The Impact of Public Guarantees on Bank Risk Taking: Evidence from a Natural Experiment

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Research question

- **Do public guarantees of banks increase or decrease risk taking?**
  - *Increase* risk taking: moral hazard, no incentives for depositors or other creditors of the bank to monitor (Merton, 1977; Ruckes, 2004)
  - ***Reduce*** **risk taking: higher charter value through lower refinancing costs. Public guarantees provide an implicit subsidy to banks (Keeley, 1990, Cordella and Yeyati, 2003)**

Tricky identification problem

- **Little time series variation in the presence of public guarantees and if there is time series variation (e.g. privatization or blanket guarantees), many other things change simultaneously**
- **Within country regressions comparing insured versus non-insured banks may suffer from endogeneity, as public guarantees are not randomly assigned.**
- **Cross country regressions may be unable to disentangle institutional differences across countries from the effect of public guarantees per se.**
- **Even if explicit public guarantees are removed for large banks, they may continue to be implicitly insured. Gropp et al. (2009) show that implicit insurance may have similar effects to explicit public guarantees.**

Identification strategy in this paper

- **Based on a European court decision in 2001, the public guarantees for all savings banks in Germany were removed.**

- **How did the savings banks react to this change?**
  - **customer credit risk**
  - **loan size**
  - **interest rate spreads charged**

Empirical strategy

- **We use the removal of guarantees of German savings bank as a *natural experiment* to analyze the effects of guarantees**
- **Law suit filed in April of 2000 with the European Court of Justice: federal guarantees of savings banks violate the subsidy rules of the EU**
- **Decision in July 2001: court ruled that the federal guarantee has to be discontinued**
- **The removal was not prompted by a financial event, but *exogenously* imposed by the court decision**

Empirical strategy

- **The court decision removed guarantees for a set of relatively small banks (unlikely to be TBTF)**
- **We can measure the risk taking relatively well for these banks, as they tend to have little off-balance sheet activities and largely engage in loans to households and small and medium size enterprises**
- **The data set contains bank/customer matched information**
- **We have the complete set of SME customers for which can calculate Z-scores (risk) and other loan characteristics (interest rates, loans sizes)**
  - Caveat: we do not have household information

