Bank bailouts, competitive distortions, and consumer welfare

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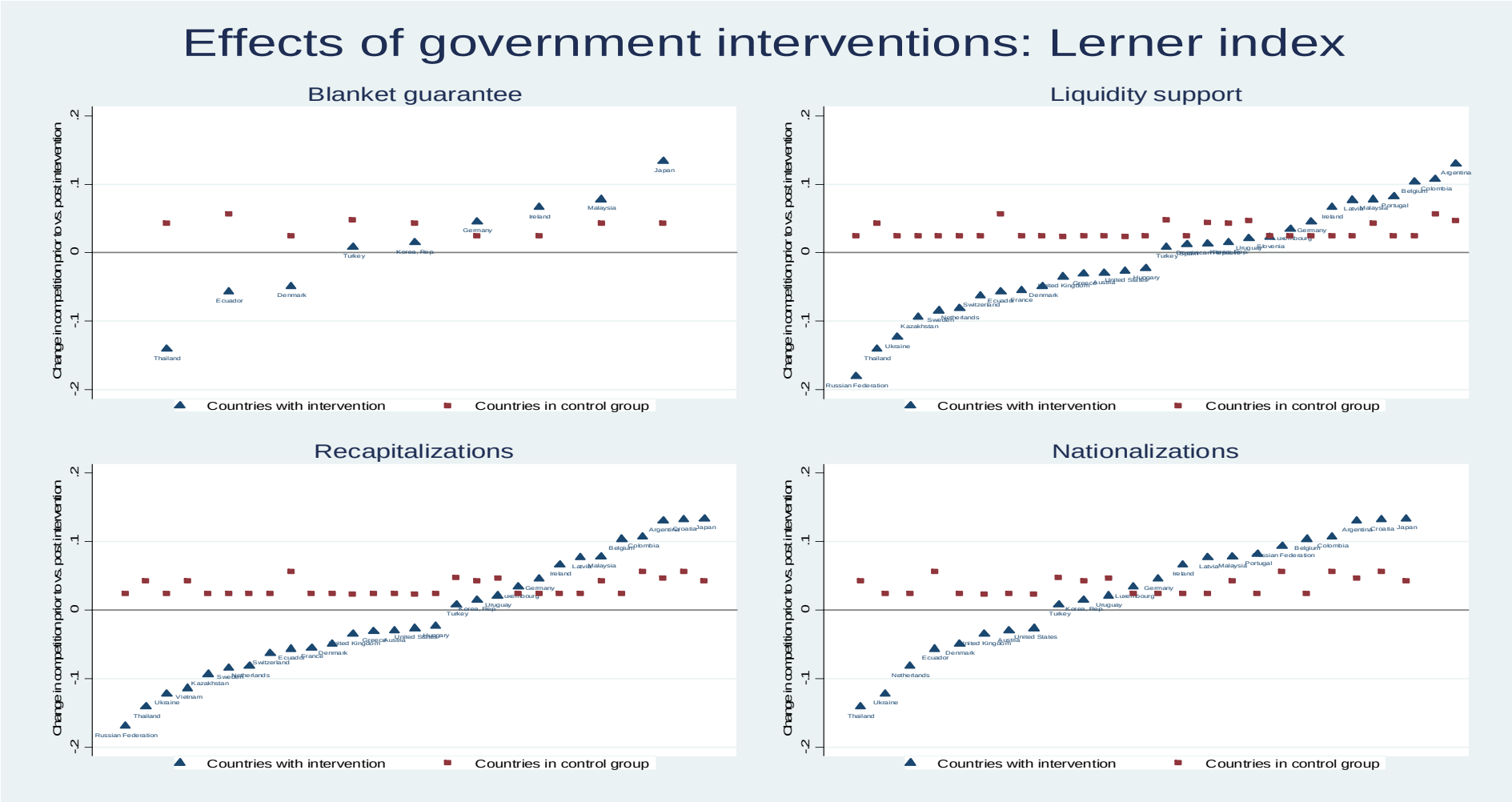
Introduction

- Banking crises result in:
  - *Large-scale and repeated policy responses that affect large numbers of institutions.*
  - *Implications for industry structure and competitive conduct in banking systems over longer periods of time.*
- Typical policy measures during crises:
  - *Blanket guarantees*
  - *Liquidity support*
  - *Capital injections*
  - *Nationalizations*
- This paper raises two questions:
  - *Do government interventions such as blanket guarantees, liquidity support, recapitalizations, and nationalizations impact on competition?*
  - *If so, do these interventions affect borrowers and depositors?*

