(0.039)***	(0.039)***
Subsidized	0.313	0.315	0.313	0.313	0.314	0.316
	(0.050)***	(0.050)***	(0.050)***	(0.050)***	(0.050)***	(0.050)***
Country fixed effects			Yes			
Year fixed effects			Yes			
Observations	7,004	7,004	7,002	7,002	6,948	4,948
Pseudo R-squared	0.04	0.04	0.04	0.04	0.04	0.04

Rejection rates: Non-parametric estimation

	2005	2008	Difference
Affected localities	0.335	0.402	-0.067***
Non-affected localities	0.319	0.332	-0.013
Difference	0.016	0.070***	-0.054***

Transmission of shocks: cross-border and domestic

- **Model 1: 2008 cross-section data**

$$Y_{ijkl} = \beta_1 \cdot X_{ijkl} + \beta_2 \cdot Finance_{jk} + \beta_3 \cdot D_k + \beta_4 \cdot D_l + \varepsilon_{ijkl}$$

  - **Firm *i*, city *j*, country *k*, industry *l***

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- **Model 2: pooled 2008 and 2005 data**

$$Y_{ijkt} = \beta_1 \cdot X_{ijkt} + \beta_2 \cdot Finance_{jkt} + \beta_3 \cdot D_k + \beta_4 \cdot D_t + \varepsilon_{ijkt}$$

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  - **Firm *i*, city *j*, country *k*, time *t***

- **Model 3: 2008 and 2005 difference-in-differences**

$$Y_{ijkt} = \beta_1 \cdot X_{ijkt} + \beta_2 \cdot Non-Affected \cdot Post + \beta_3 \cdot Non-Affected + \beta_4 \cdot Post + \beta_5 \cdot D_k + \varepsilon_{ijkt}$$

Transmission of shocks: cross-border and domestic

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- **Only on localities with non-zero foreign bank presence**

Loan rejection in 2008: equally weighted financial distress

	Finance = Equity/assets		Finance = Tier 1 capital		Finance = Gains on fin assets	
Finance	0.030	0.021	-0.05	-0.059	0.012	0.009
	(0.035)	(0.035)	(0.066)	(0.066)	(0.011)	(0.011)
Small firm	0.349	0.343	0.349	0.346	0.35	0.33
	(0.082)***	(0.092)***	(0.082)***	(0.093)***	(0.083)***	(0.093)***
Big firm	-0.073	-0.074	-0.062	-0.065	-0.106	-0.105
	(0.188)	(0.190)	(0.188)	(0.190)	(0.192)	(0.194)
Public company	0.404	0.405	0.408	0.411	0.391	0.386
	(0.141)***	(0.142)***	(0.140)***	(0.142)***	(0.142)***	(0.144)***
Sole proprietorship	0.162	0.172	0.16	0.168	0.157	0.177
	(0.082)**	(0.088)*	(0.082)*	(0.089)*	(0.082)*	(0.089)**
Privatized	-0.063	-0.047	-0.07	-0.056	-0.068	-0.043
	(0.097)	(0.102)	(0.097)	(0.102)	(0.098)	(0.104)
Exporter	-0.225	-0.216	-0.223	-0.218	-0.218	-0.196
	(0.075)***	(0.088)**	(0.075)***	(0.088)**	(0.076)***	(0.088)**
Audited	-0.264	-0.239	-0.263	-0.24	-0.265	-0.233
	(0.069)***	(0.073)***	(0.069)***	(0.073)***	(0.070)***	(0.074)***
Inverse Mill's ratio		-0.045		-0.032		-0.088
		(0.141)		(0.140)		(0.144)
Country fixed effects			Yes			
Industry fixed effects			Yes			
Observations	1,951	1,926	1,950	1,925	1,924	1,899
Pseudo R-squared	0.09	0.09	0.09	0.09	0.09	0.09