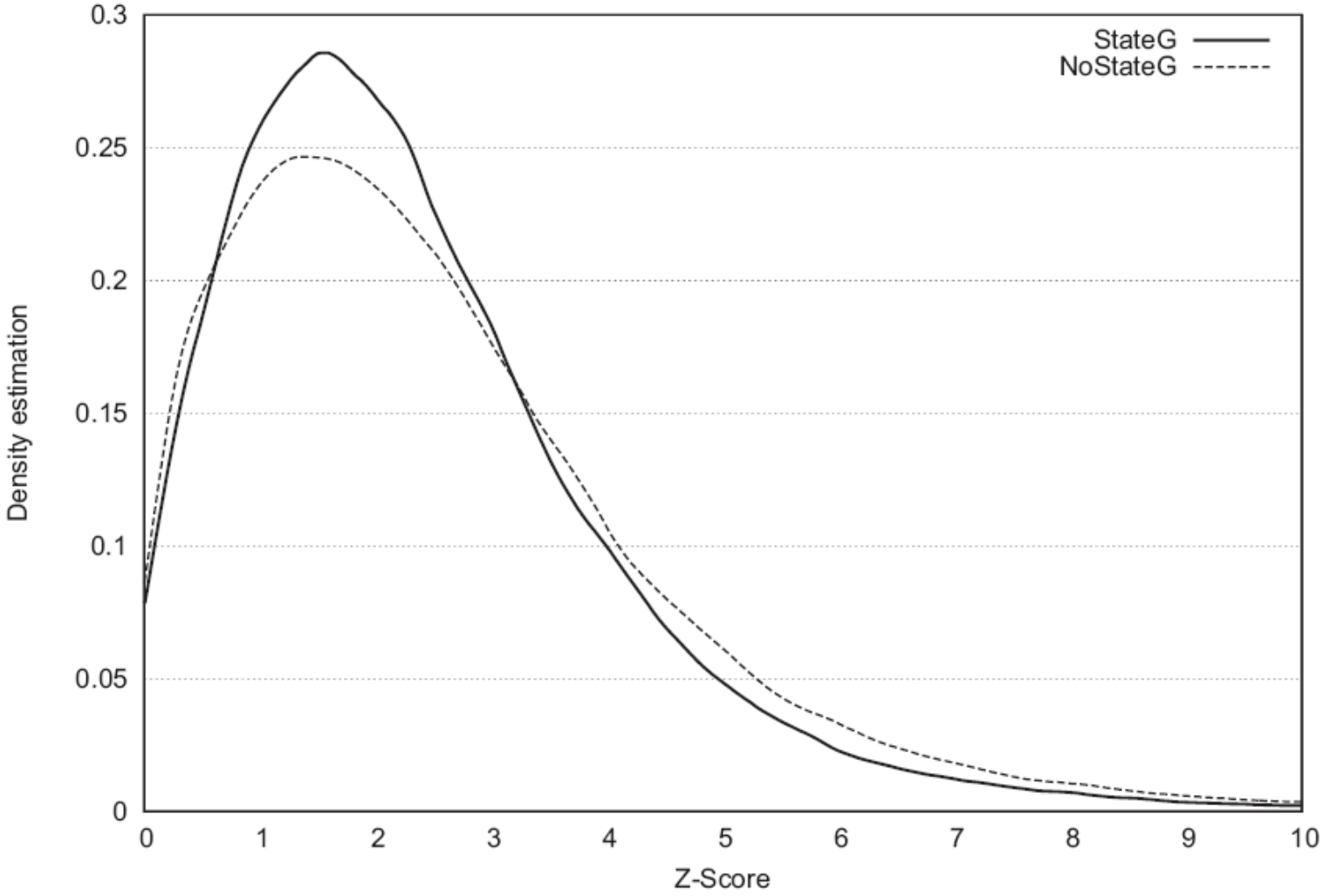
Description of the data set

- Data set from the German savings banks association (DSGV)
- Annual financial statements for all commercial loan customers of all savings banks plus the banks' balance sheets
- Time period: 1996-2006 -> equally distributed around date of removal of state guarantees (no major financial system incidence in Germany)
- 230,562 borrower-year observations for 87,702 borrowers

Descriptive statistics

	1996-2000	2001-06	Difference
Z-Score	2.36	2.56	0.20***
Loan size (€mn)	0.582	0.504	-0.078***
Interest rate spread (%)	5.94	7.06	1.12***

Change in risk



Higher risk ⟷ Lower risk

Baseline results

Independent variables	Z Score	Loan size	Interest rate spread
Panel A: Standard OLS			
NoStateG	0.172***	-0.077***	0.569***
Z Score		-0.084***	0.674***
Loan size	-0.332***		-1.164***
Interest rate spread	0.007***	-0.003***	
Total bank assets	0.004	0.008**	0.027
Downgrade	0.084***	0.021	-0.141
Indebtedness	-0.247***	-0.049	0.026
Local GDP	0.001	-0.002*	0.004
Δ GDP	0.904	0.379	-2.205
Direct competition	-0.219**	0.029	0.131
Number mergers	-0.026*	-0.014*	-0.133
Risk-free interest rate	-0.055***	0.018***	-0.577***
Intercept	2.270***	0.438***	4.125***
Observations	230,562	230,562	230,562
$Adj.R^2$	0.102	0.080	0.014

Economic significance

- Z-Score: 7% higher (less risky)
- Loan size reduction: Euro 77,000 or 13%
- Interest rate spread: plus 57 basis points or 10%