Data

- Sample: 124 countries, 1996-2010 (annual data)
  - *41 countries with banking crises (Laeven and Valencia, 2008, 2010)*
- Wide array of policy interventions
  - *Blanket guarantees (11)*
  - *Liquidity support (34)*
  - *Recapitalizations (32)*
  - *Nationalizations (26)*
- Measures of banking competition
  - *Lerner index (Mean = 0.24)*
  - *Net interest margin (Mean = 0.06)*
  - *Source of banking data: BankScope*
    - 21,988 banks
    - 181,830 bank-year observations

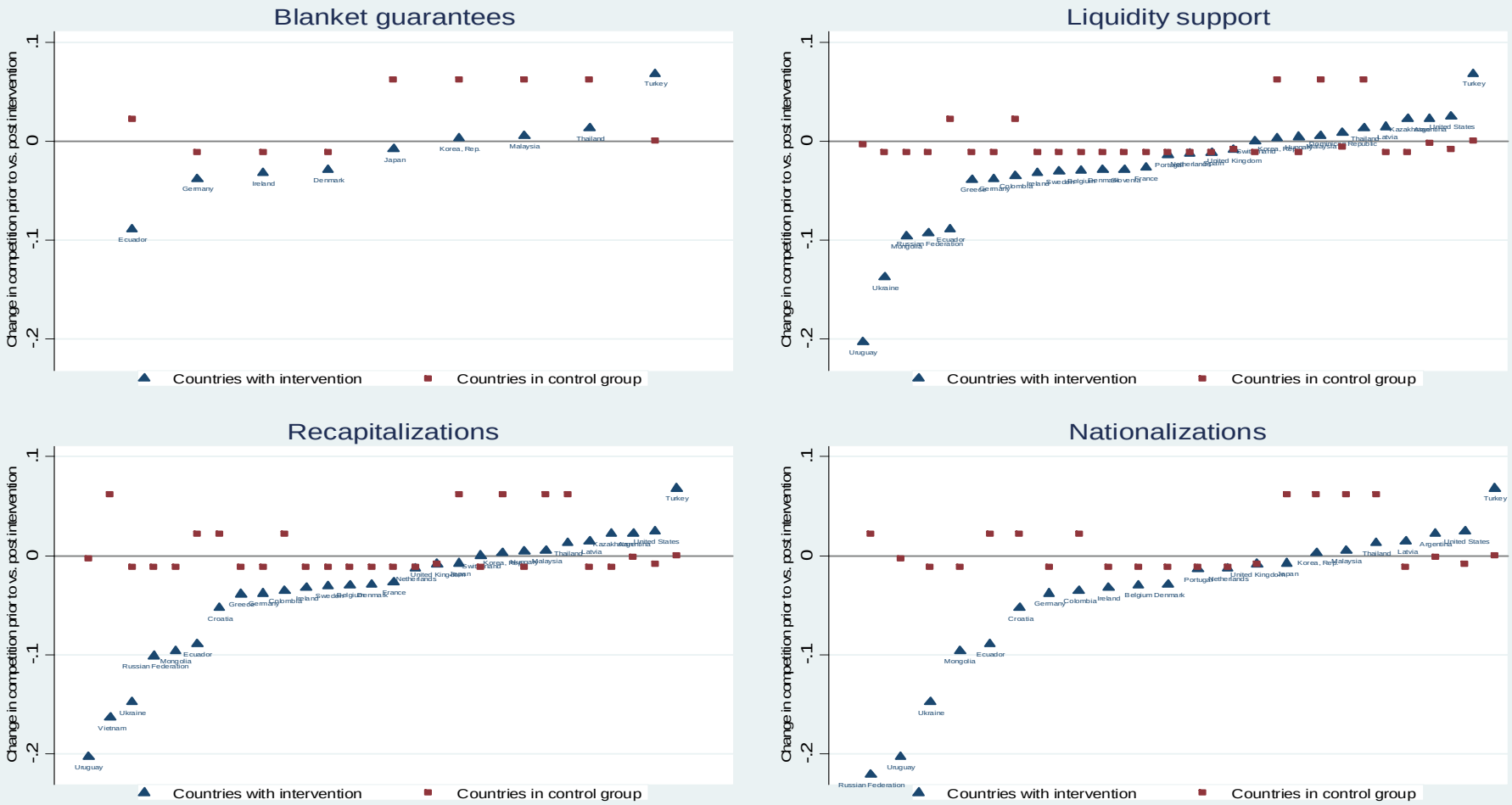
Data: Preliminary inspection



Most countries experience reductions in Lerner indices following interventions.