Loan rejection in 2008: branch-weighted financial distress

	Finance = Equity/assets		Finance = Tier 1 capital		Finance = Gains on fin assets	
Finance	-0.041	-0.047	-0.188	-0.189	0.012	0.01
	(0.035)	(0.035)	(0.065)***	(0.066)***	(0.010)	(0.010)
Small firm	0.346	0.343	0.347	0.343	0.349	0.338
	(0.082)***	(0.092)***	(0.082)***	(0.093)***	(0.083)***	(0.093)***
Big firm	-0.071	-0.076	-0.051	-0.055	-0.107	-0.108
	(0.187)	(0.189)	(0.187)	(0.189)	(0.192)	(0.194)
Public company	0.411	0.414	0.415	0.417	0.392	0.39
	(0.140)***	(0.142)***	(0.141)***	(0.142)***	(0.142)***	(0.143)***
Sole proprietorship	0.163	0.172	0.165	0.174	0.16	0.174
	(0.082)**	(0.089)*	(0.082)**	(0.089)*	(0.082)*	(0.089)*
Privatized	-0.067	-0.052	-0.07	-0.055	-0.066	-0.046
	(0.097)	(0.102)	(0.097)	(0.102)	(0.098)	(0.103)
Exporter	-0.225	-0.22	-0.218	-0.213	-0.218	-0.204
	(0.075)***	(0.088)**	(0.075)***	(0.088)**	(0.076)***	(0.088)**
Audited	-0.266	-0.243	-0.266	-0.242	-0.264	-0.236
	(0.069)***	(0.073)***	(0.069)***	(0.073)***	(0.070)***	(0.074)***
Inverse Mill's ratio		-0.032		-0.033		-0.062
		(0.141)		(0.141)		(0.143)
Country fixed effects			Yes			
Industry fixed effects			Yes			
Observations	1,951	1,926	1,950	1,925	1,924	1,899
Pseudo R-squared	0.09	0.09	0.09	0.09	0.09	0.09

Pooled 2005 and 2008 samples

	Finance = Equity/assets		Finance = Tier 1 capital		Finance = Gains on fin assets	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Post × Finance	0.088	-0.044	-0.118	-0.243	-0.015	-0.018
	(0.064)	(0.032)	(0.063)*	(0.049)***	(0.016)	(0.015)
Finance	-0.076	-0.025	0.008	0.086	0.015	0.015
	(0.054)	(0.034)	(0.039)	(0.036)**	(0.014)	(0.011)
Post	-0.377	0.282	1.039	2.115	0.074	0.074
	(0.549)	(0.210)	(0.548)*	(0.425)***	(0.111)	(0.095)
Inverse Mill's ratio	-0.309	-0.304	-0.294	-0.300	-0.331	-0.321
	(0.078)***	(0.076)***	(0.077)***	(0.077)***	(0.776)***	(0.076)***
Country fixed effects	Yes					
Observations	4,338	4,338	4,337	4,337	4,309	4,309
Pseudo R-squared	0.11	0.10	0.10	0.10	0.10	0.10

2005 vs. 2008: Difference-in-differences

	Finance = Equity/assets		Finance = Tier 1 capital		Finance = Gains on fin assets	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Post × Non-Affected	-0.391	-0.225	0.045	0.031	0.586	-0.094
	(0.126)***	(0.098)**	(0.103)	(0.100)	(0.584)	(0.398)
Non-Affected	0.163	0.190	0.062	-0.063	-0.865	-0.518
	(0.105)	(0.081)**	(0.103)	(0.086)	(0.347)**	(0.208)**
Post	0.152	0.183	0.047	0.043	0.044	0.055
	(0.075)**	(0.087)**	(0.082)	(0.090)	(0.073)	(0.073)
Inverse Mill's ratio	-0.313	-0.320	-0.329	-0.334	-0.346	-0.337
	(0.083)***	(0.083)***	(0.085)***	(0.085)***	(0.083)***	(0.084)***
Country fixed effects	Yes					
Observations	3,656	3,656	3,655	3,655	3,640	3,640
Pseudo R-squared	0.11	0.11	0.11	0.11	0.11	0.11

Transmission of distress by degree of foreign presence I

Panel A. 2008 sample

	Finance = Equity/assets		Finance = Tier 1 capital		Finance = Gains on fin assets	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Finance × Foreign	-0.159	-0.062	0.097	0.310	-0.034	-0.029
	(0.068)***	(0.055)	(0.158)	(0.137)**	(0.019)*	(0.020)
Country fixed effects	Yes					
Industry fixed effects	Yes					
Observations	1,926	1,926	1,925	1,925	1,899	1,899
Pseudo R-squared	0.09	0.09	0.09	0.10	0.09	0.09

Transmission of distress by degree of foreign presence 2

Panel B. 2005 and 2008 samples, difference-in-differences 1

	Finance = Equity/assets		Finance = Tier 1 capital		Finance = Gains on fin assets	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Post × Finance	-0.006	-0.004	0.001	0.002	-0.026	-0.025
× Foreign	(0.016)	(0.015)	(0.011)	(0.011)	(0.012)**	(0.013)*
Country fixed effects			Yes			
Observations	4,288	4,288	4,287	4,287	4,259	4,259
Pseudo R-squared	0.10	0.10	0.10	0.10	0.10	0.10