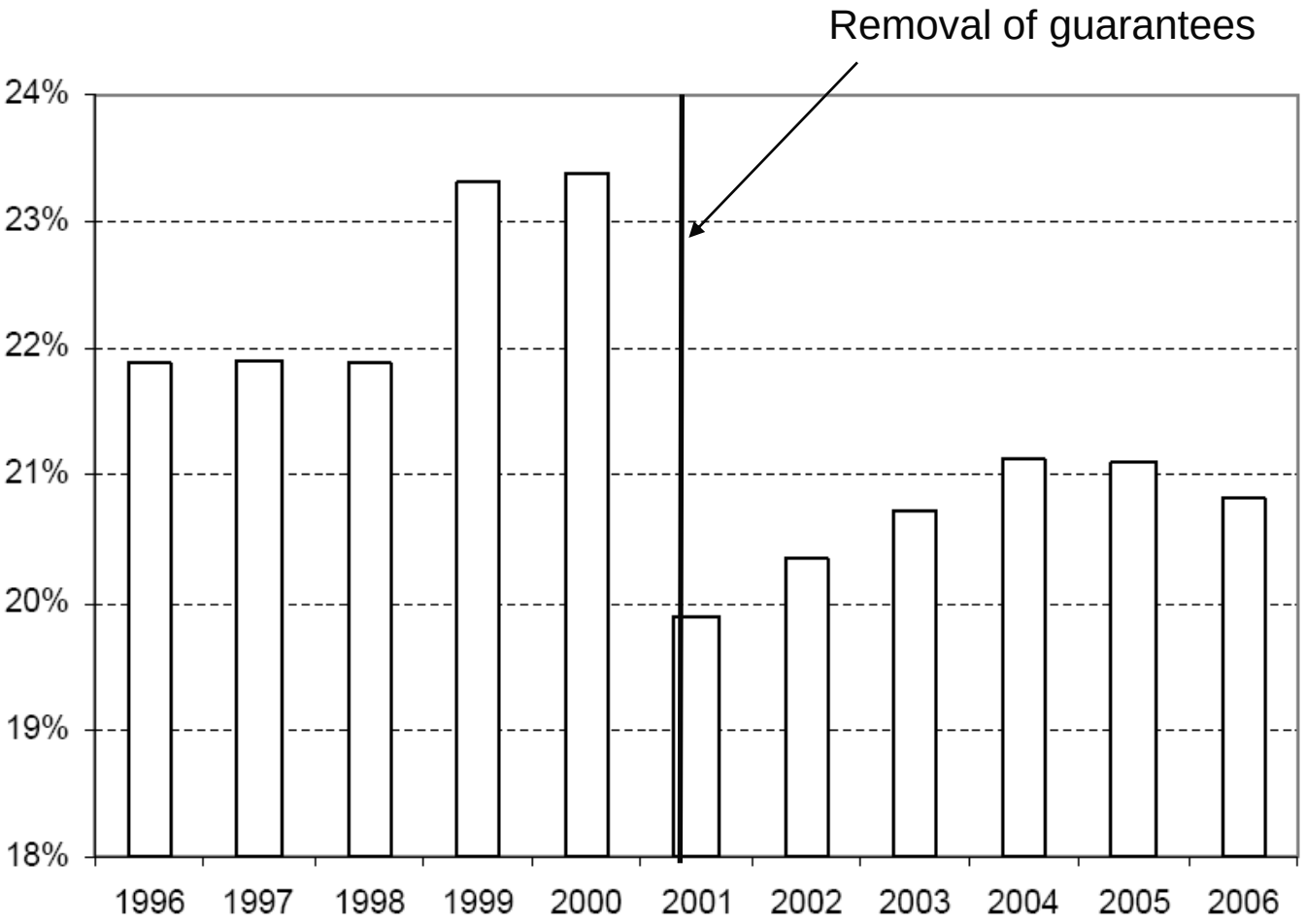
=> Riskier borrowers were either denied credit or were given a smaller and more expensive loan

=> Evidence in favour of moral hazard and against the subsidy effect

Issue: Is this just a time series trend?