Data: Preliminary inspection

Effects of government interventions: Net interest margin



Most countries experience reductions in net interest margins following interventions.

Identification strategy

- Difference-in-difference estimation
  - *Compares treatment countries (banking systems with interventions) vis-a-vis control group both before and after treatment.*
  - *Control group: Countries that did not have interventions (i.e., no crises).*
- Regression framework:

$$C_{it} = \alpha + \beta I_{it} + \rho X_{it} + A_s + B_t + \varepsilon_{it}$$

C_{it} *Competition in country i during year t*

I_{it} *Dummy variable equal to 1 in years affected by intervention*

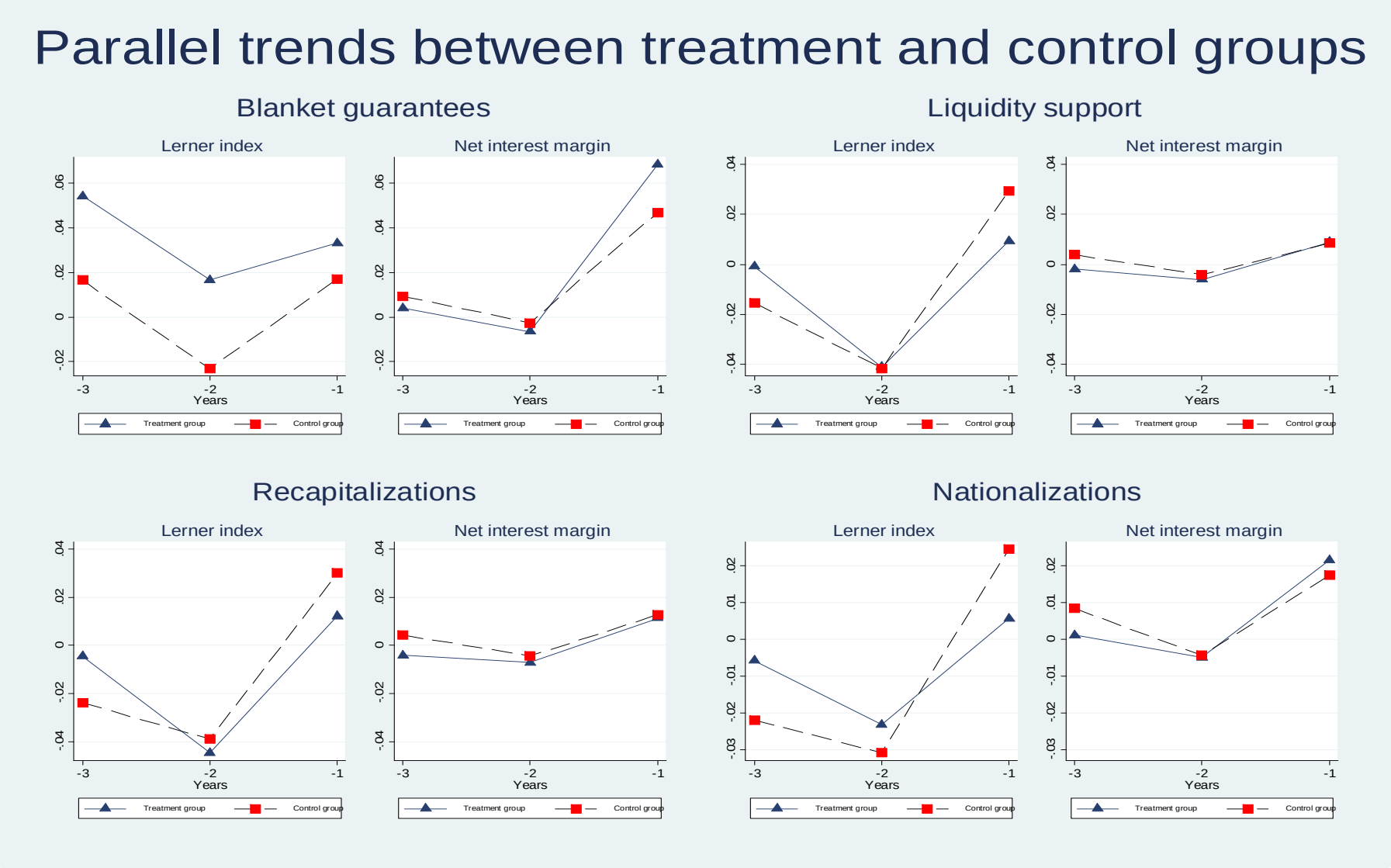
X_{it} *Control variables (GDP growth, inflation, real GDP per capita, concentration (HHI), rule of law, total assets of banking system,…)*