Transmission of distress by degree of foreign presence 3

Panel C. 2005 and 2008 samples, difference-in-differences 2

	Finance = Equity/assets		Finance = Tier 1 capital		Finance = Gains on fin assets	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Post × Non-Affected	-0.013	0.116	0.257	0.130	-0.521	-0.490
× Foreign	(0.405)	(0.108)	(0.232)	(0.119)	(0.281)*	(0.182)***
Country fixed effects			Yes			
Observations	3,606	3,606	3,605	3,605	3,587	3,587
Pseudo R-squared	0.11	0.11	0.11	0.11	0.11	0.11

Transmission of shocks: differential effects

- **Differential effects equation**

$$Y_{ijkl} = \beta_1 \cdot X_{ijkl} + \beta_2 \cdot Finance_{jk} \cdot Z_l + \beta_3 \cdot D_l + \beta_4 \cdot D_{jk} + \varepsilon_{ijkl}$$

  - **Firm *i***
  - **City *j***
  - **Country *k***
  - **Industry *l***

Differential effects by industry characteristics

	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Tier 1 capital × Asset tangibility 1	-0.359	-0.325		
	(0.217)*	(0.137)**		
Tier 1 capital × Asset tangibility 2			-0.673	-0.527
			(0.170)***	(0.119)***
City fixed effects	Yes			
Industry fixed effects	Yes			
Observations	1,210	1,210	1,210	1,210
Pseudo R-squared	0.16	0.16	0.16	0.16

Robustness: EU countries only

Panel A. 2008 sample

	Finance = Equity/assets		Finance = Tier 1 capital		Finance = Gains on fin assets	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Finance	0.021	-0.078	-0.062	-0.218	0.007	0.010
	(0.040)	(0.043)*	(0.071)	(0.078)***	(0.012)	(0.011)
Country fixed effects			Yes			
Industry fixed effects			Yes			
Observations	1,587	1,587	1,586	1,586	1,565	1,565
Pseudo R-squared	0.09	0.09	0.09	0.10	0.10	0.10

Panel B. 2005 and 2008 samples, difference-in-differences 1

	Finance = Equity/assets		Finance = Tier 1 capital		Finance = Gains on fin assets	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Post × Finance	0.064	-0.056	-0.061	-0.225	-0.017	-0.028
	(0.069)	(0.033)*	(0.066)	(0.053)***	(0.019)	(0.016)*
Country fixed effects			Yes			
Observations	3,658	3,658	3,657	3,657	3,634	3,634
Pseudo R-squared	0.10	0.10	0.10	0.10	0.10	0.10

Panel C. 2005 and 2008 samples, difference-in-differences 2

	Finance = Equity/assets		Finance = Tier 1 capital		Finance = Gains on fin assets	
	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted	Equally-weighted	Branch-weighted
Post × Non-Affected	-0.409	-0.162	-0.108	-0.152	0.691	0.105
	(0.130)***	(0.097)*	(0.111)	(0.089)*	(0.615)	(0.430)
Country fixed effects			Yes			
Observations	3,072	3,072	3,071	3,071	3,056	3,056
Pseudo R-squared	0.11	0.11	0.11	0.11	0.11	0.11

Robustness: Geography and size issues

	2008 sample			
	<3 banks	small firms only	<3 banks and small firms only	euro
Tier 1 capital	-0.321	-0.209	-0.746	
	(0.172)*	(0.079)***	(0.277)***	
Tier 1 capital * euro				-0.196
				(0.138)
Country fixed effects		Yes		
Industry fixed effects		Yes		
Observations	103	1,358	63	1,925
Pseudo R-squared	0.29	0.07	0.36	0.09

Conclusion

- Firms in localities dominated by distressed banks -> higher probability of being constrained in terms of new credit
  - After accounting for non-applicant firms (discouraged vs. healthy)
  - After eliminating common macro, local, and sector unobservables
  - Strongest evidence for Tier 1 capital ratio
- Transmission of shocks to banks‘ balance sheets increases with degree of foreign bank presence
  - Compatible with Cetorelli and Goldberg (2009) and Navaretti et al. (2010) – flows vs. stocks
- Transmission stronger when firms with less tangible assets involved
- Policy implications
  - Procyclicality of capital requirements
  - Forign bank ownership – trade-off between long-term efficiency and short-term capital crunch