Economic development in Germany

Market share of savings banks in Germany



Identification in the cross section

We use two difference in differences specification to attempt to identify the effects of public guarantees with cross sectional variation among savings banks.

- **Check whether those savings banks for whom the value of the guarantees was higher ex ante, react more strongly to their removal**
- we proxy for the ex ante value of guarantees in two ways:
  - affiliated with a “Landesbank” that was downgraded more severely after the removal (skip here)
  - were riskier before removal of the guarantees

Difference-in-differences specification

We divide the sample into riskier and less risky savings banks before removal of the guarantees (split at the mean).

If moral hazard was dominant before removal, riskier banks should react more strongly to the removal.

If the subsidy effect was important, we would not necessarily expect a difference between the two groups.

We estimate:

$$Y(i,t) = \alpha + \beta_1\ NoStateGXHighRisk(g,t)$$
$$+ \beta_2\ NoStateGXLowRisk(g,t) + \beta_3\ StateGXLowRisk(g,t)$$
$$+ \gamma_1\ X_1(i,t) + \gamma_2\ X_2(g,t) + \gamma_3\ X_3(t) + \varepsilon(i,t).$$

Higher ex ante risk

Independent variables	Z Score	Loan size	Interest rate spread
(1) NoStateGXHighRisk	0.257***	-0.093***	0.743***
(2) NoStateGXLowRisk	0.456***	-0.017	1.136***
(3) StateGXLowRisk	0.382***	0.045	0.767**
Z Score		-0.085***	0.666***
Loan size	-0.334***		-1.170***
Interest rate spread	0.007***	-0.003***	
Total bank assets	-0.009**	0.005	0.001
Downgrade	0.069***	0.017	-0.171
Indebtedness	-0.165***	-0.025	0.188
Local GDP	0.005***	-0.001	0.011
Δ GDP	0.837	0.363	-2.341
Direct competition	-0.076	0.067	0.415
Number mergers	-0.008	-0.011	-0.098
Risk-free interest rate	-0.057***	0.018***	-0.581***
Intercept	1.959***	0.378***	3.521***
Difference (1)	0.257***	-0.093***	0.743***
Difference (2)-(3)	0.073**	-0.062*	0.369**
Difference-in-differences (1)-[(2)-(3)]	0.184***	-0.031	0.374*
Observations	230,562	230,562	230,562
$Adj.R^2$	0.105	0.081	0.014

Screening versus monitoring

Year	Average Z-Score	
	New borrowers	Existing borrowers
Panel A: Before the removal of guarantees		
1996	2.94	2.80
1997	3.04	2.80
1998	3.07	2.77
1999	3.19	2.79
2000	3.21	2.83
(1) Average	3.09	2.80
Panel B: After the removal of guarantees		
2001	3.33	2.90
2002	3.24	2.95
2003	3.39	3.06
2004	3.47	3.22
2005	3.75	3.28
2006	3.96	3.48
(2) Average	3.59	3.15
Difference (2) - (1)	0.49***	0.36***
t statistic	(6.27)	(11.16)
Difference-in-differences	0.13*	
p value, Wald test	(0.056)	

Robustness checks

Results do not change if we

- use savings bank fixed effects
- use different sample selection procedures
- exclude the years 2000 and 2001
- use a seemingly unrelated regression (SUR) model to account for the simultaneity of the risk, loan size, and interest rate decisions by banks
- account for subsequent changes in the regulatory framework for savings banks

Finally, we also show that overall loan volumes decline more for banks with a higher ex ante value of a guarantee.

Conclusion

- Savings banks reacted to the removal of public guarantees by
  - Credit risk (-)
  - Loan size (-)
  - Interest rate spreads (+)
- Effects were larger for banks that ex ante benefited more from the guarantee
- Banks tightened both monitoring and screening
- Moral hazard effect of public guarantees seems to dominate subsidy effect
- Are these results applicable to other banks?