A_s *Country dummies*

B_t *Year dummies*

Assumptions

Difference-in-difference estimators come with two key assumptions.



Main results: Interventions and competition

Panel A: Lerner index					Panel B: Net interest margin			
Total banking system assets (ln)	-0.022**	-0.022**	-0.022**	-0.022**	-0.014	-0.013	-0.013	-0.013
	(-2.29)	(-2.24)	(-2.27)	(-2.29)	(-1.46)	(-1.41)	(-1.43)	(-1.45)
GDP growth	0.148	0.138	0.128	0.153	-0.043	-0.053	-0.06	-0.057
	(1.13)	(1.06)	(0.98)	(1.17)	(-0.65)	(-0.77)	(-0.84)	(-0.81)
Regulatory quality index	0.009	0.004	0.004	0.009	0.001	-0.003	-0.003	-0.004
	(0.36)	(0.15)	(0.17)	(0.37)	(0.06)	(-0.19)	(-0.17)	(-0.23)
Inflation	0.013	0.013	0.013	0.015	0.099**	0.098*	0.098*	0.098*
	(0.41)	(0.40)	(0.39)	(0.45)	(1.99)	(1.96)	(1.96)	(1.95)
Real GDP/capita	-0.000	-0.00[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.000
	(-0.28)	(-0[illegible]						(-1.11)
Concentration (HHI)	-0.034	-0.[illegible]						-0.014
	(-1.52)	(-1[illegible]						(-1.23)
Bank-based financial system	-0.055**	-0.0[illegible]					*	-0.048
	(-2.29)	(-2[illegible]						(-1.13)
Financial development indicator	-0.022	-0.[illegible]						-0.040*
	(-0.98)	(-0.[illegible]						(-1.74)
Blanket guarantee	-0.027				-0.010			
	(-1.16)				(-0.41)			
Liquidity support		**-0.032****				**-0.023***		
		(-2.10)				**(-1.74)**		
Recapitalizations			**-0.037****				**-0.027****	
			(-2.37)				**(-2.08)**	
Nationalizations				-0.004				**-0.034****
				(-0.25)				**(-2.03)**
Observations	1687	1687	1687	1687	1687	1687	1687	1687
R-squared	0.24	0.241	0.242	0.239	0.643	0.645	0.646	0.646
Number of interventions	11	34	32	26	11	34	32	26

Competition increases, reflected in lower Lerner indices and lower net interest margins!

*Notes: Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Country, year, and income category dummies included. Standard errors are clustered on the country level.*

Main Results: Alternative explanations

Are there other forces that can drive the uncovered relationship?

(1) Does the effect simply reflect occurrence of and response to systemic crises?

- *Sample includes only countries experiencing borderline crises.*

(2)Does a drop in interest income during crises mechanically cause reductions in the Lerner index and in net interest margins?

- *Regressions control for loan impairment charges/average gross loans to capture impact of credit risk management on income.*

(3)Does drop in monetary policy rates mechanically reduce Lerner index and net interest margins?

- *Regressions control for policy rates.*

(4) Does the effect reflect reactions to IMF structural adjustment programs?

- *Sample excludes countries with these programs.*

(5) Do the coefficients on interventions reflect 'TBTF' or 'TMTF' effects?

- *TBTF: Sample excludes countries with highly concentrated banking sectors*
- *TMTF: Sample excludes countries whose average total capital ratio is very low.*

- ***Coefficients of interest remain similar in these analyses!***

Main Results: Robustness

- Sensitivity to changes in the sample of countries
  - *Exclude high-income countries:*
    - ***Blanket guarantees become significant.***
  - *Exclude emerging market economies:*
    - ***No changes.***
  - *Exclude countries that experience currency crises:*
    - ***Effect of liquidity support (on net interest margins) becomes insignificant.***
- Causal effects of the interventions: Placebo treatments
  - *Placebo regressions/Falsification exercise*
    - ***Interventions forwarded one period become insignificant.***
- Competition measurement: Panzar and Rosse (1987) H-Statistic
    - ***No changes.***
- Selection problem: Propensity score matching methods
  - *Accounting for non-randomness of interventions*
  - *Propensity score: Probability of being subject to intervention conditional on pre-intervention characteristics*
    - ***Main results largely confirmed.***

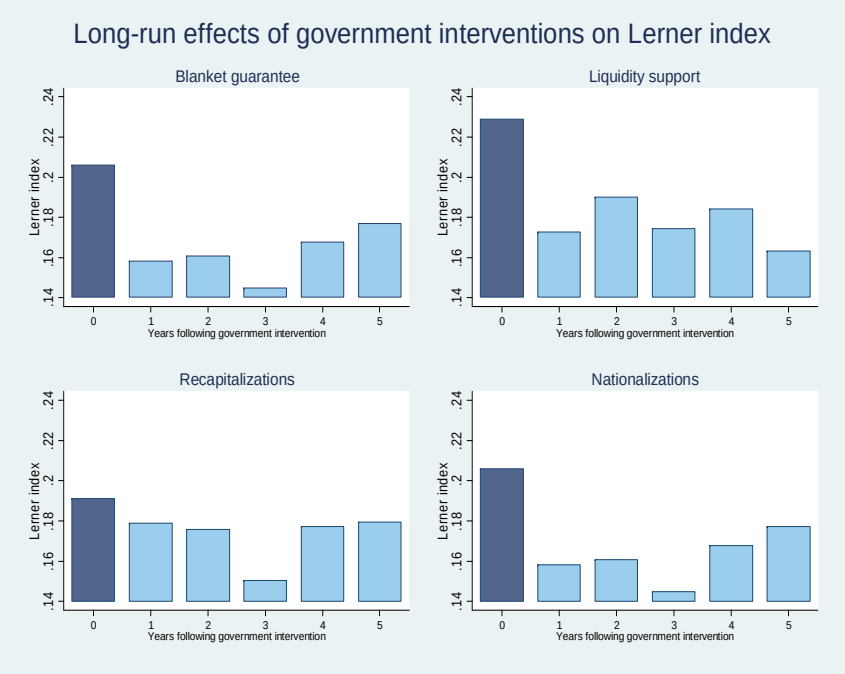
Main Results: Robustness

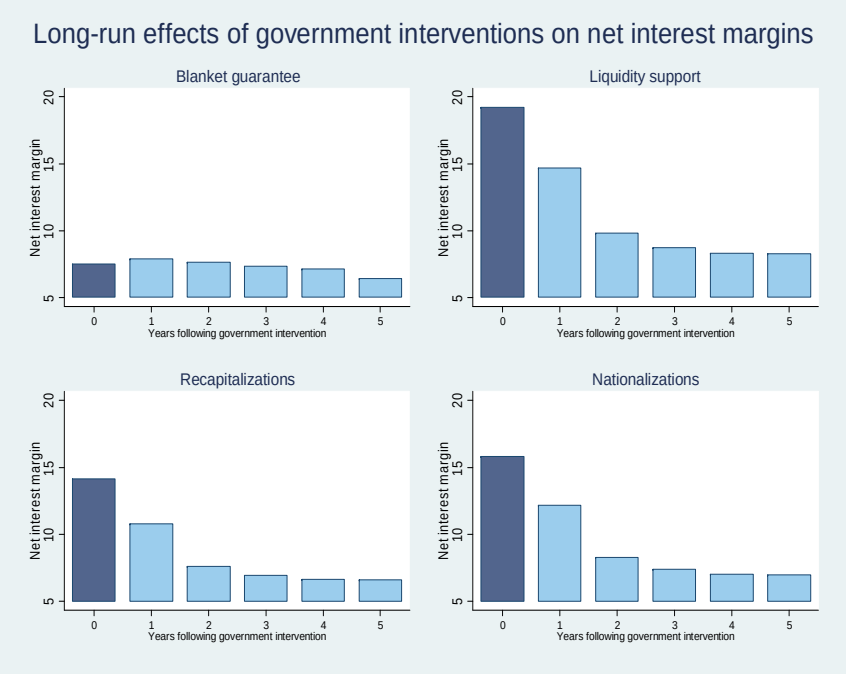
- Instrumental variables estimator
  - *1st Stage: Exploit features of political environment, electoral cycle, stability of banking system*
  - *2nd Stage: Effect of estimated probabilities of interventions on competition*
- Instruments
  - *Electoral cycle (Brown and Dinc, 2005; Dam and Koetter, 2012)*
  - *Fractionalization index (Beck et al. 2001)*
  - *Plurality voting system (Beck et al. 2001)*
  - *Weakness of the financial system: Average capital ratio, and Z-score (Acharya and Yorulmazer, 2008; Brown and Dinc, 2011)*

- ***Results from difference-in-difference estimation confirmed!***
- ***Instruments satisfy IV diagnostics!***

Main Results: Long-run analysis

- Average duration of interventions goes beyond crises duration.
  - *Begs the question of what the long-run effects are on competition.*





- ***Lerner indices tend to remain below the initial level after interventions.***
- ***Net interest margins remain compressed over the following years.***
- ***No reversal.***

Theories: The role of transparency

- Transparency and more disclosure requirements mitigate effect of bailouts which undermine market discipline *(Hakenes and Schnabel, 2010)*.
  - *Depositors observe bank risk in transparent systems and discipline banks if they compete aggressively.*
  - *In opaque banking systems, it is difficult to infer information about banks' condition, so that the effect of market discipline remains muted.*

- **Transparency index** (Index range 0-5, two components).
  - *Dummy variable that takes on the value one if a compulsory external audit is required.*
  - *Bank accounting index that is increasing in the quality of bank accounts.*
    - *Information about whether income statement includes accrued or unpaid interest or principal on nonperforming loans and whether banks produce consolidated statements.*

- **Results are consistent with theory.**

Theories: The role of transparency

	Panel A: Lerner index				Panel B: Net interest margin			
Transparency index	-0.009	-0.012	-0.01					007*
	(-0.96)	(-1.18)	(-1.09					.71)
Blanket guarantee	-0.217							
	(-1.12)							
Blanket guarantee × Transparency	0.044							
	(0.96)				-1.82			
Liquidity support		**-0.180****				**-0.116****		
		(-2.33)				(-2.44)		
Liquidity support × Transparency		**0.036****				**0.025*****		
		(2.13)				(2.78)		
Recapitalizations			**-0.217****				**-0.100***	
			(-2.24)				(-1.76)	
Recapitalizations × Transparency			**0.040***				**0.022***	
			(1.78)				(1.77)	
Nationalizations				**-0.190****				**-0.140*****
				(-2.22)				(-3.22)
Nationalizations × Transparency				**0.042****				**0.029*****
				(2.18)				(3.44)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1142	1142	1142	1142	1142	1142	1142	1142
R-squared	0.317	0.318	0.32	0.318	0.717	0.718	0.717	0.718
Number of interventions	9	26	25	21	9	26	25	21

Competition increases, but impact is mitigated as transparency increases.

*Notes: Robust t-statistics in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Country, year, and income category dummies included. Standard errors are clustered on the country level.*

Theories: Zombie Banks

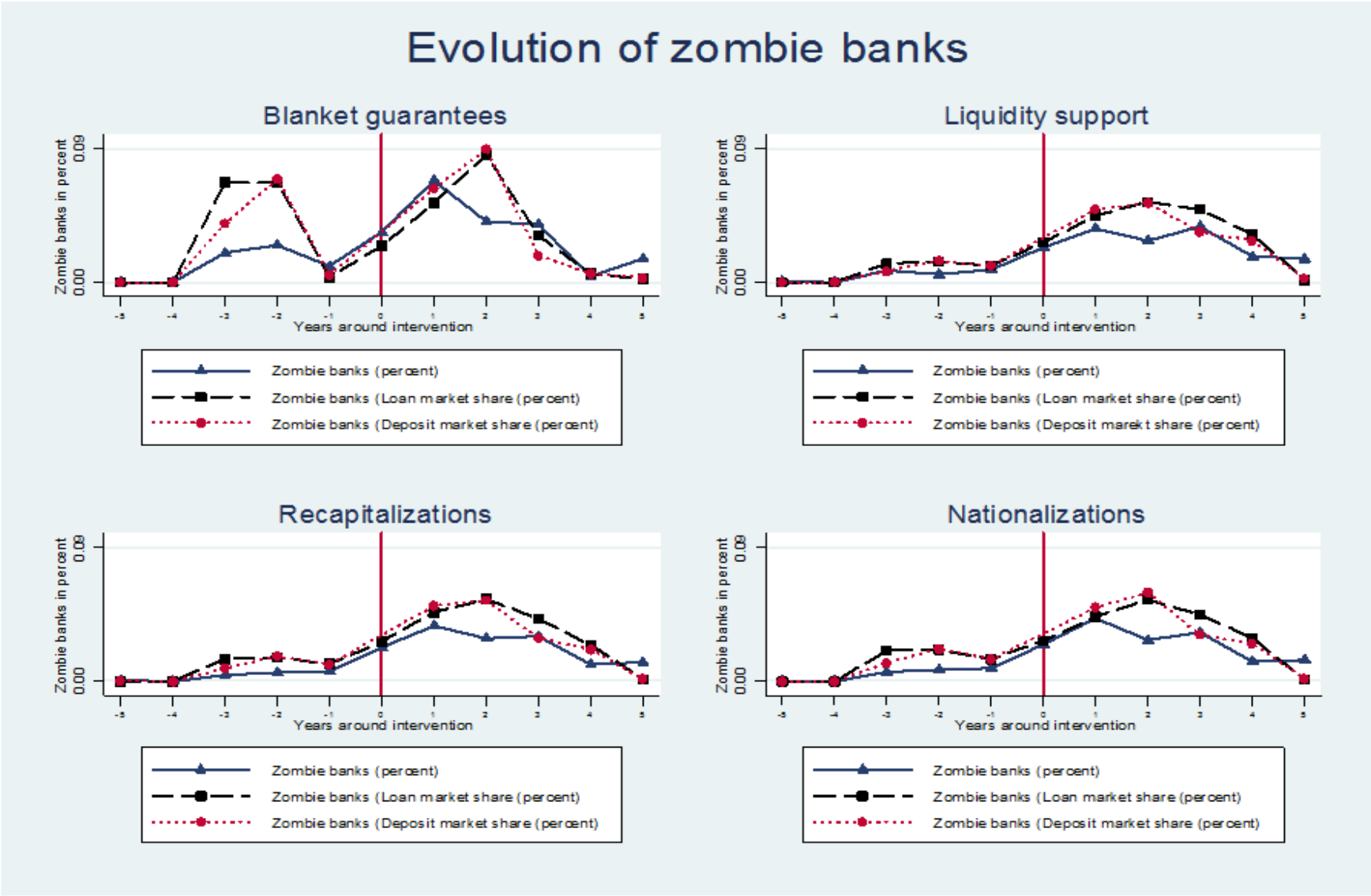
- Is the intervention-competition relation driven by zombie banks?
- Interventions may delay orderly exit of insolvent banks.
  - *Insolvent banks continue operating despite economic non-viability.*
  - *Interventions deter creditors from resolution of insolvent banks (Kane, 1990).*
  - *Zombie banks continue originating risky loans with large upside potential.*
- Measuring zombie banks:
  - *Tangible capital (Kroszner and Strahan, 1996).*
    - Tangible capital equals common equity minus intangible assets. Intangible assets comprise good will, other intangibles, and deferred tax assets.
  - *Zombie banks = Institutions with negative tangible capital.*
  - *Indicators:*

    (i) Proportion of zombie banks

    (ii) Share of loans provided by zombie banks

    (iii) Share of deposits into zombie banks

Theories: Zombie Banks



Notes: We present the information around a time window of -5 and +5 years, centered on the announcement year. Zombie banks are defined as banks with negative tangible capital ratios. Tangible capital equals common equity minus intangible assets. Intangible assets comprise good will, other intangibles, and deferred tax assets.

Theories: Zombie Banks

	Panel A: Number of zombie banks/Total number of banks				Panel B: Loan market share of zombie banks				Panel C: Deposit market share of zombie banks			
Blanket guarantee	0.028				0.002				0.001			
	(1.18)				(0.10)				(0.05)			
Liquidity support		**0.022****				**0.025***				**0.022***		
		(2.35)				(1.77)				(1.72)		
Recapitalizations			**0.022****				**0.025***				0.022	
			(2.24)				(1.69)				(1.61)	
Nationalizations				**0.018***				0.013				0.013
				(1.73)				(1.01)				(0.95)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1528	1528	1528	1528	1528	1528	1528	1528	1528	1528	1528	1528
R-squared	0.199	0.203	0.20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.273
Interventions	9	30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Notes: Robust t-statistics in parentheses. [illegible] errors are clustered on the country level.

Density of zombie banks correlated with interventions. Liquidity support enhances market shares of zombie banks, and recapitalizations raise zombie banks' loan market share.

- **Results suggest zombie bank presence correlates with interventions!**

Interventions and borrower and depositor welfare

- Financial intermediaries' *raison d'être* is to mobilize savings, evaluate projects, and allocate funds to borrowers to facilitate economic growth.

- Which parties benefit from competition: Depositors or borrowers?
  - *Jayaratne and Strahan (1998): Effects of increased competition following deregulation in U.S. banking on deposit and loan rates.*
- Equally important is to test whether government interventions have implications for
  - *Provision of credit*
  - *Access to finance*

Interventions and borrower and depositor welfare: Deposit and loan rates

Subpanel: Deposit rates					Subpanel: Loan rates			
Blanket guarantee	**-0.148****				-0.041			
	(-2.00)				(-0.74)			
Liquidity support		**-0.050***				**-0.056***		
		(-1.87)				(-1.80)		
Recapitalizations			-0.031				**-0.035***	
			(-1.16)				(-1.66)	
Nationalizations				**-0.062***				**-0.069***
				(-1.82)				(-1.91)
Control variables	Yes	Yes						Yes
Obs								3
R-sc								4
Num								1

*Notes: Robust t-statistics in parentheses. *** p<0.01, ** p<0 re clustered on the country level.*

Rescues enhance banks' market power

- *Value of a bank charter increases as a support due to lower refinancing costs (I et al., 2011).*

Negative and significant coefficient for liquidity support and nationalizations in the loan rate equation.

- *Sapienza (2004): Loans originated by state-owned banks carry lower rates.*
- *Black and Hazelwood (2011): Small banks that received TARP funds charge lower rates.*

Credit provision and access to finance: Intuition

Credit provision

- Crises periods characterised by increased risk-aversion and tightening up underwriting standards.
  - *Dell'Ariccia and Marquez (2006), Ivashina and Scharfstein (2010).*
- Demand effects reflected in reduced lending.

Access to credit

- Competition reduces the possibility banks recoup the costs involved in building relations with borrowers *(Petersen and Rajan, 1995)*.
- Competition is associated with lower loan rates which makes credit more affordable and also increases lending and access to finance.
  - *Cestone and White (2003) show that banks exhibit a reduced willingness to lend to new borrowers in uncompetitive markets because their existing lending relationships are valuable.*

Credit provision and access to finance: Results

	Panel A: Domestic credit provided by banking sector (percent of GDP)				Panel B: Bank Branches/Population (ln)				Panel C: Number of banks/Population (ln)			
Blanket guarantee	0.135				**-0.262*****				-0.15			
	(1.18)				(-5.64)				(-1.20)			
Liquidity support		**0.146*****				**-0.168*****				**-0.172***		
		(3.04)				(-3.44)				(-1.81)		
Recapitalizations			**0.101****				**-0.183*****				**-0.158***	
			(2.16)				(-3.51)				(-1.72)	
Nationalizations				**0.139****				**-0.222*****				**-0.188*****
				(2.39)				(-4.32)				(-2.20)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1687	1687	1687	1687	598	598	598	598	1033	1033	1033	1033
R-squared	0.943	0.945	0.944	0.944	0.982	0.982	0.982	0.982	0.964	0.964	0.964	0.964
Number of interventions	11	34	32	26	3	19	16	12	10	23	24	20

Liquidity support, recapitalizations and nationalizations prop up financing condit reflected in rising domestic credit.

Interventions come at a cost in terms of access:
All measures significantly reduce branch penetration.
Bank density correlates negatively with all interventions but blanket guarantees.

Policy implications

- Competitive conduct in banking following episodes of distress is conditional on the policy responses taken by the government.
  - *Consider sunset clauses at the time when policy measures are announced.*
  - *Benefits from restoring confidence in banking need to be balanced against the long-run effects on competition.*
- Government interventions have non-negligible ramifications for borrower and depositor welfare.
  - *Policymakers should aim to reduce the duration of the government interventions.*
  - *Policymakers need to consider steps that counterbalance negative effects of interventions for access to finance for small informationally opaque borrowers.*